1897.

NEW SOUTH WALES.

VOTES

AND

PROCEEDINGS

OF THE

LEGISLATIVE ASSEMBLY

DURING THE SESSION

OF

1897,

WITH THE VARIOUS DOCUMENTS CONNECTED THEREWITH.

IN SEVEN VOLUMES.

VOL. V.

SYDNEY:
WILLIAM APPLEGATE GULLICK, GOVERNMENT PRINTER, PHILLIP-STREET.

1898

458 (*e*)

1897.

LEGISLATIVE ASSEMBLY.

NEW SOUTH WALES.

VOTES AND PROCEEDINGS.

SESSION 1897.

(IN SEVEN VOLUMES.)

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1897.

LEGISLATIVE ASSEMBLY.

NEW SOUTH WALES.

NINTH REPORT

OF THE

METROPOLITAN BOARD OF WATER SUPPLY AND SEWERAGE,

From 1st July, 1896, to 30th June, 1897.

Printed under No. 26 *Report from Printing Committee,* 9 *December,* 1897.

SYDNEY: WILLIAM APPLEGATE GULLICK, GOVERNMENT PRINTER.

1897.

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1897.

LEGISLATIVE ASSEMBLY.

NEW SOUTH WALES.

METROPOLITAN BOARD OF WATER SUPPLY AND SEWERAGE.

(NINTH REPORT, FROM 1ST JULY, 1896, TO 30TH JUNE, 1897.)

Printed under No. 26 Report from Printing Committee, 9 December, 1897.

To the Honorable the Secretary for Public Works,—

17 September, 1897.

Sir,

The Board of Water Supply and Sewerage have the honor to submit to you their Ninth Report, embracing the period from 1st July, 1896, to 30th June, 1897.

WATER SUPPLY.

2. The average daily consumption of water per head of estimated population supplied was 42·2 gallons, as against 40·76 gallons during the year 1895–6. The average daily supply was 17,659,357 gallons, and the estimated population supplied 418,512.

3. During the year 2,131 houses were connected to the water supply, making a total at present supplied of 87,190 houses.

4. The work of main-laying was pushed on energetically during the twelve months, more particularly during the dry summer months, when the demand for water supply to new districts was so great as to severely test the efficiency of the staff, which, however, proved fully equal to the occasion. The total length of new mains laid was 55½ miles; of this length, over 20¾ miles were of sizes ranging from 9 inches to 20 inches in diameter. One hundred and seven screw-down and 839 ball hydrants were fixed. The total length of water-mains, exclusive of trunk mains, now under the Board's control, is 946¾ miles, with 1,715 screw-down and 17,743 ball hydrants.

5. A considerable amount of useful work has been carried out on the upper canal, consisting of the clearing of the Nepean and Cataract tunnels of debris which has been accumulating for years, cleaning and painting the wrought-iron aqueducts, repairing and painting bridges and flumes, extending the relining of the canal below Kenny Hill, renewing fences and fixing light iron gates in lieu of slip-rails.

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6. The reservoir constructed alongside the canal at 34 miles for the supply of the town of Liverpool was emptied and thoroughly cleaned, and several large holes filled, which has improved the condition of the water.

7. Owing to the severe drought through which the Colony passed during last summer, and to the increase in the consumption of water in the city and suburbs, which rose to over 23,000,000 gallons per day for several days, the level of the water in the Prospect storage reservoir fell 11·15 feet below top-water level, which caused an extensive settlement to take place in the embankment. Steps were at once taken to open up and repair the defect, which work is now nearing completion. Notwithstanding the severe test which the bank has had to endure, it is satisfactory to note that no other sign of weakness has been displayed.

Repairs have been carried out at the quick-race at the intake of the reservoir, and the outlet pipes at the intake house strengthened by being surrounded by concrete.

The canal and pipe-line between prospect and Potts' Hill Reservoirs have been maintained in an efficient condition. A slip occurred at 45½ miles, and was promptly repaired. A new offtake for the supply of the district of Prospect and Sherwood was fixed in the canal at the intersection of the Parramatta-Smithfield road.

8. The increase in the consumption during the height of the summer emphasised the necessity for some further provision being made without delay for bringing a greater quantity of water to the Potts' Hill Reservoir; the Board is, however, pleased to know that the necessary funds have been made available, and the matter dealt with by the Public Works Parliamentary Committee, and it is hoped that every expedition will be used to press the work forward.

9. The Potts' Hill Balance Reservoir is in good condition, the gauze-wire on the frames of the screening chamber is being renewed, and the valves and electrical fittings have been maintained in a satisfactory state.

10. No fractures or bursts of any kind occurred on the trunk mains, and the whole of the reticulation mains are in good condition.

11. The following improvements have been carried out in connection with existing supplies :—A duplicate 18-inch trunk main from Chatswood tanks *via* Mowbray-road for the supply of North Sydney; new trunk main from Waverley Reservoir along Frenchmen's road to Randwick; new trunk main for the supply of the Illawarra suburbs, together with new pumping plant at Carlton, and large steel reservoir at Penshurst; new trunk mains branching off the 48-inch main from Potts' Hill for the benefit of the high levels of Ashfield, Homebush, Strathfield, and surrounding localities, also to districts of Enfield, Canterbury, and Belmore. Work is now in progress for providing a second trunk main for the lowlevels of Leichhardt and Balmain; the supply to the higher portions of these two districts will be dealt with when the Centennial Park Reservoir is completed.

Within the city boundary improvements have also been effected, particularly in the Pyrmont, Haymarket, and Christ Church districts.

12. The wisdom of the action of the Board in insisting upon the adoption of an uniform pattern of water-meter for general use has been amply proved by the large reduction in the number of meters now forwarded to the Crown-street shops for repairs.

The

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The system of hiring out meters to consumers at a low rental finds increased favour yearly; 849 meters of various sizes having been issued on this system during the year, making the total number of hired meters now fixed 2,161. So satisfactory has this system proved that the Board has been enabled to reduce the rentals formerly charged by 25 per cent.

The number of meters fixed during the year was 957, 168 were removed; the net increase being 789. The total numbers of meters now fixed is 6,780.

13. In the last report of the Board, allusion was made to the great increase in the quantity of water supplied free to Charitable Institutions and Public Hospitals, and since the date of that report a still further rise has taken place, the consumption during the past year having reached the enormous quantity of 51,360,000 gallons, representing a value of £2,568.

As this was felt to be a severe tax upon the Board's resources, it was deemed advisable to make a comprehensive inquiry into the whole question of the services rendered free by the Board, and steps were taken to gauge the supply in cases where no meters are fixed, such as street washing and watering, &c. The result is tabulated below:

For what purpose supplied.	Quantity in gallons per annum.	Value.		
		£	s.	d.
Charitable Institutions and Public Hospitals	51,360,000	2,568	0	0
Public Parks and Gardens	13,566,000	678	6	0
Street washing and watering, and flushing gutters and gulleys ...	314,453,000	15,722	13	0
Watering tramway tracks	6,000,000	300	0	0
Municipal Baths, Parramatta	1,440,000	72	0	0
Her Majesty's ships of war	3,898,000	194	18	0
	390,717,000	19,535	17	0

The above figures do not represent rates, but the value of water actually supplied, most of which also is distributed from high-level reservoirs, and is consequently expensive on account of the pumping it entails; and it does seem unfair that the Board should be compelled to expend a considerable sum annually in pumping and distributing an absolutely necessary commodity, and yet be precluded from collecting any revenue whatever to set against such expenditure.

A special letter has been addressed to the Minister on this subject, and it is hoped that on the passing of the Amending Water and Sewerage Bill, now in draft, the difficulty will be considerably modified.

14. The pumping plant at Crown-street, Ryde, Richmond, Chatswood, and Carlton is working satisfactorily. At the two latter places new engines—details of which are furnished in the Engineer's Report—have been erected in order to keep pace with the growing demand in these districts.

15. The cost of pumping 1,000 gallons 100 feet high at the Crown-street pumping station, compared with former years, was as follows:—1890, ·75d.; 1891, ·70d.; 1892, ·48d., 1893, ·32d.; 1894, ·35d.; 1895–6, ·347d.; 1896–7, ·345d. At Ryde the cost was ·312d. as against ·324d. during the previous year; while at Carlton the cost was ·984d., at Chatswood 1·025d., and Richmond 1·452d.

The

The quantity of water pumped was over 3,088¾ million gallons, or nearly 50 per cent. of the total supply from Prospect.

16. The various service reservoirs and tanks are in an efficient state; and since the last report their number has been added to by the construction of a new steel tank, of a capacity of one million gallons, at Penshurst, and another similar one is in course of erection at Wahroonga.

17. The districts of Beecroft and Thornleigh and Prospect and Sherwood are now embraced within the Board's jurisdiction, the supply having been extended there at the urgent wish of the residents; and it is proposed to still further extend the works in the near future to Eastwood, Brush Farm, and surrounding locality, the water being pumped from Ryde.

18. The residents of Narellan and Camden are continually importuning the Board to extend the supply to their districts from a point on the canal near Kenny Hill. The Board are willing to comply with their wishes, but are precluded from doing so until they obtain further Legislative power to extend their jurisdiction outside the county of Cumberland. The necessary provision to meet this difficulty has been included in the Amending Bill now in the Minister's hands.

19. During the year a considerable amount of attention has been bestowed by the Board on the catchment area, with a view to preserving the purity of the streams forming the source of the Sydney water supply. For years past this area has been made a convenient dumping-ground during dry seasons by settlers in surrounding districts for their starving stock, which, it is feared, frequently got bogged in the swamps, and were left to die, and no steps afterwards taken to remove or burn the bodies.

Several visits have been paid by the President and officers to this area, the result being that an additional ranger has been appointed to give his whole time to the duty of patrolling the reserve and preventing pollution from any source. Arrangements are also made whereby all stock, before being depastured, must be inspected by the ranger and the brands registered, a small charge being made per week for agistment. A systematic inspection is also frequently made of the several holdings within the area to prevent any possible pollution. Many of the settlers have been in occupation of their farms here for many years and prior to the proclamation of the catchment area, and, with one exception, they have evinced a friendly desire to carry out any alterations suggested by the Board's officer.

20. A monthly analysis of samples of water from various points by Mr. William M. Hamlet, Government Analyst, is attached hereto, which amply proves that the high standard of purity hitherto reached has been maintained.

SEWERAGE.

21. During the year 25·56 miles of sewers were laid by the Board, making a total of 255·76 miles of sewers now under the Board's jurisdiction. 2·42 miles of storm-water drains were constructed by the Sewerage Construction Branch of the Public Works Department, and transferred to the Board. In addition to these, ·766 miles of these ducts were laid by the Board, and ·803 taken over from Municipal Councils. The total length of storm-water channels now maintained by the Board is 18·409 miles.

22. The number of houses connected to the sewers was 3,131, making a total of 47,593 now connected, the estimated population served being 228,446.

23. Surveys have been completed for reticulation sewers at Woollahra, Waverley, Alexandria, Waterloo, Annandale, Leichhardt, Balmain, Newtown, Petersham, and Marrickville. Surveys are in progress for the completion of the southern part of North Sydney, and between the cemetery and St. Leonards Park.

24. The work of extending the reticulation sewers to those portions of the Boroughs of Newtown and Marrickville which it is intended to drain into the western suburbs outfall has been finished some time, but, unfortunately, owing to the delay in completion of the main outfall, the residents cannot connect their premises, nor can any revenue be collected.

25. The low-level system of sewerage at Erskineville and Alexandria has been completed, and about 1,600 houses, representing half the population, connected. The Shone's pneumatic ejectors fixed here are working satisfactorily, and already the Medical Adviser reports a great improvement in the sanitary condition of this low-lying district.

26. The various main outfalls and the reticulation sewers have been maintained in an efficient condition, and very few cases of flooding of premises occurred as a result of the surcharging of the sewers, notwithstanding the fact that on the break-up of the recent drought some of the rainstorms were of an intense and abnormal character.

27. The total quantity of silt removed from the sewers was 2,417 tons; of this, 1,668 tons was taken from the sewers of the old system, and 629 tons and 120 tons respectively from the Bondi and Botany main sewers. About 1,400 tons was disposed of on reclamation works.

This result is satisfactory, and a great improvement on previous years; but the same cannot be said of the storm-water channels, the quantity of silt removed having increased from 2,000 cubic yards in 1895–6 to 3,530 cubic yards during last year; this the Engineer attributes to the absence of proper gulleys, but steps are being taken to deal with the matter.

28. The work of renovating and repairing the old city sewers has been continued, the work last treated being the Pitt-street sewer.

29. The quantity of silt removed from the outlet house at Cook's River on to the sewage farm was 1,975 cubic yards, as against 1,960 cubic yards during the eighteen months ended 30th June, 1896.

30. The condition of the sewage farm generally is very satisfactory; all the sludge has been disposed of without difficulty; the crops and stock are healthy, and the revenue from the sale of the same increasing daily. The receipts from agistment amounted to £97 13s. 6d., and the manager anticipates that this sum will be considerably augmented during the current year, as the farm is just recovering from the condition into which it fell during the time it was leased.

The average daily flow of sewage on to the farm was 2,361,000 gallons, as compared with 2,095,000 gallons during the previous year.

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31. Samples of effluent water from the farm have been regularly analysed by Mr. W. M. Hamlet, and a copy of his report is attached hereto, showing that the water may be allowed to flow without detriment into tidal rivers.

32. The total number of premises connected to the sewers by the Board was 138. Of these, 83 were dealt with under the compulsory clauses of the Act, and 55 under the deferred-payment system, the average cost per house being £6 14s.

33. For some time past great difficulty has been experienced, owing to a defect in the Act, in getting necessary alterations made to the sanitary fittings of existing city drainage, but latterly owing to the peremptory notices being served by the City Corporation as a local authority under the Health Act, there has been a marked increase in the number of applications for drainage plans.

This system, though effective, is cumbersome, and provision has been made in the Amending Bill to meet the difficulty.

The Engineer in his report again furnishes numerous instances showing the absolute necessity for a rigorous inspection of all old city properties, in order to prevent danger to health, the inmates of most of the premises appearing to be sublimely ignorant of the most superficial knowledge of the laws of sanitation.

34. The number of complaints received as to bad smells from the sewers were extremely few, showing that the system of ventilation adopted has been an unqualified success. During the year, 11,892 lineal feet of shafts were erected, ventilating 27·5 miles of sewers. The total length of sewers now ventilated is 210 miles, and the shafts erected 99,397 lineal feet.

FINANCIAL.

Water Supply.

35. The following table shows the working of the Water Branch :—

Year.	Revenue.	Working Expenses.	Capital Cost.	Capital Cost, excluding item City Council's Water Fund.	Percentage of Working Expenses to Revenue.	Percentage of Working Expenses to Capital Cost.	Percentage of Revenue on Capital Cost.	Interest on Capital Cost after Paying Expenses.
	£	£	£	£				
1888	125,486	19,205*	3,004,557	2,623,837	20·40	0·97	4·78	3·81
1889	138,923	36,568	3,088,068	2,707,500	26·32	1·35	5·13	3·78
1890	145,990	34,788	3,189,080	2,808,412	23·82	1·23	5·19	3·96
1891	165,831	38,291	3,306,649	2,925,987	23·09	1·30	5·66	4·36
1892	155,886	45,078	3,394,581	3,013,919	28·91	1·49	5·17	3·68
1893	157,426	37,141	3,409,731	3,029,059	23·59	1·22	5·19	3·97
1894	161,167	39,274	3,440,614	3,059,957	24·36	1·21	5·26	4·05
1895 for six months.	85,364	19,693	4,078,979	3,698,323	23·06	1·06	4·60	3·54
1895–6	174,357	37,495	4,154,261	3,776,879	21·50	0·99	4·61	3·62
1896–7	175,984	40,821	4,244,550	3,867,168	23·19	1·05	4·55	3·50

* For nine months only.

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36. Notwithstanding the fact that about 55½ miles of new water-mains have been laid during the year, which has opened up new districts, the revenue has only increased to the extent of £1,627; this result cannot but be regarded as disappointing, and is attributable to the decrease which still continues yearly in the value of properties as assessed by the various municipal councils. In 1895-6 the revenue from assessments was £133,020 8s. 8d., whereas during the year just ended the revenue was reduced to £127,656 8s. 9d., or a difference of £5,363 19s. 11d.

There is an increase in the meter revenue of £2,015 3s. 10d. During the year 1895-6 the increase from meters as compared with 1894 was £10,510, so that the improvement in the meter revenue in two years is £12,525, which must be considered satisfactory. There was also an increase in building, stock, and garden fees.

37. The working expenses have increased by £3,326, due principally to repairs at the Prospect Reservoir, extra pumping expenses on account of the erection of new machinery, and additional expenditure on general maintenance of new mains.

38. The capital debt was increased by the sum of £90,289, expended in extending the water supply to the new districts previously mentioned.

39. The revenue for the year was £175,984, and the working expenses £40,821, or 23·19 per cent. of the gross revenue, leaving a net revenue of £135,163, or a return of 3·50 per cent. upon the capital cost.

40. The towns of Campbelltown and Liverpool are supplied direct from the main canal, and are debited with the actual cost of all local works and expenses of maintenance, &c., and charged at the rate of 3d. per 1,000 gallons for the water supplied, calculated at the rate of 32 gallons per head of estimated population per day.

41. The following are the tables worked out on this basis:—

CAMPBELLTOWN WATER SUPPLY.

Year.	——	Annual Instalment required to pay off Cost of Reticulation and Interest thereon in 100 years.	Maintenance (including proportion of Head Office expenses).	Charge for Water supplied from Canal, 32 gallons per head per day at 3d. per 1,000 gals.	Total Charges.	Revenue.
		£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
1889	Reticulation, £2,175 Population supplied with water, 144	78 13 0	129 8 0	21 0 6	229 1 6	128 18 0
1890	Reticulation, £4,353 Population supplied with water, 561	157 8 1	222 17 0	81 18 1	462 3 2	346 16 0
1891	Reticulation, £4,433 Population supplied with water, 686	160 5 11	234 17 0	100 3 1	495 6 0	408 15 0
1892	Reticulation, £4,433 Population supplied with water, 748	160 5 11	222 0 6	109 10 1	491 16 6	357 1 1
1893	Reticulation, £4,454 Population supplied with water, 820	161 1 1	168 2 9	119 14 4	448 18 2	401 14 7
1894	Reticulation, £4,457 Population supplied with water, 844	161 3 3	171 10 4	123 4 5	455 18 0	398 8 4
1895 six months.	Reticulation, £4,457 Population supplied with water, 853	80 11 7	79 1 8	62 5 5	221 18 8	191 7 2
1895-6	Reticulation, £4,502 Population supplied with water, 877	162 14 4	150 2 3	128 7 10	441 4 5	383 15 0
1896-7	Reticulation, £4,741 Population supplied with water, 901	171 8 8	175 4 6	131 10 11	478 4 1	386 17 11

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Liverpool Water Supply.

Year.	——	Annual Instalment required to pay off Cost of Reticulation and Interest thereon in 100 years.	Maintenance (including proportion of Head Office Expenses).	Charges for Water supplied from Canal, 32 gallons per head per day at 3d. per 1,000 gals.	Total Charges.	Revenue.
		£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
1891	Cost of Reticulation, £11,885 ..... Population supplied with water, 1,244 ...	429 15 2	134 9 8	181 12 5	745 17 3	236 18 3
1892	Reticulation, £12,773 ..... Population supplied with water, 1,527 ...	461 17 5	853 6 5	223 11 0	1,538 14 10	1,004 4 4
1893	Reticulation, £12,997 ..... Population supplied with water, 1,661 ...	469 19 5	312 15 0	242 10 1	1,025 4 6	956 15 3
1894	Reticulation, £13,120 ..... Population supplied with water, 1,857 ...	474 8 4	332 14 3	271 2 5	1,078 5 0	947 8 0
1895 (six months.)	Reticulation, £13,274 ..... Population supplied with water, 1,923 ...	240 0 1	157 16 1	140 7 7	538 3 9	473 14 3
1895-6	Reticulation, £13,258 ..... Population supplied with water, 2,035 ...	479 2 1	365 11 5	297 18 4	1,142 11 10	983 10 10
1896-7	Reticulation, £13,264 ..... Population supplied with water, 2,111 ...	479 12 6	369 16 2	308 4 1	1,157 10 9	906 2 7

42. The following is the table in connection with the Richmond Water Supply, which is simply being managed by the Board on behalf of the Minister. As the source of this supply is outside the county of Cumberland, and consequently beyond the Board's jurisdiction, the properties not actually supplied cannot be charged, and until the Amending Bill, which contains a provision dealing with this matter, is passed into law, the financial result of the scheme must necessarily be unsatisfactory.

Richmond Water Supply.

(Date of Transfer to Board, 26th May, 1893.)

Year.	Capital Cost.	Interest at 4 per cent.	Maintenance (including proportion of Head Office Expenses).	Total Charges.	Revenue.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
1893	12,340 0 0	493 12 0	314 16 1	808 8 1	399 15 3
1894	12,340 0 0	493 12 0	638 7 10	1,131 19 10	438 18 6
1895 ..... (for six months)	12,352 2 6	247 0 10	178 6 2	425 7 0	337 3 2
1895-6	12,480 7 0	499 4 3	529 10 1	1,028 14 4	547 11 11
1896-7	12,637 7 4	505 9 7	383 9 0	888 18 7	658 5 7

Sewerage.

43. The following table shows the working of the Sewerage Branch :—

Year.	Revenue.	Working Expenses.	Capital Cost.	Capital Cost, exclusive of items paid from Revenue.	Percentage of Working Expenses to Revenue.	Percentage of Working Expenses to Capital Cost.	Percentage of Revenue on Capital Cost.	Interest on Capital Cost after paying Expenses.
	£	£	£	£				
1890	81,800	22,249	1,281,045	1,177,614	27·19	1·88	6·94	5·06
1891	81,302	25,411	1,447,287	1,343,856	31·25	1·89	6·05	4·16
1892	87,927	27,305	1,605,948	1,503,517	31·05	1·81	5·84	4·03
1893	93,661	27,092	1,691,462	1,588,031	28·92	1·70	5·89	4·19
1894	93,134	28,053	1,745,120	1,641,689	30·12	1·70	5·67	3·97
1895 ..... (six months)	43,110	14,250	1,831,611	1,728,180	33·05	1·64	4·98	3·34
1895-6	85,486	30,304	1,892,256	1,788,825	35·44	1·69	4·78	3·09
1896-7	87,652	29,680	2,018,120	1,914,689	33·86	1·55	4·57	3·02

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44. There is an increase in the revenue of £2,166, although the sewerage rates proper are less by the sum of £2,123 than those of the previous year, due as previously explained to falling Municipal assessments. The excess is derived from drainage rates from new districts, which have lately become liable.

45. The working expenses are less by the sum of £621, notwithstanding the fact that the length of sewers and stormwater drains to be maintained has been increased to the extent of 29½ miles.

46. The capital debt has been increased by the sum of £125,864, representing the cost of sewers laid by the Board, stormwater channels constructed by the Government, and drains taken over from Ashfield and North Sydney Councils.

47. The revenue was £87,652, and the working expenses £29,680, or 33·86 per cent. on the gross revenue, leaving a net revenue of £57,972, or a return of 3·02 per cent. on the capital cost.

Water and Sewerage.

48. The following table shows the working of the two Branches taken together:—

Year.	Revenue.	Working Expenses.	Capital Cost.	Capital Cost, exclusive of Items on which Interest has not to be paid.	Percentage of Working Expenses to Revenue.	Percentage of Working Expenses to Capital Cost.	Percentage of Revenue on Capital Cost.	Interest on Capital Cost after paying Expenses.
	£	£	£					
1890	227,790	57,037	4,470,125	3,986,026	25·03	1·43	5·71	4·28
1891	217,133	63,702	4,783,936	4,269,843	25·77	1·49	5·78	4·29
1892	243,813	72,583	5,001,529	4,517,436	29·68	1·60	5·39	3·79
1893	251,087	64,233	5,101,183	4,617,090	25·58	1·39	5·43	4·04
1894	254,301	67,327	5,185,734	4,701,646	26·47	1·43	5·40	3·97
1895 (6 months).	128,474	33,943	5,910,590	5,426,503	26·42	1·24	4·72	3·48
1895–6	259,843	67,799	6,046,517	5,565,704	26·09	1·21	4·67	3·46
1896–7	263,637	70,502	6,262,670	5,781,857	26·74	1·21	4·56	3·34

49. The capital cost of the water and sewerage schemes on 30th June, 1897, amounted to £6,262,670; deducting from this sum what is known as the City Council Water Fund, and the cost of certain works which were paid for from revenue, leaves £5,781,857 as the amount upon which interest has to be paid.

50. The total revenue was £263,637, and the working expenses of both Branches £70,502, or 26·74 per cent. of the gross revenue, leaving a net revenue of £193,135, or a return of 3·34 per cent. on the capital cost.

51. The amount required to pay interest, calculated at rates varying from 6 per cent. to 4 per cent. on the Municipal debentures taken over by the Board, and 3·789 per cent. on moneys provided out of Government loans raised for general purposes, is £215,378 1s. 7d., to which must be added £4,336 0s. 1d. for depreciation in the

value

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value of machinery, working plant, buildings, &c., and £70,502 0s. 3d. working expenses, making the total expenses of the Board £290,216 1s. 11d., whilst the revenue was £263,637 6s. 8d. There was, therefore, a net deficiency on the year's transactions of £26,578 15s. 3d.

	Water.	Sewerage.	Total.
	£ s. d.	£ s. d.	£ s. d.
Maintenance	26,221 5 11	18,918 12 10	45,139 18 9
Management	14,600 3 2	10,761 18 4	25,362 1 6
Depreciation	3,350 2 8	985 17 5	4,336 0 1
Interest	144,049 12 4	71,328 9 3	215,378 1 7
Total Expenses ... ... £	188,221 4 1	101,994 17 10	290,216 1 11
Revenue ... ... £	175,984 11 2	87,652 15 6	263,637 6 8
Deficiency ... ... £	12,236 12 11	14,342 2 4	26,578 15 3

52. The chief cause of this deficiency, as already stated in paragraphs 36 and 44, is the shrinkage of revenue in consequence of the lowering of the Municipal assessments, on which the Board's rates are based, and also the necessity for providing interest, as pointed out in the last Report to 30th June, 1896, on the cost of the Potts' Hill Reservoir and the duplicate 48-inch trunk main from Potts' Hill to Crown-street, which practically brought in no fresh revenue, though both works were absolutely necessary. The difficulty from this latter cause will be intensified later on, when the Centennial Park Reservoir and the duplication works between the Prospect Reservoir and the Pipe Head Basin are completed.

In considering this deficiency it seems only right to revert to paragraph 13, dealing with the services rendered free by the Board, and to point out that when credit for the item therein mentioned is given the loss on the year's operations will be reduced to £7,042 18s. 3d., and this sum will be more than overtaken by the abolition of the 5 per cent. discount for the prompt payment of rates, which the Board intend to recommend to take effect from 1st January, 1898.

53. The amount of revenue outstanding on 30th June, 1897, was £43,079 0s. 9d., of which the following are the principal items :—Meters, £16,364, representing excess consumption over assessments to 30th June, accounts for which have only just been rendered; vacant lands, the owners of which are unknown, £7,742; churches and charities which have been allowed to remain in abeyance pending fresh legislation, £7,990; house properties, £7,314, which sum is less by £928 than the arrears of the previous year; Government rates, £2,125; municipal rates, £248.

54. The gross receipts paid into the Treasury, exclusive of Richmond, amounted to £260,364 8s. 6d. Legal proceedings were taken for the recovery of £5,009.

The total amount actually expended by the Board was :—

Chargeable to Loans	£152,541 1 11
Chargeable to Revenue	69,847 2 11
	£222,388 4 10

11

55. The number of premises which became liable for water rates was 2,784, and sewerage rates 3,739, making the total number, including vacant land, now rated—water, 120,901; sewerage, 51,815. Rate notices to the number of 279,101 were delivered.

56. A report by the Medical Adviser to the Board is attached, showing that the general health of the employees has been very satisfactory, and in no single case of illness could the cause be traced to any defect in the works of the Board. The health of the sewer maintenance men he shows to have been particularly good.

57. Other reports are also submitted by the Medical Adviser on the influence of the Water and Sewerage Schemes on the health of the metropolis, showing that cases of illness and mortality, resulting from such diseases as diarrhœa, diphtheria, phthisis, and typhoid fever, are steadily decreasing.

It has been the practice for some time past for Dr. Kendall to submit quarterly reports on this subject. These reports entail considerable research and inquiry, and are prepared with great care and thoroughness, and are thought of so highly by the various Municipal Councils and other public bodies as to be eagerly sought after. It has therefore been decided to furnish a copy quarterly to each Municipal body.

58. The Controller of Stores reports that the value of goods received by him was £28,732 16s. 1d., and issued, £31,221 19s. 3d. The value of stock on hand is £16,746 3s. 6d.

The above figures do not include goods forwarded direct from the manufacturers to the works, which are not actually handled by the Controller's Staff, but the issue of which is nevertheless supervised by him. If these are included the total issues would amount to £64,751 2s. 8d.

A very important work carried out by the Stores Branch is the cleaning and tar coating of old cast-iron mains, and specials taken up out of the ground on replacement by larger mains.

The cost of this work averages about £1 per ton, which is debited to revenue, while the pipes are credited and charged out on reissue at the value of new goods.

The value of mains so treated was £7,220 4s., at a cost of £274 15s. 3d.

59. Since the date of last Report no alteration has taken place in the personnel of the Board.

60. During the year all the important works, both completed and in progress, have been inspected by the Board, and in addition sixty-two meetings have been held at the Board's offices, at which the attendance was as follows:—

MEETINGS OF BOARD FROM 1ST JULY, 1896, TO 30TH JUNE, 1897.

	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apl.	May.	June.		
Meetings held	6	5	7	6	4	5	4	4	6	5	5	5	62 meetings.	
													Present.	Absent.
T. Rowe, President	6	5	7	6	4	5	4	4	6	5	5	5	62	Nil.
J. Taylor, Vice-President ...	6	4	7	4	4	5	4	4	6	4	5	5	58	4
G. A. Mansfield	5	4	6	3	4	5	4	4	6	5	3	5	54	8
J. Macpherson	4	4	6	5	4	5	4	4	5	5	4	4	54	8
F. Buckle	5	4	5	5	4	5	4	1	6	4	5	5	53	9
D. Davis	6	4	7	5	3	5	4	4	6	5	5	5	59	3
J. Ahearn	5	5	7	5	3	5	4	4	5	5	5	5	58	4

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61. The Board regret to have to report the death of Mr. William Wakeford, late Superintendent of Works at Prospect, and desire to place on record their high appreciation of the valuable services rendered by him during his term of office. His place has been filled by the appointment of Mr. A. F. Jacob, A.M.Inst. C.E., who has been for many years connected with the Public Works Department of this Colony, and who has an intimate acquaintance with the works he is now supervising, having been engaged upon them as a Resident Engineer during their construction.

62. Enclosed are the Balance-sheets prepared by the Accountant, and important Reports by the Engineer, Mr. J. M. Smail, M.Inst. C.E., and other officers.

THOMAS ROWE, Col., F.R.I.B.A.,
President.

WILLIAM HOLMES,
Secretary.

Description

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Description of Sydney Waterworks at end of June, 1897.

THE source of supply is from the Nepean River, and two of its tributaries, the Cordeaux and Cataract Rivers. The catchment area is about 354 square miles. Across the Nepean River is built a concrete dam 10 feet high, which is designed to divert a portion of the stream only into the tunnel, and lift it to level of crown of the same. The water is then taken by a tunnel 4½ miles in length to the Cataract River. Another concrete dam, similar to that on the Nepean, is thrown across this river just below the outlet of the tunnel from the Nepean, and the water is thence conveyed by a tunnel for about 1¾ mile, and then by a series of open canals and tunnels, making a total distance from the source of about 40½ miles to Prospect Reservoir. There are 11⅜ miles of tunnels and about 28¾ miles of open canal from the off-take to the Prospect Reservoir. Several gorges are crossed—some by inverted siphons, others by pipe aqueducts.

Prospect Reservoir.

This reservoir covers an area, when full, of 1,261 acres, and has a capacity of 10,812,313,000 gallons.

The dam is earth with a clay-puddle core, and is 7,300 feet long, maximum height 84 feet, with slopes of 3 to 1 on the water side, and 2½ to 1, with two 15-foot berms, on the outer side, and is 30 feet wide on the top; the water-face is covered with heavy bluestone pitching. When quite full there are 6,744,343,000 gallons available by gravitation.

The water is drawn off from the reservoir through a valve-tower into pipes placed in a brick tunnel, carried outside and round the northern end of embankment, and is discharged through controlling valves into a basin (at the end of this basin is placed a gauge-weir, from which can be read the quantity passing over daily), from which it then proceeds by an open canal for 5 miles to the Pipe Head Basin, situated 16¼ miles from Sydney, and is then conveyed by a wrought-iron pipe, 6 feet in diameter, to Potts' Hill, a distance of 5 miles.

Potts' Hill Balance Reservoir.

The water is delivered here into a 100,000,000-gallon tank, built partly in excavation, partly in bank, the bottom of which is lined with hydraulic lime concrete, and the sides, which are laid to slopes of 1 to 1, are lined with dry-coursed rubble. This work is designed to tide the city over any interruption of supply from Prospect, as well as to prevent fluctuation of head of pressure.

Screening Tank and Trunk Mains.

This screening-tank is of brick, built in two concentric rings. The water is delivered into the outer ring, and passes through a series of copper-gauze screens of 810 meshes to the inch These screens are arranged so that the orifice which they fill can be closed, and the screen taken out and scoured. From these tanks the water passes into two 48-inch cast-iron mains.

The 48-inch main first laid continues with same diameter to Lewisham, whence it bifurcates, one branch (48-inch) leading to Petersham Reservoir, the other (42-inch) to Crown-street Reservoir. The new 48-inch main was completed in 1893, and is worked alternately with the old. The two trunk mains are connected at New Canterbury Road, Petersham.

Crown-street Reservoir and Pumping-station.

Crown-street Reservoir is built of brick, and contains 3,250,000 gallons. The top-water level is 141 feet above high-water mark. At this place is situated the main pumping-plant, consisting of three compound high-duty pumping-engines. No. 1 Worthington pumping-engines are capable of raising 500,000 gallons per hour to the Paddington Reservoir, a height of 70 feet above the pumps; No. 2 Worthington pumping-engines are capable of raising 210,000 gallons per hour to Woollahra Reservoir, a height of 140 feet above the pumps, and also of raising 200,000 gallons per hour to Waverley, a height of 220 feet above pumps. Owing to the small storage capacity at Paddington and Woollahra these engines are not being worked to their greatest advantage, as they have to start and stop at short intervals. No. 3 pumping-engines, of the horizontal compound condensing rotative direct-acting type, designed and erected by Mort's Dock and Engineering Company, are capable of raising 100,000 gallons per hour to a height of 219 feet.

Four 142-h.p. Babcock and Wilcox boilers generate the requisite steam.

Paddington Reservoir.

Paddington Reservoir, top-water level of which is 214 feet above high-water mark, or 73 feet above Crown-street, is built of brick, and contains 2,000,000 gallons, and is supplied by a 36-inch cast-iron main from Crown-street pumps, and distributes the water through a 24-inch cast-iron main *viâ* Begg-street, and a 36-inch *viâ* Park-road.

Woollahra Reservoir.

Woollahra Reservoir, top-water level of which is 282 feet above high-water mark, or 141 feet above Crown-street, is built of brick, and contains 1,000,000 gallons, and is supplied by a 24¾-inch wrought-iron main from Crown-street, and distributes the water through a 20-inch main.

Waverley Reservoir.

Waverley Reservoir top-water level is 360 feet above high-water mark, and 78 feet above Woollahra, is built of brickwork, and contains 1,087,000 gallons. Water is distributed therefrom through two outlets of 24-inch and 15-inch diameter respectively. Supplemental tanks in Waverley Park, erected at an elevation of 20 feet above the present reservoir, now supply the upper zones of the district.

Petersham Reservoir.

This reservoir is built of brick, and contains 2,157,000 gallons. The top-water level is 166 feet above high-water mark, and receives its supply by gravitation from Potts' Hill through a 48-inch cast-iron main, which branches off the 48-inch main at Lewisham, and distributes the water through two 18-inch and one 20-inch outlets.

North

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North Sydney Supply—Ryde Pumping-station, Ryde Hill Tank, and Chatswood Tanks.

North Sydney, which was supplied from Paddington by a submarine pipe up to the end of 1891, has since received its supply from Potts' Hill, the water being delivered through a cast-iron pipe partly 24-inch and partly 20-inch diameter into a balance reservoir, near the Ryde Railway Station containing 2,116,000 gallons. Here a pair of powerful pumps raise the water through a 24¾-inch wrought-iron rising main into a 1,000,000-gallon wrought-iron tank to Ryde village, at a level of 234 feet above high-water mark, and by a continuation of the same main into a pair of each 1,500,000-gallon wrought-iron tanks at Chatswood, at an elevation of 370 feet above high-water mark.

From the first-named tank the whole of Ryde, Gladesville, and Hunter's Hill get their supplies, and a 9-inch branch was extended over the Parramatta River and Iron Cove Bridges for the supply of the heights of Balmain.

The pair of iron tanks at Chatswood afford a liberal supply to Willoughby, North Sydney, and Mosman, and the newly-reticulated district of Gordon and Hornsby.

Gordon, Wahroongah, and Hornsby.

This popular residential district, extending from Chatswood to Hornsby, and adjacent to the Milson's Point Railway, is now supplied with water from the Board's works. A small pumping-plant has been erected at Chatswood, from whence water is pumped to Wahroongah into a 40,000-gallon elevated tank, at a height of 720 feet above sea-level. The pumping main, which is also used as a main distributory, is 10 in. in diameter, and is 7½ miles in length; a further extension, also of same diameter, was laid to Hornsby. About 9 miles of reticulation mains of 6-inch and 4-inch diameters have been laid along such streets in the various centres of population as are sufficiently built upon to warrant the outlay. Further extensions of this scheme are intended, in the immediate future, to meet the growing wants of residents.

Campbelltown.

Campbelltown is supplied direct from the main canal by gravitation, a 6-inch pipe from the canal at 16 miles 40 chains being laid to the town, a distance of 2⅓ miles, and the reticulation consisting chiefly of 4-inch mains.

Liverpool.

Liverpool receives its supply by a 9-inch pipe from the main canal at Cecil Hills, which is extended as far as Mount Young, and thence by a 6-inch main to the town. In order to tide over any possible interruption to the flow in the canal a 4,000,000-gallon earthen reservoir has been constructed close to the canal, and is filled from the canal.

Smithfield.

The Smithfield water-works, completed in July, 1895, were designed to supply the township of Smithfield, which is situated on the Prospect Creek, about 3 miles south-east of the reservoir. The works included may be briefly summarised as under:—

An off-take on the main canal, about 3 miles below Prospect Reservoir; a circular concrete tank on the bank of said canal, having a capacity of 100,000 gallons; a 4-inch main to the township; and mains totalling about 3½ miles of the same diameter laid in all streets occupied by dwellings. The works cost about £2,900, and supply a population of 300.

Granville, Auburn, and Rookwood.

Granville is supplied by gravitation through a 15-inch branch from the 72-inch wrought-iron trunk main laid along Woodville-road for a distance of 2⅓ miles.

Rookwood and Auburn receive their supply from a 12-inch main along Joseph-street from Potts' Hill.

Ashfield.

A part of Ashfield is too elevated to receive a supply by gravitation from Potts' Hill level; therefore the loftier parts are supplied from the Woollahra Reservoir by the Petersham trunk main, which conveys the water to a 100,000-gallon wrought-iron tank, erected on a brick circular support, at an elevation of 223 feet above high-water mark.

Hurstville, Kogarah.

The bulk of the supply to Kogarah is given by gravitation from 12-inch mains connected with the Petersham Reservoir system. The higher portions of this district are supplied with water from Penshurst, where is erected an elevated steel tank having a capacity of 1,000,000 gallons; and also a 20,000-gallon cast-iron tank, built on brick piers. The water is pumped from Carlton Station by the small steam pumping-plant (Blake's duplex), which was formerly erected at North Sydney to supply that district, prior to the completion of the Ryde pumps. A new pumping-plant of the Worthington direct-acting type, having a capacity of raising 30,000 gallons per hour, has recently been built at Carlton to meet the increasing demand of residents.

Richmond.

In July, 1893, the Board assumed the temporary management of the Richmond water-works, which were completed in 1892, and had since then been worked locally by the Richmond Municipal Council. The scheme, which is entirely unconnected with the Sydney supply system, consists of a small pumping-plant—two horizontal 6-horse power engines, coupled and geared, working two brass-lined single-barrel deep-well pumps (Tangyes), fixed 61 ft. 6 in. below floor of engine-room—erected on the left bank of the Hawkesbury River, just below the confluence of the Grose and Nepean; a circular brick service tank, 60 ft. in diameter, having a capacity of 225,000 gallons; a 6-in. supply main to Richmond, 4 miles in length; and 5⅛ miles of reticulation mains, 3 in. and 4 in. diameter, within the town.

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Description of the Metropolitan Sewerage System.

The Metropolitan Sewerage System, under the control of the Board of Water Supply and Sewerage, comprises the old and new systems, the former having been initiated by the old City Commissioners in 1853, and was carried out by their successors, the present City Council, which was incorporated in 1857. The City Council had control of the water and sewerage works within the city until the year 1888, when the waterworks were transferred to the Board. The transfer of the existing sewerage-works followed in 1889.

The old system comprised four main outfalls, with subsidiary sewers along the principal streets, which in turn received the reticulation sewers of the minor thoroughfares. The four main outfalls discharged the sewage of the city into the various parts of the harbour at Blackwattle Bay, Darling Harbour, Sydney Cove, and Woolloomooloo Bay, respectively. This system was designed on the principles of what is termed the "combined system." The pollution of the freshness of the harbour, by the discharge of the sewage of the city, and consequent danger to public health, led to the appointment of a Commission to inquire into the best means of diverting the sewage from the harbour and otherwise disposing of same. The new intercepting system was the outcome of the labours of the Commission. The main works were carried out by the Government, and on completion were transferred, with all other existing works, to the control of the Board by Act of Parliament. The system, which is on the lines of the partially "separate system," intercepts all sewage, which heretofore was discharged into the harbour, at a level of 40 feet above high-water mark. This is termed the gravitation zone. The sewage from the low-level area, *i.e.*, between high-water mark and 40 feet contour, will eventually be pumped into the gravitation sewers, and discharged into the ocean or into the sewage farm.

The system consists of two main outfalls, named the northern and southern respectively, the former discharging into the Pacific Ocean, at a point named "Ben Buckler," at Bondi, and the latter discharging into a sewage farm at "Webb's Grant," on the shores of Botany Bay. These works are of considerable magnitude, and have not been constructed without considerable difficulty and outlay.

Northern Outfall.

The northern system commences at "Ben Buckler," where a large chamber was constructed in the sandstone rock. From this chamber two channels bifurcate, so as to ensure a free discharge during the prevalence of either northerly, easterly, or southerly gales. From the chamber a shaft extends to the surface for ventilation and escape of air when the sea breaks into the discharge channels. The dimensions of main outfall at chamber is 8 ft. x 7 ft. 6 in., and decreases by decrements to 6 ft. 10 in. x 5 ft. 10 in. at Oxford and Liverpool streets junction. At this point is a large chamber into which three different branches discharge, viz.:—The northern branch, which passes under Hyde Park to Castlereagh-street, where it bifurcates, one submain intercepting the sewage from main outfall at Macquarie Point, and the other intercepting the sewers discharging at Queen's Wharf. 2nd. The western branch, which extends along Liverpool-street to and along Kent-street to Miller's Point, intercepting the sewage which discharged into Darling Harbour. 3rd. The south-western branch, which passes under Belmore Gardens, Benevolent Asylum, and along George-street West to Carlton-street, where it bifurcates into two submains, one passing through Darlington, University Grounds, to Camperdown, Newtown, and Petersham, intercepting old city sewers and draining new areas; the other submain passing along George-street West by a long siphon, on account of a depression. Connected with this siphon is a scour chamber and valves for periodic cleansing. This branch extends to the Glebe and boroughs of Balmain and Leichhardt. The whole of the sewage above the 40-foot contour line, which formerly flowed into Blackwattle Bay, is intercepted by this branch and discharged into the ocean. 4th. The Potts Point branch, commencing at Bourke-street, near rear of Darlinghurst Gaol, and extending along same for some distance, then passing along Victoria-street, and terminating at Challis Estate. This sewer intercepts a considerable quantity of sewage formerly discharging at Woolloomooloo Bay. 5th. Elizabeth Bay branch, which extends along western bank of Lacrozia Creek and Rushcutter's Bay, intercepting sewage formerly discharging into them. 6th. The Woollahra and Waverley branch, extending along east side of Double Bay valley, passing under Edgecliff Road, and terminating at present at Denison-street, Waverley; this sewer drains the northern watershed of Woollahra and Waverley.

The work was carried through varying formations—in some instances the stratum was indurated sandstone; in others shale, clay, and water-charged drift-sand. Concrete enters largely into the construction of the works, the lining of rock tunnels being principally bluestone concrete rendered with cement mortar. Wherever the outfall sewer crossed natural creeks or watercourses offlet and scour valves were provided. An overflow sewer discharging into Rushcutter's Bay is connected with the main outfall to take surplus water during heavy rain-storms. This sewer was carried across low-lying swampy land on arches and circular piers; the latter were constructed on the same principle as carried out in India.

Southern Outfall.

The southern main outfall commences at the inlet chamber, which is constructed on the north bank of Cook's River, near its junction with Botany Bay. The sewer is 5 ft. 6 in. in diameter, constructed of concrete, with brick lining rendered with Portland cement. In places the sewer is above the level of the adjoining land, and in others it passes through low sand-hills and swampy ground. Where natural watercourses are passed over, concrete culverts and overflow chambers and valves are provided. The outfall sewer extends to Botany-road, where the size is decreased for a short distance, to 4 ft. 6 in. x 3 ft. 6 in. Hawksley Section: From Botany-road the sewer extends along Bourke-street, through the boroughs of Waterloo, Redfern, and the City of Sydney to Nobbs-street, where the submains from different districts join. This outfall drains the southern watershed of the city and boroughs of Redfern, Waterloo, Alexandria, Macdonaldtown, and Newtown.

Inlet

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Inlet House.

The sewage passes from the main outfall into the straining-chambers of inlet house. The chambers are in duplicate and controlled by inlet valves, so that when one series is in use the other is being cleaned out. The sewage is strained by means of three circular screens; the mesh varies from 3 inches to 1 inch. The screens are worked by one central shaft, with gearing fixed on the platform at one end, and intercept all extraneous matter before the sewage passes into the siphon-well. From the siphon-well the sewage passes under the bed of Cook's River by a cast-iron siphon 3 ft. 9 in. in diameter laid in a trench and surrounded with concrete. The siphon is connected with a well in outlet house on south side of river, from which the sewage flows along a main carrier, and is distributed over the irrigation-beds and settling-tanks by valves. The valves are of simple construction, and the distribution of the sewage is easily controlled by the farm manager.

Sewage Farm.

The Sewage Farm is situated on a neck of land called Webb's Grant, the formation of which is raw drift-sand, originally covered with low dense scrub. For agricultural purposes, to be worked at a profit, the soil is useless, but as a filter for crude sewage—this being the state in which the sewage is distributed over it—it cannot be surpassed. The farm is laid out on one side in irrigation-beds, at different levels, so as to enable the manager to command the whole area. On this area the sludge, which is dredged from the inlet house, is conveyed in trucks by a small locomotive to the various beds, and is used as manure. On the other or southern side the ground is laid out in a series of filtering-tanks, the number admitting of the sewage being dealt with intermittently. At times, when circumstances admit, these tanks are cultivated, which assists in keeping the ground clean and improves the soil as a filter. Cattle and pigs are reared and fattened on the surplus products of the farm. The styes are built in concrete, and kept clean by daily washing. Cattle and horses are also taken for agistment. The daily discharge on to the farm is 2,059,200 gallons; this is disposed of over 65½ acres of land prepared to receive same, the irrigation and filtration beds being specially formed and subdrained, the effluent water discharging above high-water mark at Botany Bay.

The farm is now being worked by the Board; the experience of leasing same was not successful.

Western Suburbs.

The sewerage system for this district is now being carried out by the Government Sewerage Department under a special vote as regards the main ducts. The outfall works are nearly completed, and the eastern branch sewer is now in progress. This sewer drains portions of Marrickville, Petersham, and Leichhardt, and will also receive the sewage from low-level system which will be pumped into it at Meeks'-road pumping-station. The system will also discharge on a portion of the Sewage Farm area upon the western side, further resumption of land having been made for that purpose.

17

Rates and Charges for Water, Sewerage, and Stormwater Drainage.

WATER RATES.

1. The following rates and charges are those which the owners and occupiers of houses, tenements, and lands shall pay in respect of water supplied by the Board, that is to say:—

For water supplied for domestic purposes otherwise than by measure.

2. (I.) In respect of lands and tenements of which the assessed annual value is £17 or under, 10s. per annum.

(II.) In respect of lands and tenements of which the assessed annual value is over £17, a rate of 7d. for each pound sterling on the amount of the assessed annual value up to £300 inclusive; 5d. for each pound sterling on the amount of the assessed annual value in excess of £300 up to £700 inclusive; 4d. for each pound sterling on the amount of the assessed annual value in excess of £700 up to £1,000 inclusive; 3d. for each pound sterling on the amount of the assessed annual value in excess of £1,000 up to £4,000 inclusive; and 2d. for each pound sterling on the amount of the assessed annual value in excess of £4,000.

3. The following rates shall be paid in each year in respect of lands and tenements which are not supplied with water for domestic purposes, and which are not more than 60 yards distant from a main constructed by or vested in the Board, that is to say:—

(I.) In respect of lands and tenements of which the assessed annual value is £10 or under, a rate of 1s. in the pound.

(II.) In respect of lands and tenements of which the assessed annual value is over £10, a rate of 10s. per annum up to the assessed annual value of £17 inclusive.

(III.) In respect of lands and tenements of which the assessed annual value is over £17, a rate of 7d. for each pound sterling on the amount of the assessed annual value.

(IV.) In respect of lands on which no building is erected for human habitation, a rate of 4d. in the pound of the assessed value.

(V.) The like rates as those above-mentioned shall be charged on all lands and tenements 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.

(VI.) When any lands or tenements become liable to a rate, or to an increased rate, during the currency of any half-year by reason of the extension of a main or for any other reason whatsoever, then a part of such rate or increased rate, as the case may be, proportionate to the unexpired period of the current half-year, shall become due and be paid forthwith.

Supply of water by meter.—Charges for water supplied by meter.

4. The charge for water supplied by meter shall be 1s. per 1,000 gallons for all water consumed up to 20,000,000 gallons per annum, and 9d. per 1,000 gallons for all water consumed in excess of 20,000,000 gallons per annum: Provided that the minimum quantity of water to be charged for, where water is so supplied, shall be 10,000 gallons per annum. Her Majesty's ships will be supplied free of charge.

5. All charges for water supplied by meter shall, unless otherwise provided by a contract made between the Board and the person to be supplied, be paid within one month after service by the Board upon the person liable to pay such charge of a notice in writing setting forth the amount due for water so supplied, and demanding payment thereof within the period of one month aforesaid. Service of any such notice may be effected by serving the same personally on the person named therein, or by sending such notice through the post to the person named therein at his last known place of abode or business; and where the place of abode and the place of business of such person are unknown to the Board, by sending it through the post addressed to him at the lands and tenements to or in respect of which the water is supplied, or by leaving it on such lands and tenements.

6. A discount of £5 per cent. will be allowed by the Board on all rates imposed upon lands and tenements of the assessed annual value of over £17, and on all lands and tenements not supplied with water on which no building is erected for human habitation of the assessed value of over £30: Provided that such rates are paid within thirty days from the date of service of the rate-notice in each half-year. A like discount of £5 per cent. will be allowed by the Board on all charges for water supplied by meter where such charges shall be paid within one month of the delivery of the meter account: Provided that such discount as aforesaid will not be allowed in any case in which its allowance would have the effect of reducing the amount of the rate or meter charge respectively payable below the sum of 10s.

For water for other than domestic purposes otherwise than by measure.

(VI.) The charge for water supplied to gas-engines or oil-engines shall be 5s. per annum for each engine of two horse-power and under, and for every additional horse-power beyond two horse-power an additional charge of 2s. 6d. per annum for each horse-power.

(VII.) The charge for water supplied to steam-boilers shall be £1 per annum for each steam-boiler up to three horse-power. And for every additional horse-power beyond three horse-power an additional charge of 5s. per annum for each horse-power.

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(VIII.) The charge for water supplied for actuating ventilators or refrigerators shall be by special fee, according to the following scale, namely:—

Class A.—Passing 60 gals. per hour at 65 lb. pressure—
1 nozzle, £6 per annum.
2 nozzles, £4 10s. per annum each.
3 „ £3 10s. „
4 „ and upwards, £3 per annum each.

Class B.—Passing 40 gals. per hour at 65 lb. pressure—
1 nozzle, £3 15s. per annum.
2 nozzles, £3 per annum each.
3 „ £2 10s. per annum each.
4 „ and upwards, £2 per annum each.

Supply for twelve hours only in each day.

Provided, however, that the supply of water under this By-law shall be for twelve hours only in each day, and no person having such supply shall continue to use the same for more than twelve hours in any one day.

Water for trade purposes, &c.

(IX.) The charge for water supplied for purposes of the undermentioned or other trades shall be at such rates, upon such terms, and subject to such conditions as may be agreed upon by the Board and the person requiring to be supplied, provided, however, that for any year or part thereof, the minimum charge for water supplied for the undermentioned trades shall be that in each hereunder case set opposite the trade, viz.:—

Photography, and any like process...	5s. per annum.
Tripe-cleaning	5s. „
Tyring purposes	5s. „
Laundries	5s. „
Dyers	10s. „
Condiment-making	5s. „
Bottle-washing	5s. „
Small goods (sweets)	5s. „
Waterfalls and fountains	5s. „
Shop-fronts, by hose	5s. „
Organ motors and such like mechanisms	20s. „

Washing Vehicles.

(X.) The Board may supply water for the washing of vehicles with a hose, without meter, at the rate of 5s. per annum for each vehicle.

In all cases where special fees are charged the Board reserve to themselves the right of insisting upon a meter being fixed at any time, notwithstanding the fact that the special fee may have been paid. All special fees are in addition to the assessed annual rate of the premises on which such fees are charged, and are payable in advance. All premises on which water is used for other than domestic purposes, and upon which special fees are paid, shall be open for inspection by the inspectors of the Board at any reasonable hour.

2. Assessed rates shall 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 or otherwise. Cheques and Post-office orders must be crossed in favour of the Board.

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. per 1,000 gallons), then such excess shall be charged in addition to the assessment.

4. One meter may be allowed to supply several tenements when such tenements are occupied by one person or firm as a place of business or abode, and the meter account will be credited with the assessments of all such tenements. One service only will be allowed under these conditions, upon which the meter will be fixed, and all the water for such tenements must pass through such meter. Where peculiar circumstances entail a departure from the above, and two services are absolutely necessary, then there shall be a meter on each service pipe.

Building Charges, &c.

(XI.) The charge for water supplied for building and plastering purposes, for buildings to be used either wholly or partly as dwelling-houses, shall be at the rate of one half-penny per cubic yard on the cubical contents of each building. The Board will supply water for all other buildings either by meter or at the rate above-mentioned per cubic yard on the cubical contents of each building as the Board shall determine: Provided that before any water shall be used through meter for building purposes such meter shall be submitted to the Board in each case for examination, and must pass the sensitive test; and the minimum charge in each case for water so supplied through meter shall be 10s.

(1.) The charge for water supplied for plastering rooms only shall be 2s. 6d. for each room, and for the building of wash-houses, water-closets, coppers, and chimneys only, 2s. 6d. each.

(2.) The charge for water supplied for making and mixing of concrete for foundations of wooden blocks, stone cubes, or other form of permanent roadway or pavement, shall be at the rate of £1 1s. per 1,000 square yards by superficial measurement of road surface, and for all other concrete, brickwork, or masonry, at the rate of three half-pence per cubic yard, as measured on the work.

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(XII.) 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.

(XIII.) All lands or premises actually supplied with water by the Board, on which any one or more head of horses or cattle shall be kept or maintained, 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. And where such lands or premises are not actually supplied with water by the Board they shall be liable to an extra rate or charge (beyond and in addition to the assessed annual rate of the premises) of 2s. 6d. per head for each head of horses or cattle kept or maintained on such lands or premises.

(XIV.) 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 per 1,000 square feet superficial area, or part thereof, and 2s. 6d. for every additional 250 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.

SEWERAGE RATES.

1. The following rates and charges are those which the owners and occupiers of houses, tenements, or lands shall pay for or in respect of sewerage, or for or in respect of the liability of such houses, tenements, or lands to rates and charges for sewerage, that is to say :—

(I.) Where the premises are of the assessed annual value of £17 or under, 10s. per annum.

(II.) Where the premises are above the assessed annual value of £17, a rate of 7d. for each pound sterling on the amount of the valuation.

2. The following rates shall be paid in each year in respect of vacant and unoccupied lands and tenements, on which no building is erected for human habitation, and which are not connected with any sewer or drain under the control of the Board, and which are situated within 150 feet from a sewer or drain belonging to the Board, that is to say :—

(I.) A rate of 4d. for each pound sterling on the amount of the assessed value.

3. A discount of £5 per cent. will be allowed by the Board on all rates imposed upon lands and tenements of the assessed annual value of over £17, and on all vacant and unoccupied land unconnected with any sewer under the control of the Board, and on which no building is erected for human habitation of the assessed value of over £30: Provided that such rates are paid within thirty days from the date of service of rate-notice in each half-year: Provided that such discount as aforesaid will not be allowed in any case in which its allowance would have the effect of reducing the amount of the rate payable below the sum of 10s.

METROPOLITAN DRAINAGE BY-LAWS.

Whereas by the "Metropolitan Water and Sewerage Act Extension Act of 1894" the Board of Water Supply and Sewerage is authorised and empowered 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 abovementioned Act, do hereby make the By-laws following, that is to say :—

Assessment and Rates.

1. For the purposes of these By-laws the value of lands and tenements in each year shall be the value (if any) at which the same are for the time being assessed for rating purposes by the Municipal Council of the City of Sydney or the Borough or Municipal District respectively in which such lands or tenements are situated, on the 1st day of January and the 1st day of July respectively, as the case may be, in each year; and such value shall continue to be the value of such lands or tenements for the purposes aforesaid during such year.

2. The rates which are respectively set opposite to the descriptions of stormwater drains hereunder mentioned are those which shall be paid by the owners or occupiers of the lands or tenements situated within the boundaries of the drainage areas respectively proclaimed in respect of such stormwater drains, and for the purpose of assessing such rates, the valuation of such lands and tenements by the Municipal Council of the City of Sydney or the Borough or Municipal District respectively within which the same respectively are situated, shall be taken as the valuation thereof by the Board under the said Act. The minimum rate payable under these By-laws shall be in each case 1s. per annum :—

Rushcutter's Creek Drain.—A rate of 7d. for each pound sterling on the amount of the valuation of the lands or tenements.

Willoughby Falls, Neutral Bay, and Careening Cove Drains.—A rate of 7d. for each pound sterling on the amount of the valuation of the lands or tenements.

Blackwattle, Glebe, and Denison Ward Drain.—A rate of 7d. for each pound sterling on the amount of the valuation of the lands or tenements.

Beattie-street, Balmain, Drain.—The rate to be paid by the owners or occupiers of the lands or tenements situated within the boundaries of the drainage area proclaimed in respect of the Beattie-street, Balmain, Drain, shall be 2d. for each pound sterling on the amount of the valuation of such lands or tenements.

Iron Cove Creek, Ashfield, Burwood, Enfield, and Canterbury Drain.—A rate of 6d. for each pound sterling on the amount of the valuation of all lands or tenements situated within the drainage area described in the Schedule hereto as applicable to the said drain, and a rate of 4d. for each pound sterling on the amount of the valuation of all lands or tenements situated outside of the area described in the Schedule hereto and within the drainage area proclaimed in respect of the said drain.

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Long Cove Creek, Leichhardt, Ashfield, and Petersham Drain.—A rate of 3d. for each pound sterling on the amount of the valuation of all lands or tenements situated within the drainage area described in the Schedule hereto as applicable to the said drain, and a rate of 1d. for each pound sterling on the amount of the valuation of all lands or tenements situated outside of the area described in the Schedule hereto and within the drainage area proclaimed in respect of the said drain.

Erskineville and Munni-street, Newtown, Alexandria, and Erskineville Drain.—A rate of 7d. for each pound sterling on the amount of the valuation of the lands or tenements.

3. All such rates as before-mentioned 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 an owner or occupier becomes liable to pay such rates.

4. A discount of £5 per cent. will be allowed by the Board on all rates imposed upon houses, tenements, or lands of the assessed annual value of over £17, and on all lands not supplied with water on which no building is erected for human habitation, of the assessed annual value of over £30: Provided that such rates are paid within thirty days of the date of service of rate-notice in each half-year. A like discount of £5 per cent. will be allowed by the Board on all charges for water supplied by measure where such charges shall be paid within one month of the delivery of the meter account: Provided that such discount as aforesaid will not be allowed in any case in which its allowance would have the effect of reducing the amount of the rate or meter charge respectively payable below the sum of 10s.

FOR COUNTRY DISTRICTS IN COUNTY OF CUMBERLAND.

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 or unimproved lands are 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 charge for water supplied by measure shall be 1s. per 1,000 gallons for all water consumed up to 20,000,000 gallons per annum, and 9d. per 1,000 gallons for all water consumed in excess of 20,000,000 gallons per annum.

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Analyses.

WATER 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	8,144,169	2,972,621,623	61,718	296,246	132	27 49	53 893	4 890
1889	8,820,000	3,219,244,159	67,924	326,035	129	27 05	86 1,468	16 907
1890	8,486,034	3,097,402,486	71,501	343,204	118	24 70	75 866	7 278
1891	9,540,102	3,482,237,514	76,093	365,246	125	26 11	102 250	26 1,566
1892 . .	12,129,152	4,439,273,890	78,926	378,885	153	32 12	89 915	29 741
1893 ..	12,533,652	4,574,782,838	81,288	390,182	153	32 12	15 1,711	26 456
1894 ..	13,738,874	5,014,689,009	83,621	401,380	164	34 23	46 1,262	4 295
1 Jan , 1895, to 30 June, 1896	16,645,014	9,194,922,372	85,059	408,282	196	40 76	98 1,568	3 1,628
1 July, 1896, ,, 1897	17,659,357	6,445,655,328	87,190	418,512	204	42 2	55 954	10 1,654

WATER RATES.

Year	Gross Revenue	Rates Cancelled	Discounts	Net Revenue	Revenue Collected	Revenue Outstanding
	£ s d	£ s d	£ s d	£ s d	£ s d	£ s d
1888	125,762 3 0	276 4 0		125 485 19 0	87,987 16 11	40,791 2 6
1889 .	141,531 3 0	2,607 4 9		133,923 18 3	145,059 3 4	34,655 17 5
1890	149,316 0 2	3,325 10 10	.	145,990 9 4	155,954 19 9	24,691 7 0
1891	171,445 17 5	5,614 16 6	.	165,831 0 11	164,494 3 9	26,028 4 2
1892	160,325 3 9	4,438 16 9	.	155,886 7 0	162,719 15 7	19,194 15 7
1893	158,963 12 5	1,537 0 7		157,426 11 8	158,473 1 2	18,148 6 1
1894	162,087 0 4	919 19 1	.. .	161,167 1 3	158,785 14 5	19,982 11 3
To June, 1895 (6 months) .	91,849 12 6	491 19 8	5,992 16 10	85,364 16 0	80,893 15 2	24,242 6 6
,, 1896 (12 ,,)	185,208 5 7	1,326 16 11	9,523 14 4	174,357 14 4	165,195 7 3	30,870 0 5
,, 1897 (12 ,,)	183,454 9 5	1,705 18 0	5,764 0 3	175,984 11 2	173,098 5 9	33,756 5 10

MAINTENANCE. MANAGEMENT.

Year.	Maintenance of Mains and Works generally, including Wages	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.
1888	8,534 10 5	901 14 5	767 6 8	10,023 11 .6	1,253 10 3	6,099 18 10	1,303 7 1	525 6 4	9,182 2 6
1889	17 139 9 0	1,489 13 10	1,756 10 0	20,385 12 10	1,708 12 6	12,346 15 8	933 9 11	1,193 13 7	16,182 11 8
1890 .	17,312 12 5	2,272 11 11	960 16 9	20,546 1 1	1,242 10 0	10,912 0 2	965 6 9	1,122 12 0	14,242 8 11
1891	19,795 8 10	2,663 6 3	1,107 9 4	23,571 4 5	1,242 10 0	11,204 3 1	943 0 9	1,290 2 1	14,684 15 11
1892	28,260 10 8	1,729 17 5	1,100 4 0	31,090 12 1	1,041 18 8	10,747 17 6	641 14 4	1,556 3 10	13,987 14 4
1893 .	20,606 4 0	1,635 13 2	1,101 15 10	23,343 13 0	859 3 4	10,997 18 11	550 5 8	1,390 12 8	13,798 0 7
1894	22,067 5 5	2,024 6 5	1,131 4 8	25,222 16 6	847 10 0	11,060 3 8	799 4 1	1,344 5 6	14,051 3 3
To June, 1895 (6 months)	10,912 9 10	871 7 6	722 12 6	12,506 9 10	437 10 0	5,620 7 6	463 14 8	665 8 3	7,187 0 5
,, 1896 (12 ,,)	20,434 12 3	1,986 3 8	1,293 10 5	23,714 6 4	1,015 6 6	10,851 8 5	622 17 3	1,291 7 8	13,780 19 10
,, 1897 (12 ,,)	22,831 1 0	2,088 0 0	1,302 4 11	26,221 5 11	1,042 10 0	11,414 13 7	807 15 9	1,335 3 10	14,600 3 2

GENERAL SUMMARY.

Year	Revenue	Total Maintenance	Total Management	Total Maintenance and Management	Interest.		Total Interest.	Depreciation	Total Expenses.
					On Loan Capital.	On Debentures			
	£ s. d	£ s. d	£ s. d	£ s d.	£ s d	£ s. d	£ s d	£ s d	£ s. d
1888	125,485 19 0	10,023 11 6	9,182 2 6	19,205 14 0	59,976 7 3	4,300 0 0	64,276 7 3	. . .	83,482 1 3
1889	138,923 18 3	20,385 12 10	16,182 11 8	36,568 4 6	101,477 5 5	4,150 0 0	105,627 5 5	2,446 8 8	144,641 18 7
1890	145,990 9 4	20,546 1 1	14,242 8 11	34,788 10 0	105,099 19 9	4,000 0 0	109,099 19 9	3,421 15 2	147,310 4 11
1891	165,831 0 11	23,571 4 5	14,684 15 11	38,256 0 4	107,981 11 8	4,000 0 0	111,981 11 8	3,916 18 0	154,154 10 0
1892	155,886 7 0	31,090 12 1	13,987 14 4	45,078 6 5	111,869 8 2	4,000 0 0	115,869 8 2	877 12 3	161,825 6 10
1893 . . .	157,426 11 8	23,343 13 0	13,798 0 7	37,141 13 7	115,187 0 10	4,000 0 0	119,187 0 10	2,511 15 2	158,840 9 7
1894	161,167 1 3	25,222 16 6	14,051 3 3	39,273 19 9	115,660 5 5	4,000 0 0	119,660 5 5	1,771 18 6	160,706 3 8
To June, 1895 (6 months)	85,364 16 0	12,506 9 10	7,187 0 5	19,693 10 3	69,383 2 9	2,000 0 0	71,383 2 9	775 16 5	91,852 9 5
,, 1896 (12 ,,)	174,357 14 4	23,714 6 4	13,780 19 10	37,495 6 2	137,098 5 2	4,000 0 0	141,098 5 2	3,481 16 5	182,075 7 9
1897 (12 ,,)	175,984 11 2	26,221 5 11	14,600 3 2	40,821 9 1	140,049 12 4	4,000 0 0	144,049 12 4	3,350 2 8	188,221 4 1

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SEWERAGE TABLE.

Year	Number of Houses Drained	Estimated Population served	New Sewers Laid During the Year		Existing Sewers	Total Length of Sewers	Storm water Drains Laid					Ventilating Shafts Erected	Sewers Ventilated
			By Board	By Govt			By Board	By Govt	By Municipalities	Existing	Total		
			miles	miles	miles	miles	miles	miles	miles	miles	miles	feet	miles
1890 .	22,765	109,272	9 33	13 68	99 02	122 03	77	Nil	Nil	2 38	3 15	12,639	14 5
1891	26,884	129,043	21 53	4 46	122 03	148 02	Nil	1 23	Nil	3 15	4 38	47,628	70 74
1892	31,402	150,729	22 50	2 42	148 02	172 94	47	77	Nil	4 33	6 62	49,089	79 25
1893	36,062	173,097	4 35	5 05	172 94	182 34	10	2 38	Nil	6 62	9 10	50,239	81 43
1894	39,965	191,832	18 35	1 27	182 34	201 95	06	66	Nil	9 10	9 82	54,405	92 50
1895-96	44,462	213,417	22 63	5 62	201 95	230 20	00	4 60	Nil	9 82	14 42	87,505	182 50
1896-97	47,593	228,446	25 56	Nil	230 20	255 76	766	2 42	803	14 42	18 409	99,397	210 00

Sewerage Rates.

Year	Gross Revenue	Rates Cancelled	Discounts	Net Revenue	Revenue Collected	Revenue Outstanding
	£ s d	£ s d	£ s d.	£ s d	£ s d	£ s d
1890	85,291 9 7	3,491 18 7		81,799 11 0	74,189 2 1	7,610 8 11
1891	83,731 10 11	2,428 12 7		81,302 18 4	80,270 17 0	8,642 10 3
1892 .	89,031 18 4	1,104 19 6		87,926 18 10	86,554 11 5	10,014 17 8
1893	94,504 15 1	843 12 3		93,661 2 10	95,385 6 10	8,290 13 8
1894	93,721 13 0	587 4 4		93,134 8 8	93,356 16 10	8,068 5 6
June, 1895 (6 months)	47,123 16 6	213 7 2	3,800 7 7	43 110 1 9	43,372 17 0	7,805 10 3
June, 1896 (12 months)	91,082 15 10	260 0 5	5,337 1 0	85,485 14 5	84,355 2 6	8,936 2 2
June, 1897 (12 months)	91,366 4 5	495 16 5	3,217 12 6	87,652 15 6	87,266 2 9	9,322 14 11

Maintenance. Management.

Year	Maintenance of Sewers and S W Drains and Works generally, including Wages	Sewage Farm Maintenance	Rents	Total Maintenance	President and Board Fees	Salaries	Stationery and Printing	Advertising and Incidentals	Total Management
	£ s d	£ s d	£ s d	£ s d	£ s d	£ s d	£ s d	£ s d	£ s d
1890	9,490 12 3	918 2 10	1,041 13 4	11,450 8 5	1,427 2 6	7,796 17 0	1,110 6 3	464 19 7	10,799 5 4
1891	13,794 8 4	829 18 7	1,000 0 0	15,624 6 11	1,242 10 0	7,180 7 6	889 7 8	475 2 9	9,787 7 11
1892	14,492 18 9	887 17 1	1,002 0 0	16,382 15 10	1,041 18 8	8,533 13 5	611 18 6	735 2 4	10,922 12 11
1893	15,567 9 0	968 8 2	1,069 13 6	17,605 10 8	859 3 4	7,270 14 11	550 4 1	806 14 3	9,486 16 7
1894	16,181 8 10	890 18 9	1,116 3 0	18,188 10 7	847 10 0	7 428 3 3	658 1 9	930 16 2	9,864 11 2
T June, 1895 (6 months)	8,002 17 2	*64 6 6	559 2 6	8,626 6 2	437 10 0	3,927 4 2	410 2 10	849 10 0	5,624 7 0
To June, 1896 (12 months)	18,185 2 5	625 2 1	1,227 10 5	20,037 14 11	1,015 6 5	7,792 3 0	711 0 9	747 14 9	10,266 4 11
To June, 1897 (12 months)	16,802 0 8	884 4 9	1,232 7 5	18,918 12 10	1,042 10 0	8,140 13 3	687 18 3	890 16 10	10,761 18 4

* Farm leased during this period

General Summary.

Year	Revenue	Total Maintenance	Total Management	Total Maintenance and Management	Interest		Total Interest	Depreciation	Total Expenses
					On Loan Capital	On Debentures			
	£ s d	£ s d	£ s d	£ s d	£ s d	£ s d	£ s d	£ s d	£ s d
1890	81,799 11 0	11,450 8 5	10,799 5 4	22,249 13 9	36,141 10 1	8,635 0 0	44,776 10 1		67,026 3 10
1891 .	81,302 18 4	15,624 6 11	9,787 7 11	25,411 14 10	39,674 17 4	6,820 0 0	46,494 17 4		71,906 12 2
1892	87,926 18 10	16,382 15 10	10,922 12 11	27,305 8 9	45,196 19 0	6,820 0 0	52,016 19 0	220 12 10	79,543 0 7
1893	93,661 2 10	17,605 10 8	9,486 16 7	27,092 7 3	50,863 12 4	6,820 0 0	57,683 12 4	586 15 11	85,362 15 6
1894	93,134 8 8	18,188 10 7	9,864 11 2	23,053 1 9	53,821 12 7	6,820 0 0	60,641 12 7	541 19 10	89,236 14 2
To June, 1895 (6 months)	43,110 1 9	8,626 6 2	5,624 7 0	14,250 13 2	28,564 0 3	3,560 0 0	32,124 0 3	230 15 8	46,605 9 1
To June, 1896 (12 months)	85,485 14 5	20,037 14 11	10,266 4 11	30,303 19 10	60,458 15 11	6,970 0 0	67,428 15 11	1,016 3 0	98,748 18 9
To June, 1897 (12 months)	87,652 15 6	18,918 12 10	10,761 18 4	29,680 11 2	64,151 9 3	7,177 0 0	71,328 9 3	985 17 5	101,994 17 10

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Analysis of Approximate Cost of Water Supply Scheme, City and Suburbs, and Percentage of Revenue on same to 30th June, 1897.

District.	Acreage.	Mileage of Mains.	Properties Liable.	Population	Capital Cost of Work.			Maintenance and Management.	Revenue.	Percentage of Net Return on Cap. Cost after paying Expenses.
					Local Reticulation.	Proportionate Charge for Main Works on Population Basis.	Total.			
	acres.				£	£	£	£	£	
Alexandria	1,024	11·76	2,829	8,700	11,740	67,629	79,369	762	2,168	1·77
Annandale	333	9·9	2,138	8,325	7,750	64,810	72,560	697	1,704	1·52
Ashfield	2,018	36·2	4,171	13,500	35,000	105,077	140,077	1,346	4,283	2·09
Auburn	2,048	14·3	972	2,500	4,900	19,462	24,362	234	344	0·45
Balmain	576	34·3	7,357	25,500	40,600	198,517	239,117	2,298	6,885	1·91
Bankstown	.....	1·8	25	125	1,000	973	1,973	19	130	5·63
Botany	2,163	6·3	700	2,500	4,800	19,462	24,262	233	956	2·98
Burwood	1,050	24·4	1,950	6,500	22,700	50,602	73,302	704	2,739	2·77
Campbelltown	.....	5·7	257	877	4,670	6,827	11,497	110	380	2·34
Camperdown	435	10·3	1,712	7,175	9,069	55,857	64,926	624	1,610	1·51
Canterbury	7,104	12·1	976	2,969	9,300	23,043	32,343	311	507	0·60
City of Sydney	2,880	159·2	23,528	101,935	158,000	793,563	951,563	9,145	72,087	6·61
Concord	2,560	13·6	1,046	2,300	10,000	17,905	27,905	268	1,031	2·74
Darlington	38	3·5	758	3,750	2,200	29,193	31,293	302	845	1·73
Drummoyne	512	8·6	987	2,200	6,450	17,127	23,577	227	684	1·94
Enfield	1,696	9·0	754	2,200	2,750	17,127	19,877	191	547	1·79
Erskineville	166	5·7	1,433	5,850	4,390	45,542	49,932	480	1,027	1·09
Five Dock	1,412	9·6	491	1,300	10,450	10,120	20,570	198	405	1·06
Glebe	461	22·4	4,103	17,500	17,700	136,237	153,937	1,479	4,932	2·24
Gordon	.....	25·4	1,919	2,000	28,800	15,570	44,370	426	1,723	2·92
Granville	2,830	19·3	2,170	4,800	18,840	37,368	56,208	540	1,645	1·96
Hunter's Hill	1,100	11·0	710	4,560	8,780	35,499	44,279	426	1,175	1·69
Hurstville	8,384	29·2	2,377	4,480	22,800	34,876	57,676	554	1,021	0·80
The Islands	.....	1·1	25	125	3,000	973	3,973	38	764	18·27
Kogarah	3·648	14·3	1,414	2,800	12,450	21,798	34,248	329	730	1·17
Lane Cove	2,496	9·3	541	1,200	5,250	9,342	14,592	140	495	2·42
Leichhardt	1,120	33·3	4,859	15,500	30,750	120,667	151,417	1,455	2,989	1·01
Liverpool	20,608	13·1	647	2,035	10,500	15,842	26,342	253	892	2·42
Marrickville	2,010	36·0	5,155	16,195	37,000	126,078	163,078	1,567	4,837	2·60
Mosman	2,048	14·5	1,411	2,200	9,600	17,127	26,727	257	1,182	3·46
Newtown	442	26·4	5,217	21,500	27,210	167,377	194,587	1,870	5,317	1·77
North Botany	2,176	8·7	1,008	3,000	3,650	23,355	27,005	260	506	0·91
North Sydney	2,067	36·1	5,382	17,840	34,700	138,884	173,584	1,668	6,798	2·96
Paddington	403	28·5	4,518	19,500	27,080	151,807	178,887	1,719	5,736	2·24
Petersham	762	27·0	3,394	12,500	25,130	97,312	122,442	1,177	3,823	2·16
Prospect and Sherwood	7,680	1·8	182	785	1,850	6,111	7,961	76	234	1·98
Parramatta	2,176	0·5	21	110	850	856	1,706	16	1,239	71·68
Randwick	8,000	32·0	2,116	7,400	26,500	57,609	84,109	808	3,736	3·48
Redfern	435	25·5	4,764	24,340	24,100	189,486	213,586	2,044	9,984	3·71
Rockdale	4,442	27·3	2,608	6,100	28,300	47,488	75,788	728	1,696	1·27
Rookwood and Silver Water	5,376	8·3	680	2,350	5,160	18,294	23,454	225	1,005	3·32
Ryde	10,240	8·7	468	2,340	7,800	18,216	26,016	250	791	2·07
St. Peters	896	11·8	1,819	5,500	16,050	42,817	58,867	566	988	0·71
Strathfield and Flemington	1,747	15·8	1,280	2,500	15,800	19,462	35,262	339	1,409	3·03
Smithfield and Fairfield	7,680	3·6	118	505	2,100	3,931	6,031	58	96	0·63
Waterloo	806	13·5	2,381	9,500	13,400	73,957	87,357	839	2,396	1·78
Waverley	1,965	22·5	3,063	10,250	21,100	79,796	100,896	970	3,707	2·71
Willoughby	5,286	21·8	1,303	3,700	21,050	28,804	49,854	479	1,384	1·81
Woollahra	2,222	27·0	2,719	10,500	20,500	91,084	111,584	1,072	4,805	3·34
Vaucluse	768			1,200						

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Approximate Mileage of the various sized Mains, City of Sydney and Suburbs, &c.

	3″	4″	5″	6″	8″	9″	10″	12″	15″	18′.	20″	24″	Miles
Alexandria	...	5 8	...	3 4	...	1·0	...	...	1 5	...	...	...	11 7
Annandale	...	7·13	...	·75	...	1·15	...	·5	...	...	...	...	9 53
Ashfield	.	18 07	...	12·09	...	1 2	...	2 7	·25	...	...	...	34·31
Auburn	...	6 6	...	3 1		·2	...	. .	..	...	. .	...	9 9
Balmain	1 2	22·86	...	7·47	·125	2 0	...	·6	1·4	·6	. .	...	36 255
Beecroft	...	·4	...	1 3	..	...	...	...	...	...	...	...	1·7
Botany	...	3 9	...	1·2	...	1 3	...	...	...	...	..	...	6 4
Burwood	..	13 4	...	6 5	.	2·6	...	1·8	...	...	...	...	24·3
Bankstown	.	1 8	...	.. ..	..	. .	...		...	..	...	...	1·8
Campbelltown	·017	2·7	...	3 1		...	...	...	...	...	..	..	5 817
Camperdown	·5	6 73		1·2	..	1 4	.	·2	...	. .	. .	..	10 03
Canterbury	.	6 6	. .	4·4				1 0	...	.		..	12·0
City of Sydney	6 0	27·6	2 0	36 6	1 46	10 0	2 5	15 3	16 3	·75	4 0	1·75	124 26
Concord	...	7·44	...	4 05		·1	...	. .	...	2 0	...	..	13 59
Darlington	·2	2 7	·4	·1	..	·1	...	...	...	...	...		3 5
Drummoyne	.	4 88	..	2 0	..	1 7	...	·1	...	...	...	..	8 68
Enfield	·1	7 1	...	1·23	. .	·25	·05	...	...	...	.	...	8 73
Erskineville	..	4 2	...	·6	..	. .	.	·7	...	...		...	5·5
Five Dock	...	4 5	...	1 6	...	1·3	...	1 3	·9	...	.	...	9 6
Glebe	3 0	11 8	...	5 5	08	2 4	...	...	...	...	...	...	22 78
Gordon	...	6·08	...	5 06	...	. .	9 7	...	...	...	...	...	20 84
Granville	...	16 6	...	4 4	. .	...	...	...	2·6	..	.	...	23 6
Hunter's Hill	. .	5·8	...	2 4	..	2 5	.	·8	1 6	...	..	...	13 1
Hurstville	...	18 4	...	6·25	...	...	1 1	2 7	...	...	...	...	28 45
The Islands	·3	·2	..	·6	. .	...	.	..	...	...	..	...	1 1
Kogarah	...	7·85	...	5·2	...	1·5	.	·62	...	...	...	...	15·17
Lane Cove	...	8 58	...	·60	.	...	...	...	...	...	.	...	9·18
Leichhardt		25 2	..	5 35	...	·8	...	·25	1·5	42		...	33·52
Liverpool	...	4 9	..	3·3	...	4 9	...	..	·1	...	...	...	13 2
Marrickville	...	22·2	...	8 1	...	1 4	. .	...	2·3	...	1 0	·7	35·7
Mosman	.	9·1	. .	4·9	.	·5	...	...	. .	...	.	..	14 15
Newtown	·3	17 56	...	5 8	...	2 6	...	·6	...	...	..	...	26 86
North Botany	...	2·86	.	4·5	...	1·2	...	·2	...	..	...	...	8 76
North Sydney	..	20 6	..	10 44	..	·7	·5	·5	1 5	·47	.	.	34·71
Paddington	·3	11 4	·15	14 0	8	·6	·1	·25	.	...	·5	·2	28 30
Petersham	. .	15 81	.	7 0	.	·5	...	1 6	1 3	·7	·1	...	27·01
Prospect and Sherwood	...	6	·3	·2	.	·5	...	...	·03	·2	...	...	1·83
Parramatta	...	.	...	.	..	·5	...	...	.	.	...	...	·5
Randwick	...	17 7	...	10 9	·3	1·1	·3	3 0	...	...	...	...	33 3
Redfern	1 0	13·08	...	6 26	·4	2 2	...	·9	1·6	·5	...		25 94
Richmond	7 95	2·06	...	·8	...	...	...	. .	...	...	.	...	10 81
Rockdale	·10	14·4	...	5·18	...	2 74	...	2·78	...	...	2 07	...	27 27
Rookwood and Silverwater	.	4 86	...	2 14	...	. .	...	1 2	...	. .	...		8·20
Ryde	..	5 0	...	2 1	·2	·5	...	·62	·25	...	1·3	...	9 97
St. Peters	. .	6 65	...	1·5		1·25	. .	1 0	...	.	...		10 40
Strathfield and Flemington	...	7·2	...	7 56	...	8	...	·9	.	...	.	.	16·46
Smithfield and Fairfield	...	3 5	...	.....	...	...	...	...	...	. .	...	..	3 5
Vaucluse	.	1 87	...	2 8	...	. .	...	.		...		...	4 67
Waterloo	·05	8 3	...	3 25	...	...	...	.	...	·8	...	...	12·40
Waverley	...	14 35	...	4 87	...	·75	·42	1·3	·1	·5		...	22 29
Willoughby	...	12·3	...	5 26	...	·02	·25	...		2·4	·02	...	20 25
Woollahra	·25	11·9	...	7 3		2·42	·03	·18	. .	...	1·0	...	23·11
Totals	21·267	483·12	2·85	244·21	3 365	56 66	15·0	43 6	33·23	9 34	9 99	2·65	925 282

The above does not include Trunk or Pumping Mains.

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Appendix.

RESULTS of Analysis of the Sydney Water Supply; by WILLIAM M. HAMLET, Government Analyst, Government Laboratory, Sydney.

Date, 1896-7.	Description of Water	Expressed in Grains per Gallon.				Expressed in Parts per Million				Appearance in standard 2 foot Tube.	General observations on the character of the Water.
		Total Solid Residue, dried at 220°	Chlorine as Chlorides.	Nitrogen as Nitrates and Nitrites	Phosphates from animal impurity.	Free Ammonia.	Albuminoid Ammonia.	Oxygen absorbed in 15 min.	Oxygen absorbed in 3 hours.		
1896.											
7 July	Crown street Reservoir	6 16	2 4	03	·00	02	·10	·32	·64	Clear and bright	
	Randwick Post office .. .	6 72	2 4	·03	00	08	·08	·32	·64	do	
	Prospect Reservoir, near the Inlet	6 44	2 4	·03	00	·00	·07	·32	·60	do	
	Basin at the head of the Canal	6 30	2 4	·03	00	·00	07	·32	·60	do	
	Mean of the four samples received	6 40	2 4	03	00	·02	08	·32	·62	do	
5 August	Crown-street Reservoir	6 16	2 35	Trace	None	01	·10	·40	·82	Clear	
	Belmore-road, Randwick	6 02	2 35	do	do	·00	·08	·35	·76	do	
	Prospect Reservoir, near the Inlet	6 02	2 35	do	do	·00	06	·30	·68	do	
	Basin at the head of the Canal	5 80	2 35	do	do	00	·07	·30	·68	do	
	Mean for the month .	6 00	2 35	do	do	002	077	33	73	do	
18 September .	Crown street Reservoir	5 88	2 35	do	do	02	08	·30	·65	do	
	Belmore road, Randwick	5 46	2 35	do	do	·00	06	·30	·65	do	
	Prospect Reservoir, near the Inlet	6 02	2 35	do	do	00	·06	30	·68	do	
	Basin at the head of the Canal	5 80	2 35	do	do	00	·07	·30	·68	do	
	Mean for the month . .	5 79	2 35	do	do	005	067	30	·66	do	
20 October .	Crown street Reservoir	5 88	2 4	do	do	·03	·09	34	·73	Clear and bright on standing.	
	Post office, Randwick	5 74	2 4	do	do	·00	·08	·32	·66		
	Prospect Reservoir, near the Inlet	5 88	2 4	do	do	.00	·09	·34	·73	Very slight sediment	
	Basin at the head of the Canal	5 88	2 4	do	do	00	·08	·35	·80		
	Mean of September analyses .	5 84	2 4	·002	do	·00	·08	·33	·73		
3 November	Crown-street Reservoir	6 31	2 4	Trace.	do	·01	·08	·36	·69	Clear and bright ..	Of the usual quality and composition.
	Post office, Randwick . .	6 02	2 4	do	do	·00	08	·37	·70	do	
	Prospect Reservoir, near the Inlet	5 84	2 4	do	do	00	·07	·32	·65	do	
	Basin at the head of the Canal	5 86	2 4	do	do	·00	·07	·35	·66	do	
	Mean for November	6 00	2 4	do	do	·00	·07	·35	67	do	
19 December*	Crown street Reservoir .	6 11	2 4	do	do	00	·09	38	·70	do	These results indicate a water of good quality, suitable for all domestic purposes.
	Post-office, Randwick	5 89	2 4	do	do	00	·07	·35	·68	do	
	Prospect Reservoir, near the Inlet	6 00	2 4	do	do	·00	·06	·32	·66	do	
	Basin at the head of the Canal .	6 06	2 4	do	do	·00	·06	·32	·68	do	
	Mean for the month	5 76	2 4	do	do	00	·07	34	·68	do	
1897.											
19 January ...	Crown street Reservoir .	5 80	2 4	do	do	·00	·06	·35	·68	do	An excellent drinking water, suitable for all domestic purposes.
	Post-office, Randwick .	6 02	2 4	do	do	·00	06	·35	·68	do	
	Prospect Reservoir, near the Inlet	6 16	2 4	do	do	·00	08	·31	·62	do	
	Basin at the head of the Canal	6 02	2 4	do	do	·00	08	·31	·62	do	
	Mean for the month	6 00	2 4	do	do	·00	07	33	65	do	
12 February ..	Crown street Reservoir ..	6 02	2 5	do	do	00	·09	·31	·68	Clear	
	Belmore-road, Randwick	5 88	2 5	do	do	00	·09	·31	68	do	
	Prospect Reservoir, near the Inlet	5 88	2 5	do	do	00	08	31	·68	do	
	Basin at the head of the Canal	5 88	2 5	do	do	·00	·08	·31	·68	do	
	Mean for the month	5 91	2 5	do	do	00	085	·31	·68	do	
19 March .	Crown street Reservoir	6 16	2 6	do	do	02	·08	·38	·80	Clear and bright .	This is a water remarkably free from organic impurity It is fit for drinking, and all domestic purposes.
	Post office, Randwick	6 44	2 6	do	do	00	07	·38	·80	do	
	Prospect Reservoir, near the Inlet	6 02	2 6	do	do	·00	06	·38	·80	do	
	Basin at the head of the Canal..	6 16	2 6	do	do	·01	·08	38	·80	do	
	Mean for the month	6 19	2 6	do	do	00	·07	·38	·80	do	
13 April	Crown street Reservoir	6 58	2 55	do	do	·001	·110	·36	70	.....	Slightly darker tint than usual. Citron-green when viewed in depth.
	Post office, Randwick.. ..	5 88	2 55	do	do	·002	·080	·30	·65		
	Prospect Reservoir, near the Inlet	6 70	2·60	do	do	001	·060	·35	·75		
	Basin at the head of the Canal .	6 60	2 60	do	do	001	·080	·32	·71		
	Mean results for April	6 44	2 57	do	do	·001	·080	·33	70		
14 May	Crown street Reservoir .	5 88	2 55	do	·00	·00	·06	·30	·60	Clear	Of the usual composition.
	Belmore-road, Randwick	6 30	2 55	do	·00	00	·08	·30	·60	do	
	Prospect Reservoir, near the Inlet	6 00	2 55	do	·00	·00	07	·32	·60	do	
	Basin at the head of the Canal .	6·00	2 55	do	·00	00	·06	·32	·60	do	
	Mean for May	6 03	2 55	do	·00	00	·067	·31	·60	do	
17 June	Crown street Reservoir	6 16	2 5	do	·00	00	·05	·35	75	do	Its suitability for all the purposes of a town supply remain evident.
	Belmore road, Randwick	6 16	2 5	do	.00	·00	04	35	·75	do	
	Prospect Reservoir, near the Inlet	6 00	2 5	do	00	·00	06	·35	·75	do	
	Basin at the head of the Canal .	5 84	2 5	do	·00	·00	·06	35	·76	do	
	Mean of the June analyses	6 04	2 5	do	00	·00	052	·35	·752	do	

* Mr. HAMLET remarks.—"During this month, in company with the President, Engineer, and Secretary of the Water Board, I had the satisfaction of traversing a large part of the catchment area from whence this water is derived. Various places were pointed out to me where possible contamination might be looked for, and in all instances there was a considerable area of cultivated soil to act as an efficient barrier or filtering medium; quite enough to intercept the possible pollution The results of my visits confirm the results of my analyses, and certainly strengthen my opinion, namely, that the water supplied to the City of Sydney is good in quality, and suitable for all domestic purposes."

METROPOLITAN BOARD OF WATER SUPPLY AND SEWERAGE—WATER SUPPLY REVENUE ACCOUNT, 30TH JUNE, 1897.

REVENUE.	£ s. d.	Total £ s. d.	EXPENDITURE.	£ s. d.	Total. £ s. d.
To Balance brought forward	.....	25,545 5 9			
			Maintenance.		
Water rates	127,656 8 9		By General maintenance	11,333 9 9	
Meter accounts	43,567 8 1		Pumping expenses	6,844 0 3	
Building fees	2,021 10 4		Prospect and canal maintenance	6,326 13 6	
Drilling fees	484 9 6		Rent	1,302 4 11	
Special fees	691 6 5		Meter and tap testing and repairing account	224 8 0	
Plumbers' licenses	229 10 0		Meters hired out, without interest	190 9 6	
Plumbers and others	77 9 1				26,221 5 11
Rents received	1,225 3 8				
Stock fees	2,583 8 4		*Management.*		
Garden fees	1,867 16 4		President's salary and Board fees	1,042 10 0	
Meter and tap testing and repairing account	201 17 9		Salaries	11,414 13 7	
Agistment	335 1 3		Stationery and printing	807 15 9	
Hire of meters	901 4 9		Advertising and incidental expenses	1,335 3 10	
Royalty	3 16 6				14,600 3 2
Miscellaneous receipts	1,606 6 1				
Compulsory water connections	1 12 7		Depreciation	.....	3,350 2 8
	183,454 9 5		Interest on Debentures	.....	4,000 0 0
Less—			Interest on Loan Account	.....	140,049 12 4
Rates cancelled, discounts, &c., as under	7,469 18 3	175,984 11 2			188,221 4 1
Rates cancelled	1,686 8 5				
Discounts	5,764 0 3				
Revenue refunded	19 9 7		Balance	.....	13,308 12 10
		201,529 16 11			201,529 16 11

Sydney, 17th August, 1897.

MELBOURNE GREEN,
Accountant.

METROPOLITAN BOARD OF WATER SUPPLY AND SEWERAGE—BALANCE-SHEET—WATER SUPPLY DEPARTMENT, 30TH JUNE, 1897.

DR.	£ s. d.	£ s. d.
To Amount advanced by Treasury—		
From Loans, Works Department	2,700,316 17 4	
Interest paid to 25th May, 1888, as per Legislative Council statement, printed 28th June, 1888	423,657 0 0	
	3,123,973 17 4	
Less amount repaid during 1896	662 10 6	
		3,123,311 6 10
Amount advanced to Board by Treasury—		
From loans to 30th June, 1896	572,904 19 3	
,, ,, 30th June, 1897	90,952 2 11	
		663,857 2 2
,, ,, 30th June, 1897 — Account erection Board's Offices		32,531 2 10
Amount advanced by Treasury—		
From loans for Richmond Water Supply Works—		
£ s. d.		
Expended by Public Works Department 12,340 0 0		
Expended by Board 297 7 4		
		12,637 7 4
City Council Water Fund		377,382 1 6
,, Debentures		80,000 0 0
Colonial Treasurer—Cash Account Balance		4,157 4 11
,, ,, Store Advance Fund		15,332 11 4
,, ,, Summons Fees Advance Account		27 7 9
,, ,, Contractors' Advance Account		8 5 3
,, ,, Trust Fund—Compulsory insurance of Board's officers		2 19 2
President's Trust Fund Account—Contractors' deposits, &c.		723 6 4
Outstanding accounts due contractors and others		4,619 3 5
Rates overpaid		581 11 5
Balance as per Revenue Account		13,308 12 10
,, ,, ,, Richmond Water Supply		337 5 3
	£	4,328,817 8 4

CR.	£ s. d.	£ s. d.
By Metropolitan Water Supply Works, constructed by Works Department and vested in Board	2,699,532 0 1	
Duplicate pipe line—Potts' Hill to Crown-street	163,495 3 2	
Water Supply Works, districts north of Parramatta River	159,314 11 7	
Lands	139,797 0 11	
£ s. d.		
Reservoirs—Crown-street, Paddington, and Woollahra 46,464 3 11		
,, Hurstville 6,585 11 7		
,, Ashfield 4,768 10 9		
,, Waverley 798 4 0		
,, Potts' Hill 108,456 0 5		
	167,072 10 8	
Machinery	34,690 18 8	
Buildings	24,780 5 1	
Mains— £ s. d.		
City Council 241,453 18 8		
Board 537,570 12 10		
	779,024 11 6	
Campbelltown Water Supply Works	4,741 10 1	
Liverpool Water Supply Works	13,264 15 3	
Smithfield Water Supply Works	2,641 5 7	
Gordon Water Supply Works	23,672 15 6	
Richmond Water Supply Works	12,637 7 4	
Beecroft Water Supply Works	1,272 14 0	
Ryde Water Supply Works (Board's)	136 16 2	
Camden Water Supply Works	0 13 5	
Sundry Works	7,986 19 5	
Stores	16,804 6 3	
,, Meter-tester	583 1 6	
Samples	73 13 0	
Meters	5,399 18 5	
Working plant and tools	2,518 15 8	
Board's offices—Water Supply portion	31,557 16 10	
Furniture	1,999 15 3	
		4,293,000 5 4
Rates outstanding	34,089 17 1	
Accounts ,,	811 12 0	
		34,901 9 1
Summons fees outstanding		27 7 9
Compulsory Life Insurance Account—Officers' premiums outstanding		2 19 2
Commercial Banking Company of Sydney (contractors' deposits, &c.)		723 6 4
Dishonored cheques		32 3 10
Colonial Treasurer—Richmond Cash Account Balance	112 19 2	
,, ,, Trust Account, unclaimed moneys	16 17 8	
		129 16 10
	£	4,328,817 18 4

Sydney, 17th August, 1897.

MELBOURNE GREEN,
Accountant.

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RICHMOND WATER SUPPLY REVENUE ACCOUNT, 30th June, 1897

Revenue	£ s d	£ s d	Expenditure	£ s d	£ s d
To Balance brought forward		62 8 8	By Salaries	108 0 0	
Water rates	387 12 10		Stationery	10 0 0	
Meter accounts	256 9 7		Wages	195 2 6	
Building fees	1 3 1		Stores, pumping expenses, &c	70 6 6	
Drilling fees	0 12 0				383 9 0
Stock fees	9 7 6				
Garden fees	1 0 0				
Special fees	2 15 0				
Meter rents	9 2 3				
	668 2 3				
Less—Rates cancelled	9 16 8		Balance		337 5 3
		658 5 7			
		£720 14 3			£720 14 3

Sydney, 17th August, 1897.

MELBOURNE GREEN,
Accountant

Metropolitan Board of Water Supply and Sewerage—SEWERAGE REVENUE ACCOUNT, 30th June, 1897

Revenue	£ s d	£ s d	Expenditure	£ s d	£ s d
			Maintenance		
To Balance brought forward		27,991 1 9	By Wages, general maintenance, working expenses, repairs, &c., maintenance of ventilating shafts, maintenance of storm water sewers	16,250 3 9	
Sewerage rates	83,039 14 1		Rent	1,232 7 5	
Drainage rates	5,939 16 1		Inlet and outlet house expenses sewage farm	421 14 0	
Drainers' licenses	135 10 0		Maintenance of sewage farm	884 4 9	
Sale of plans	690 5 0		Legal expenses	130 2 11	
Drainers and others—Accounts	19 19 2				18,918 12 10
Rents receivable	316 14 6		*Management*		
Compulsory drainage	227 17 0		President's salary and Board fees	1,042 10 0	
Agistment, sewerage farm	88 9 3		Salaries	8,140 13 3	
Miscellaneous receipts	890 18 4		Stationery and printing	687 18 3	
Sale of Produce	17 1 0		Advertising and incidental expenses	890 16 10	
	91,366 4 5				10,761 18 4
Less—Discounts, rates cancelled, &c., as under	3,713 8 11		Depreciation		985 17 5
		87,652 15 6	Interest on—		
Summary			Debentures	7,177 0 0	
Discounts off rates	3,217 12 6		Loan expenditure	64,151 9 3	
Rates cancelled or removed	492 4 11				71,328 9 3
Revenue refunded	3 11 6				
	£3,713 8 11				101,994 17 10
			Balance		13,648 19 5
		£115,643 17 3			£115,643 17 3

Sydney, 17th August, 1897.

MELBOURNE GREEN,
Accountant.

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Metropolitan Board of Water Supply and Sewerage —BALANCE-SHEET—SEWERAGE, 30th June, 1897.

Dr.	£ s. d.	£ s. d.	Cr.	£ s. d.	£ s. d.
To Amount advanced by Treasury—			By Government Sewerage Works constructed by Public Works Department, and vested in the Board	1,175,577 18 11	
From Loans, Works Department, to 30th June, 1896	1,170,529 4 5		Sydney Municipal Council Works to 31st December, 1889	248,974 13 1	
,, ,, ,, ,, 1897	56,498 2 5		Redfern ,, ,, ,, £22,712 11 4		
		1,227,027 6 10	,, ,, ,, New Sewers 7,287 8 8	30,000 0 0	
,, Revenue, Works Department, to 30th November, 1889	101,629 18 6		North Sydney Municipal Council Works £4,423 0 0		
,, Revenue, Works Department, to 31st December, 1891	1,801 1 6		,, ,, Sewers (Government) 20,996 19 0		
		103,431 0 0	,, ,, ,, (Board's) 8,596 14 6	34,016 13 6	
,, Loans, Board, to 30th June, 1896	327,685 3 10		Randwick Sewerage Works	9,571 19 5	
,, ,, ,, ,, 1897	61,166 16 0		Darlington Sewerage Works	5,000 0 0	
		388,851 19 10	Storm-water Sewers (Government) £134,883 8 11		
,, Loan, New Offices, to 30th June, 1897, portion charged to Sewerage		32,525 3 11	,, ,, (Board) 849 11 8		
			,, ,, (Ashfield Council Works) 9,700 0 0	145,433 0 7	
Debentures, City Council	100,000 0 0		New Sewers (Board)	317,772 13 2	
,, Redfern Council	30,000 0 0		Ventilating Shafts	32,099 17 6	
,, Balmain Council	2,500 0 0		Machinery	3,658 1 11	
,, Ashfield Council	8,200 0 0		Lands	513 5 3	
		140,700 0 0	Buildings	3,842 9 4	
City Council Debentures and Overdraft paid by Treasury		158,110 5 4	New offices (sewerage portion)	31,557 16 11	
Contractors' Advance Account—Trust Fund		2,945 2 10	Sewage Farm—Live Stock	80 10 3	
Outstanding Accounts due to Contractors		2,783 16 10	Sundry Works £128 12 9		
Rates Overpaid		142 9 8	,, Sewage Farm 7,782 16 4	7,911 9 1	
Balance as per Revenue Account		13,648 19 5	Flushing Hydrants	396 1 4	
			Working Plant and Tools	1,088 10 4	
			Furniture	1,612 4 0	
					2,049,107 4 7
			Rates Outstanding	8,599 3 1	
			Accounts ,,	4,488 1 7	
					13,087 4 8
			Colonial Treasurer—		
			Balance Cash Account	7,966 7 5	
			,, Trust Account (Unclaimed money)	5 8 0	
					7,971 15 5
		£2,070,166 4 8			£2,070,166 4 8

Sydney, 17th August, 1897.

MELBOURNE GREEN,
Accountant.

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Report on the Health of the Metropolis for the year ending December 31st, 1896.

To the Secretary, for presentation to the President and Members of the Metropolitan Board of Water Supply and Sewerage,—

SIR,

I have the honor to inform you that although the year just ended exhibited such remarkable extremes of heat and cold, and so great an unevenness of rainfall, still the general health of the metropolis as shown by the death-rate is much improved. Climate and season have always exercised a greater power over the different diseases, and often supply favourable conditions of propagation. When the atmosphere is dry and the temperature is high, the germs of disease flourish more easily, because their vitality is promoted, and they are more readily carried through the air to breed contagion in many directions. It is impossible, therefore, to lay too much stress upon the necessity for a proper efficient exercise of municipal control so that the efficiency of our water supply and sewerage systems may be enhanced, and the danger arising from disease minimised as much as possible. It is greatly to be regretted that a short-sighted policy of retrenchment holds among the members of Municipal Councils to the detriment of public health which is synonymous with public wealth.

The activity of a man's organs demands a supply of certain necessaries which can only be obtained from the surrounding world, viz., air for breathing, water for drinking and cleansing, plenty of sunlight, and proper housing. That the human body may continue to be in a state of health, it is absolutely essential that an abundance of pure air should be constantly supplied to it, and in order to make provision for this, a proper and efficient Building Act is necessary, so that all houses might be bright, warm, and dry, and be provided with plenty of sunlight and fresh air, having which they would harbour neither foul air, dirt, nor the germs of disease. For the perfecting of cleanliness, which without doubt is the greatest factor of health, we must look to the individual whose responsibility it is impossible too greatly to enlarge upon, for through individual neglect both water and milk may become contaminated within the dwelling notwithstanding the existence of an efficient water supply and sewerage systems, as the benefits accruing from such systems are discounted by dirty surroundings, the breeding grounds of disease. Massing together of human beings is objectionable, but sometimes unavoidable; keeping poultry and animals in close proximity to dwelling-houses is both objectionable and avoidable; and as fowls suffer from a disease akin to diphtheria they at least should be absent from the yards of town houses and small dwellings. The extreme prevalence of typhoid fever among children attending school led me to ask for a thorough inspection of all our public schools. This fever is not readily transmitted by school attendance unless the sanitary condition of the school premises is at fault, and it is surprising that those in authority should for so long a time have allowed masses of children to be exposed to the risk of drinking water stored in filthy tanks and to use latrines destitute of all sanitary conditions. This subject of school infection is a most important one, as the protracted close contact of children in schools, even if the ventilation is satisfactory, affords greater facilities for infection than occur under home conditions or during hours of play in the open air. It is satisfactory, however, to state that arrangements have been made by the Education Department to reorganise the sanitary arrangements of our public schools. A source of infection would also be removed if young children were checked in the habit of expectoration, which is confirmed by age, and is as dangerous as it is disgusting. The storage of human food is always an important subject, and judging from the exterior of some of the premises placarded as licensed dairies, the Dairies Supervision Act needs to be administered with more rigour. The Public Health Bill which has now passed into law will be a distinct gain to the citizens, as the notification of infectious disease will cause much evil to be avoided, and the regulations relating to the composition of a building site will remedy many existing abuses, put an end to the building of houses on the refuse of the past, and cause aldermen to pause before they pass by-laws allowing house garbage and street refuse to be used in repairing municipal streets.

To prevent the return of sewer gas into houses, and the depreciation of health which would ensue through the persistent breathing of sewer gas, it is necessary to ventilate the sewers and the house drains. The sewers must be ventilated, otherwise the seals of the house drains would be forced and sewer gas laid on *ad nauseam*. House drains must be kept clean and regularly flushed with water, otherwise the good effect of sewer ventilation will be abolished; and further, a true distinction must be drawn between a house drain and sewer, as the latter is often blamed for the short-comings of the former. There are, however, odours existing in many houses in this city and its suburbs which are not due to sewer gas, but to a want of cleanliness on the part of the individual and to the unhealthy composition of the building site, where the builder of the house has (in the words of Lord Bacon) committed himself unto a prison.

At the end of the year 1895 the population of the metropolis had greatly decreased. This decrease was not owing to any disastrous consequence of disease, but to a tide of emigration to the country districts and to other colonies.

POPULATION.

	1895.		1896.
City	103,870	...	100,000
Suburbs	319,730	...	308,500
Metropolis	423,600	...	408,500

The density of the population in the city per acre was 46·6 for 1895, and 44·4 for 1896.

The temperature was subject to great variation, and great extremes of heat and cold were experienced during the year. On 13th January, 1896, 108·5° F., the record shade temperature for the city since the foundation of the Colony, were registered; on 6th January, the temperature fell from 105·2° F. at midday to 71·6° F. at night, being a range of 33·6°, the greatest range of temperature during the whole year. The temperature on 30th January was 63° F. On 1st February 98° F. were registered, and the range at night was 30·7° F.; on the 4th of this month the temperature was very low, viz., 58·7° F. On 5th March it was 80·9° F., and on the 31st, 52·6° F. On 8th April, 83·9° F., and on 15th April, 51° F. On 3rd May the temperature was 81° F., and on 13th May 45·2° F. On 22nd June, the temperature was again low,

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42·5 F., but on 28th June, 67° F. were registered. On 2nd July the lowest temperature for the year, 39·8 F., was registered, and on 5th July it was 66° F. The mean temperature for July, 1896, was higher than for July, 1895, which was the coldest July known for thirty years. On 1st August the second lowest temperature of the year was registered, 40·5 F., and the mean temperature was lower than the mean for August, 1895, which was the hottest August known since 1864. On 13th September, 78° F. were registered. On 3rd October, 47·6 F., and on 12th October, 92·4 F. On 1st November the temperature was again very low, 48·3 F., but on the 18th it was 88° F., and on 8th December, 58·4 F., and 101° F. on the 28th, when the second lowest range of temperature, 32·4 F., occurred.

The highest temperatures were recorded on 13th January, 108·5 F.; 6th January, 105·2 F.; 28th December, 101·4 F.; 1st February, 98° F.; and on 12th October, 92·4 F.

The lowest temperatures were recorded on 2nd July, 39·8 F.; 1st August, 40·5 F.; 22nd June, 42·5 F.; 26th September, 44·6 F.; and on 13th May, 45·2 F.

The greatest ranges were 33·6 on 6th January, and 32·4 on 28th December.

It will be seen, therefore, that with regard to temperature, the year 1896 was subject to great variation.

During the year 1896 the rainfall, as compared with the two preceding years, increased considerably, the downpour during the second quarter of the year being in some places phenomenal. It was, however, spread over a much fewer number of days.

	1894.		1895.		1896.	
	inches.	days.	inches.	days.	inches.	days.
Quarter ending March 31st	17·25	61	16·20	59	9·97	43
Quarter ending June 30th	6·63	38	5·12	41	18·70	34
Quarter ending September 30th	7·11	39	4·41	31	4·83	36
Quarter ending December 31st	6·75	50	6·13	42	8·92	44
Total	37·74	188	31·86	175	42·42	157

Notwithstanding the increase and virulence of typhoid fever during the year, the general death-rate was lower than during the preceding years. This shows that the tone of health in the community had much improved during the last two years, although they can both be characterised as hot and dry.

	1894.			1895.			1896.		
	City.	Suburbs.	Metropolis.	City.	Suburbs.	Metropolis.	City.	Suburbs.	Metropolis.
Quarter ending Mar. 31st				448	925	1,373	474	1,141	1,615
Quarter ending June 30th				358	962	1,320	364	840	1,204
Quarter ending Sept. 30th				433	944	1,377	391	931	1,322
Quarter ending Dec. 30th				443	1,036	1,479	396	955	1,351
Total	1,782	4,177	5,961	1,682	3,867	5,549	1,625	3,867	5,492

Comparison of Death-rate for Nine Years in the Metropolis.

Year.	Population.	Deaths under— One Year. Number.	One Year. Rate per 10,000.	Five Years. Number.	Five Years. Rate per 10,000.	Number.	Rate per 10,000.
1888 ...	333,551	2,128	63·4	3,080	91·1	6,313	189·2
1889 ...	357,470	5,323	66·09	4,273	121·1	6,431	182·9
1890 ...	370,357	1,854	50·0	2,516	67·9	5,591	150·9
1891 ...	389,655	2,175	55·7	2,821	72·4	6,418	169·8
1892 ...	406,480	1,830	45·0	2,422	60·0	5,512	135·6
1893 ...	431,710	1,966	47·7	3,161	76·7	6,418	156·8
1894 ...	423,600	1,788	42·1	2,373	53·6	5,961	140·7
1895 ..	423,600	1,331	31·4	2,156	50·9	5,549	130·9
1896 ...	408,500	1,711	41·8	2,232	54·5	5,492	134·4

The zymotic death-rate for the city stood, at the end of the year 1895, at 2·4 per 10,000 of the population. At the end of January, 1896, owing to the increase of enterica, the rate rose to 2·5, falling again at the end of February to 1·2, and rising at the end of March to 2·2. At the end of April it stood at ·9, and although it rose to 1·3 at the end of May, it fell to ·7 at the end of June, to ·5 at the end of July, and to ·3 at the end of August. At the end of September the rate had risen to ·4, but fell during October to ·3. By the end of November it had risen to 1; at the end of December it stood at 1·3.

In the suburbs this rate stood at 2·6 at the end of the year 1895; 2·3 at the end of January, 1896; 1·9 at the end of February; 1·4 at the end of March; 1·6 at the end of April; 1·5 at the end of May; 1·1 at the end of June; ·9 at the end of July; ·4 at the end of August; ·4 at the end of September; 1 at the end of October; 1·04 at the end of November; and 1·1 at the end of December. The

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The mortality from diarrhœa shows a very marked decrease as compared with last year. During a phenomenally hot and dry season such as was experienced during the first quarter of this year it was to be expected that there would be an increase in the death-rate from this disease. The earth temperature and its variation has a very important relation with this disease, and as the laying of deep sewers has been experimentally proved to materially alter the earth temperature, it is highly probable that as the sewerage system is extended to the various suburbs it will tend to check the propagation of this disease, which has been the cause of so much disaster. As the mortality from diarrhœa has, since the installation of the water supply and sewerage systems decreased from 10·5 per 10,000 of the population to 6·1, it is only fair to attribute at least a portion of this good result to the operations of the Board.

	1895.			1896.		
	City.	Suburbs.	Metropolis.	City.	Suburbs.	Metropolis.
Quarter ending March 31st ...	21	74	95	36	108	144
Quarter ending June 30th ...	18	46	64	7	35	42
Quarter ending September 30th	3	10	13	1	8	9
Quarter ending December 31st...	25	100	125	14	144	58
Total	67	230	297	58	195	253

Comparison of Deaths from diarrhœa in the metropolis for Eight Years.

	1889.	1890.	1891.	1892.	1893.	1894.	1895.	1896.
Number of deaths	384	263	288	297	305	281	297	253
Rate per 10,000 of the population ...	10·9	7·1	7·37	8·3	7·4	6·6	7·0	6·1

The mortality from diphtheria shows only a small decrease. In certain districts it would appear to be endemic; much depends upon the nature of the subsoil, a water laden soil being the home of the diphtheria organism, and at certain seasons of the year, soils, with an impervious surface, are dangerous. The peculiarity of the distribution of this disease suggests that its causes "should not be sought for primarily in any high development of civilisation, such as sewers, but rather in some condition associated with a more primitive form of life." The disease is very frequently sporadic, and may occur in dwellings possessing all modern sanitary improvements. The relation between filth and disease is not even yet properly understood, and Pettenkofer has given the key to the situation when he likens filth to gunpowder, and disease to the spark. Proper efficient municipal control can remove the one, and without such control all our efforts to beat off the spark will be vain. The presence of large quantities of air in soil is salutary, and deep drainage usually renders innocuous diphtheria-breeding soils. The discovery of Anti-Toxin has proved a valuable aid in combating this disease, but it is a very noticeable fact that as the Board has been extending its operations the mortality from this disease has fallen from 4·1 per 10,000 of the population to 2·07; and the number of deaths this year is the smallest for fifteen years.

	1894.	1895.			1896.		
	Metropolis.	City.	Suburbs.	Metropolis.	City.	Suburbs.	Metropolis.
Quarter ending March 31st	29	2	23	25	0	10	10
Quarter ending June 30th	46	4	25	29	4	39	43
Quarter ending September 30th	35	4	17	21	1	18	19
Quarter ending December 31st	24	0	13	13	1	12	13
Total	314	10	78	88	6	79	85

Comparison for Eight Years of Deaths from Diphtheria in the Metropolis.

	1889.	1890.	1891.	1892.	1893.	1894.	1895.	1896.
Number of deaths	188	149	179	120	128	134	88	85
Rate per 10,000 of population	5·2	4·62	4·5	2·9	3·1	3·1	2·7	2·07

Phthisis is now recognised as a contagious disease, communicated by a specific virus or microbe. The experience of many large English cities and towns has been that after the establishment of sanitary works the mortality was very considerably reduced. The disease itself flourishes best upon a damp soil, consequently, the establishment of an effective sewerage system has proved a great factor in lessening the mortality, by improving the dryness of the soil. When we consider the severity of the last

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last winter, the sudden changes of temperature experienced during the year, and the fact that the mortality has during the last nine years been reduced from 20 0 to 10·5 per 10,000 of the population we may trace some good effect to the operations of the Board.

	1895.			1896.		
	City.	Suburbs.	Metropolis.	City.	Suburbs.	Metropolis.
Quarter ending March 31st ..	56	51	107	41	43	84
Quarter ending June 30th ...	39	73	112	29	74	103
Quarter ending September 30th	47	83	130	38	79	117
Quarter ending December 31st...	38	58	96	42	82	124
Total	180	265	445	150	278	428

The year was notable for the disastrous and virulent epidemic of typhoid fever which maintained throughout the year; and the importance of the disaster caused by this disease is emphasised by the following table, showing the distribution of deaths in the metropolis according to age:—

Under 5 years.	5 years to 10 years.	11 years to 20 years.	21 years to 30 years.	31 years to 40 years.	41 years to 50 years.	53 years.	54 years.	56 years.	61 years.	75 years.
4	14	38	34	32	9	1	3	1	1	1

In a city such as Sydney, or even its suburbs, where in the early times of the formation slight attention was paid to sanitary matters, the soil must have become sewage-sodden, and although people ought now to know better, still they are very careless, and drain their houses anywhere so long as the matter disappears, caring little for a future generation. The extension of sewerage and sanitary works in such a soil is always attended with present danger, through rousing into activity the germs of disease by breaking up the soil, and the benefit will be for the future at the expense of some of the present generation. I have always been of opinion that typhoid fever is in some way connected with the soil, and Sir Charles Cameron, of Dublin, remarks, "that a filth-laden soil is a good nidus for the bacilli of typhoid fever;" he is also of opinion that the disease is a soil disease. Unless, therefore, personal cleanliness is more strictly attended to, the local hygienic conditions will not be in a good state, and the resisting power of the human organism will be lowered, so that less opposition can be offered to invading germs. From actual inquiry made I have ascertained that more than one-half of the deaths registered in the city during the year were those of persons coming from outside to the city to be treated during their illness, and that in many cases the illness of the remaining half did not arise in the reported dwellings. Since the installation of the present water supply and sewerage systems the death rate per 10,000 of the population has decreased from 8·43 to 4·2 in the city of Sydney.

Deaths from Typhoid Fever.

	1894.	1895.			1896.		
	Metropolis.	City.	Suburbs.	Metropolis.	City.	Suburbs.	Metropolis.
Quarter ending March 31st ...	50	6	26	32	18	39	57
Quarter ending June 30th ...	26	2	17	19	13	32	45
Quarter ending September 30th ...	14	2	4	6	4	12	16
Quarter ending December 31st ...	30	10	14	24	7	18	25
Total	120	20	61	81	42	101	143

City of Sydney only.

Year.	Population.	No. of Deaths.	Rate per 10,000.
1884	118,645	100	8·43
1885	122,175	93	7·61
1886	123,645	62	5·58
1887	122,770	46	3·75
1883	119,590	50	4·18
1889	116,490	59	5·07
1890	113,470	43	3·79
1891	109,090	29	2·66
1892	107,730	19	1·76
1893	106,380	15	1·41
1894	104,880	42	4·06
1895	103,870	20	1·92
1896	100,000	42	4 2

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The deadly importance of this late epidemic of typhoid fever in the metropolis will be better appreciated when it is known that even with our present imperfect system of notification the loss to the community through death and sickness may be estimated at more than £27,000.

During the year 616 cases of typhoid fever were reported to the Board, as against 381 cases in the year 1895, and 542 for the year 1894. Many of the dwellings reported this year have been reported before, and as many as six cases came from one dwelling.

	1894.	1895.	1896.
Quarter ending March 31st...	214	176	253
Quarter ending June 30th	168	87	216
Quarter ending September 30th	27	30	45
Quarter ending December 31st	133	88	102
Total	542	381	616

Of the 616 cases reported in the year 1896, 559 were admitted into the various hospitals, and 57 were treated at home.

	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
Prince Alfred Hospital	17	24	28	13	23	11	5	4	2	6	14	4	161
Sydney Hospital	17	14	17	23	10	5	3	0	2	1	2	7	101
St. Vincent's Hospital	8	2	3	2	7	4	0	1	0	1	2	1	31
Children's Hospital	2	2	5	10	2	3	1	0	0	0	2	3	30
Coast Hospital	23	29	38	38	32	16	6	2	11	23	7	11	236
Own Homes	8	8	10	7	6	4	4	2	2	0	0	8	57
Total...	75	77	101	93	80	43	19	9	17	31	27	44	616

A very searching inquiry was made by the Board's Inspectors as to the environment of these cases, with results as are shown in the following. It was found, however, that many of the dwellings had only recently been provided with proper sanitary improvements; and others, although properly fitted according to the by-laws of the Board, had very dirty surroundings.

	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
No sewers were available	45	53	65	50	40	24	9	6	14	12	12	29	359
Dwellings were insanitary	16	10	20	24	21	9	6	2	2	15	5	9	139
No fixed abode	4	6	5	4	2	4	3	0	1	2	3	3	37
Owners had complied with the regulations of the Board	10	8	11	15	17	6	1	1	0	2	7	3	81
Total	75	77	101	93	80	43	19	9	17	31	27	44	616

An analysis of the occupations of the 81 cases coming from houses, the sanitary arrangements of which were in accordance with the Board's regulations, shows—School children, 45; housewives, 4; actor, 1; domestic servants, 7; bootmaker, 1; clerk, 1; ironmonger, 1; cabman, 1; carpenters, 2; draper, 1; carter, 1; butcher, 1; constable, 1; fruiterer, 1; nurses, 2; waiters, 2; cooper, 1; painter, 1; dealer, 1; tailoress, 1; labourers, 3; salesman, 1; factory girl, 1.

Of the 559 cases admitted into the various hospitals, 86 proved fatal.

Hospital.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.	Rate per cent. of Admission.
Prince Alfred	2	7	3	5	1	5	3	0	0	1	3	2	32	19·8
Sydney	3	3	5	4	2	1	2	0	1	0	3	0	24	23·8
St. Vincent's	3	1	1	0	3	0	0	0	0	0	0	1	9	29·0
Coast	1	4	2	1	3	2	1	0	1	1	0	3	19	8·05
Children's	0	0	0	0	0	1	0	0	0	0	0	1	2	6·6
Total	9	15	11	10	9	9	6	0	2	2	6	7	86	15·3

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
No sewers were available	13	15	13	12	9	12	4	1	4	3	3	10	99
Dwellings were in an insanitary state	3	3	5	4	5	1	3	1	0	0	3	3	31
Owners had complied with the regulations of the Board	0	1	0	1	1	0	0	0	0	0	0	2	5
No fixed abode...	1	1	2	0	0	0	3	0	0	0	0	1	8
Total	17	20	20	17	15	13	10	2	4	3	6	16	143

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Only five, therefore, of the fatal cases during the year came from dwellings the sanitary arrangements of which were in accordance with the Board's regulations, and from personal inquiry I found that not a single case of typhoid fever during the year originated in such a dwelling.

The operations of the Board, therefore, have been attended with good results notwithstanding the severity of the typhoid epidemic.

I have the honor to be,

Your obedient servant,

THEO. MAILLER KENDALL,
Medical Adviser.

DISTRIBUTION of Reported Cases.

	Population.	Cases.	Rate per 10,000.
Sydney	100,000	100	10
Suburbs—			
North-western—			
Balmain	30,000	35	11 6
Leichhardt	13,022	63	48·3
Glebe	16,469	19	11·5
Annandale	6,300	41	64·07
West Central—			
Newtown	21,375	22	10 02
Camperdown...	6,750	8	11·8
Erskineville	6,125	11	17·9
St. Peters	4,000	12	30·0
East Central—			
Redfern	24,776	41	16·5
Darlington	3,357	5	14·8
Waterloo	7,508	28	37·3
Alexandria	7,600	87	114·4
Botany	2,700	18	66 6
North Botany	4,068	16	39·3
Eastern—			
Paddington	19,000	16	8·04
Randwick	6,350	11	17·3
Waverley	9,645	1	1·03
Woollahra	12,905	7	5·5
Western—			
Ashfield	12,785	9	6·9
Burwood	6,250	5	8·0
Enfield	.....	1	...
Concord	.....	1	...
Strathfield	.....	2	...
Five Dock	1,300	1	7·6
Drummoyne	.....	0	...
Marrickville	18,000	9	5·0
Petersham	12,830	13	10·1
Southern—			
Canterbury	2,600	2	7·6
Hurstville	5,900	3	5·008
Kogarah	4,000	2	5·0
Rockdale	4,000	5	12·05
North Shore—			
North Sydney	17,465	4	2·2
Willoughby	2,535	0	...
Mosman	.....	0	...
Manly	.....	2	...
Ryde	.....	2	...
Hunter's Hill	.....	2	...
Beyond the Metropolis—			
Liverpool	.....	1	...
Rookwood	.....	2	...
Canley Vale	.....	1	...
Newcastle	.....	1	...

It will be seen, therefore, that Alexandria shows the highest rate, 114·4; Botany next, 66 6; the third is Annandale, 64·07; and the fourth is Leichhardt, 48·3. Waverley stands lowest of all at 1 03.

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Report on the Health of the Metropolis for the Quarter ending March 31, 1897.

To the Secretary, for presentation to the President and Members of the Metropolitan Board of Water Supply and Sewerage.

Sir,

I have the honor to inform you that during the quarter just ended the mortality from such diseases as enteric fever and diarrhœa has much decreased, while that from phthisis and diphtheria has increased.

The population of the metropolis, which has so very considerably diminished during the first quarter of the year, 1896, has increased during the quarter just ended, chiefly in the suburbs.

	1895.	1896.	1897.
City	103,870	100,000	100,000
Suburbs	319,730	308,500	310,500
Metropolis	423,600	408,500	410,500
Density per acre in city ...	46·6	44·4	44·4

The exceeding high temperatures recorded during the first quarter of the year 1896 were, fortunately, not maintained during the first quarter of the present year, still, the weather was warm and oppressive, and the temperature variable. On 18th January, 1897, 51·6 were registered; on 22nd January, 90·6, the range for that day being 23·6; on 23rd January, 76. On 6th February, 61·3 were recorded; on 24th February, 90·5, the range for this day being 26. On 11th March, 51·8 were registered, and on the 14th the heat was excessive, and the temperature reached 92·9, the highest temperature recorded during the quarter, the range for this day reached 31.8, the greatest range during the quarter; 15 March, the temperature was 73. The lowest temperature was registered on 18th January, 51·6.

The rainfall during the quarter was the smallest known for some years, and fell upon very few days.

Rainfall for Quarter ending 31st March.

1894.		1895.		1896.		1897.	
Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.
17·25	61	16·20	59	9·97	43	5·96	33

The mortality during the quarter just ended was much lower than during the corresponding quarter of last year. The variability of the temperature, the great humidity of the atmosphere, and the scanty rainfall are all to be considered in estimating the importance of this decrease.

Deaths Registered during the Quarter ending 31st March.

	1895.	1896.	1897.
City	448	474	341
Suburbs	925	1,141	872
Metropolis	1,373	1,615	1,213

The zymotic death rate for the city at the end of December, 1896, was 1·3 per 10,000 of the population, at the end of January, 1897, ·7, and remained at the same point at the end of February, At the end of March it fell to ·4 as compared with 2·2 at the end of March, 1896. In the suburbs this rate was 1·1 at the end of December, 1896; 1·2 at the end of January, 1897; 1· at the end of February, and ·9 at the end of March as compared with 1·4 at the end of March, 1896.

The mortality from diarrhœa has decreased during this last quarter, when compared with the corresponding quarter of last year. It is highly probable that the laying of sewers has contributed to this good result by causing a variation of the earth temperature.

Mortality from Diarrhœa quarter ending 31st March.

	1895.	1896.	1897.
City	21	36	8
Suburbs	74	108	55
Metropolis	95	144	63

Diphtheria has, unfortunately, proved more fatal than during the corresponding quarter of last year. The reappearance of this disease at intervals in particular districts would point to the specific organism having either a saprophytic tendency, or to its retaining its vitality in dust, thus rendering the site of previous cases more or less permanently infective. The organism multiplies rapidly in milk, and dogs, cats, and cows suffer from it. Dark, dirty, damp dwellings favour the increase of diphtheria, while its virulence depends upon and increases with the stagnation of air in the soil and the level of the ground water. The value of sunlight as sanitary agent can therefore never be over estimated.

Mortality from Diphtheria quarter ending 31st March.

	1894.	1895.	1896.	1897.
City	...	2	0	3
Suburbs	...	23	10	12
Metropolis	50	25	10	15

Phthisis may be and probably is conveyed by air through the medium of dried sputum. The air of an inhabited room is contaminated from many sources besides expired air, the most important source being dust, particles of which contain pathogenic micro-organisms and prove a dangerous element in the air. The bacilli

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bacilli of tuberculosis retain their vitality for a very long time in dust and dried sputum, but the growth of the organism is prejudiciously affected by light. The importance of a rigorous and systematic inspection of dairies; dairy cattle and workers in dairies is to be emphasised when we consider the great possibility of the disease being spread through milk. The mortality from phthisis was higher for the past quarter than for the corresponding quarter of last year.

MORTALITY from Phthisis quarter ending 31st March.

	1895.	1896.	1897.
City	56	41	31
Suburbs	107	43	59
Metropolis	163	84	90

The chief means of the propagation of Typhoid Fever is through the organism becoming endemic in the soil in close proximity to the patients above or through its finding its way into water or milk, in which latter food the bacilli multiply enormously faster than in water. The establishment of creameries therefore may prove a great danger in the dissemination of milk typhoid, as the milk of one farm contaminated with fever would be, when mixed with others, the means of carrying the disease over a large area. As delivered, in large cities, milk contains a vast number of bacteria, due to the defective methods of dairies, and the slow delivery to customers. The control of the milk supply of our city is therefore very important; and much praise is due to our Board of Health for their activity in this direction. It has been very conclusively decided that the obtaining of a water supply from a far distant source is far better than all the systems of filtration, and that notwithstanding the presence of some vegetable matter, such a supply is potable and healthy. Defective pipes in house connections often change the conditions of the water supply, but the water itself is not to blame. I have had for three months a sample of water taken from a tap where the water was described as filthy, and it is now as bright, clear and odourless as the day on which it was drawn from the tap. It is absolutely necessary to disconnect all house drains from sewers, and to see that all drains and sewers are efficiently ventilated, but the disconnecting traps must be kept clean and have a free exit, so that no chokage can take place. It is here that the responsibility of the individual is in evidence, and such responsibility cannot be over estimated, for if a system of absolute cleanliness is instituted, there should be nothing to disinfect in a properly managed closet; and the use of any agent to wash away or destroy effluvia will only lead to the obscuring of the ready perception of the leakage of sewerage gas or the necessity for proper ventilation. Bacteria are to be found in air, water, and dust, but they cannot live and multiply unless they have proper nourishment and conditions of growth; they are destroyed by light and cleanliness. Personal cleanliness and the proper lighting of dwellings are factors of public health. So far as the sanitation of houses in thickly-populated districts is concerned, experts have approached very closely to a knowledge of the arrangements universally demanded for securing an absolutely healthy state of things; though the practical obstacles to carrying them out is often very great. In townships and settlements where there is no efficient system of drainage, it must be remembered that all slop waters will take the same course as rain falling upon land upon which the house is built, that being the natural line of drainage. Bedroom slops, therefore, and kitchen and pantry waste, which contain solid food particles and are very prone to get foul, ought to be delivered at some distance from the houses, and no stagnation should be allowed. Were this caution noticed more carefully, typhoid fever would be avoided in many of our fast growing suburbs.

DISTRIBUTION of Mortality from Typhoid Fever in the Metropolis according to Age for Quarter ending 31st March, 1891.

6 yrs.	8 yrs.	11 yrs.	16 yrs.	18 yrs.	23 yrs.	24 yrs.	25 yrs.	27 yrs.	30 yrs.	32 yrs.	35 yrs.	39 yrs.	41 yrs.
2	1	2	1	1	1	2	1	1	2	1	1	1	1

Eleven of these cases were males, and seven females. The mortality from typhoid during the first quarter of this present year is lower than it has been during the same quarter for four years.

MORTALITY from Typhoid Fever, Quarter ending 31st March.

	1894.	1895.	1896.	1897.
City	...	6	18	5
Suburbs	...	26	39	13
Metropolis	50	32	57	18

During the first quarter of the year 1896, 253 cases of Typhoid Fever were reported to the Board, and during the past quarter of this present year 157 cases were so reported. Of the cases reported there were treated at the

	Jan.	Feb.	Mar.	Total.
Prince Alfred Hospital	11	22	20	53
Sydney Hospital...	1	9	11	21
St. Vincent's Hospital	3	1	5	9
Coast Hospital	16	6	17	39
Children's Hospital	0	4	8	12
At home	10	3	10	23
	41	45	71	157

The usual careful inquiry was made by the Board's Inspector with the following result :—

	Jan.	Feb.	Mar.	Total.
No Sewers were available	23	25	42	90
Dwellings were Insanitary	12	12	21	45
Owners had complied with the Regulations of the Board...	4	5	4	13
No fixed abode	2	3	4	9
Total	41	45	71	157

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An analysis of the 13 patients coming from dwellings, the sanitary arrangements of which were in accordance with the regulations of the Board shows: Book-keeper, 1; dressmaker, 1; clerk, 2; housewives, 2; school, 5; bus-driver, 1; hawker, 1.

Some of these dwellings had very dirty surroundings, and were, strictly speaking, in an insanitary state, notwithstanding the fitness of their sanitary fittings.

During the quarter, 18 cases of Typhoid Fever proved fatal at the—

	Jan.	Feb.	Mar.	Total.	Rate per cent. of Admission.
Prince Alfred Hospital	...	1	...	1	1·8
Sydney Hospital	...	1	...	1	4·7
Coast Hospital	4	...	...	4	10·2
St. Vincent's Hospital	...	...	...	...	0·
Children's Hospital	...	...	...	...	0·
At home	7	3	2	12	
Total	11	5	2	18	

An inspection of the surroundings of these fatal cases shows:—No sewers were available in 10 cases; dwellings were in an insanitary state in 7 cases; owners had complied with the regulation of the Board in one case. Total 18 cases.

Notwithstanding a very trying and dry quarter the good effect of the operations of the Board is very evident.

I have, &c.,

THEO. MAILLER KENDALL,
Medical Adviser.

DISTRIBUTION of Reported Cases of Enteric Fever for quarter ending March 31st, 1897.

	Population.	Number of Cases.	Rate per 10,000.
City of Sydney	100,000	24	2·4
Suburbs (North Western)—			
Balmain	30,000	8	2·6
Leichhardt	13,022	10	7·6
Annandale	6,300	3	4·7
Glebe	16,469	8	4·8
West Central—			
Newtown	21,375	5	2·3
Camperdown	6,750	4	5·7
Erskineville	6,128	5	8·1
St. Peters	4,000	4	10·0
East Central—			
Redfern	24,375	10	4·1
Darlington	3,357	...	...
Waterloo	7,500	2	2·6
Alexandria	7,600	8	10·5
North Botany	4,068	2	4·9
Botany	2,700	...	...
Eastern—			
Paddington	19,000	4	2·1
Randwick	6,350	2	3·1
Woollahra	13,505	2	1·2
Waverley	9,645	3	3·1
Western—			
Ashfield	12,875	5	3·7
Burwood	6,250	5	8·0
Enfield	.....	8	...
Concord	.....	...	...
Strathfield	.....	...	...
Five Dock	.....	1	...
Drummoyne	.....	...	...
Marrickville	18,000	10	5·5
Petersham	12,830	6	4·0
Southern—			
Canterbury	2,600	3	11·5
Hurstville	.....	...	...
Kogarah	4,000	...	...
Rockdale	4,000	...	...
Northern—			
North Sydney	17,465	5	2·2
Willoughby	3,600	1	2·7
Mosman	.....	...	...
Ryde and Hunter's Hill	.....	...	...
Manly	.....	...	...
Beyond the Metropolis.			
Gosford	.....	1	...
Cobar	.....	1	...
Charters Towers	.....	1	...
Pymble	.....	1	...
Goulburn	.....	1	...

The highest percentage is shown by Canterbury, 11·5; Alexandria comes next, 10·5; and St. Peters follows closely, 10·0; Burwood s almost equal with Erskineville at 8·1; Leichhardt stands sixth, 7·6.

Report

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Report on the Health of the Metropolis for the Quarter ending 30th June, 1897.

To the Secretary, for presentation to the President and Members of the Board.

Sir,

I have the honor to report that although the general death rate of the second quarter of this present year was higher than of the corresponding quarter of last year, still the mortality from phthisis, diarrhœa, diphtheria, and enteric fever was less.

The population during the second quarter of the current year was—

	Population.
City	95,850
Suburbs	314,150
Metropolis	410,000
Density per acre in city	43·05

The rainfall was lower than for the corresponding quarter of last year. The largest fall taking place in June, viz., 8·06 inches.

Rainfall, quarter ending 30th June.

1894.		1895.		1896.		1897.	
Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.
6·63	38	5·12	41	18·70	34	17·70	33

The temperature was higher during April than during the corresponding month of last year, 88·0° F. being registered on 12th April, 1897; the highest temperature for the quarter, 50·8° F., 22nd April; 25·5° F. the greatest range during the quarter, 12th April; 17th May, 78·8° F.; 9th May, 44·0° F., the lowest temperature for the quarter; 10th June, 68·0° F.; 30th June, 44·8° F. The mean temperature was lower than the mean temperature for the corresponding quarter of last year.

The total number of deaths was higher than for the corresponding quarter of last year, the increase being due to the facts that the mortality from bronchitis and pneumonia was for each nearly double of that for the corresponding quarter of last year; the mortality from puerperal fever five times as great; from premature birth more than double as great; and from cancer nearly double as great.

	1895.	1896.	1897.
City	358	361	444
Suburbs	962	840	954
Metropolis	1,320	1,204	1,398

The zymotic death rate, which at the end of March, 1897, stood at 0·4 for the city, rose during April to 1·3, but fell again at the end of May to 0·4, and at the end of June stood at 0·6. For the suburbs this rate fell from 0·9 at the end of March to 0·7 at the end of April, rose to 0·9 at the end of May, and fell to 0·6 per 10,000 of the population at the end of June. The mortality from zymotic diseases during May was very low.

The mortality from diarrhœa was the lowest known for many years past, and considering that the weather was warmer and dryer than usual, some of the good result is to be attributed to the operations of the Board.

Mortality from diarrhœa, quarter ending 30th June.

	1895.	1896.	1897.
City	18	7	7
Suburbs	46	35	25
Metropolis	64	42	32

The mortality from diphtheria was exceptionally low, in fact the lowest known for twenty years. This result has been probably brought about by the improved diagnosis and treatment of the disease. The subject has been dealt with in a special report already before the Board, and from result of that investigation it will be seen that at any rate a portion of the good result may be attributed to the Board's operations.

Mortality from diphtheria, quarter ending 30th June.

	1894.	1895.	1896.	1897.
City		4	4	2
Suburbs		25	39	14
Metropolis	75	29	43	16

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The mortality from phthisis has been greater this quarter in the city than it has during the corresponding quarter for the last two years, but it is less for the suburbs. The question of dealing with this disease is now a subject of great interest, more especially since the subject of tuberculous milk has been under discussion. In England the milk supply of country dairies has been found to be more tuberculous than that supplied by town dairies, and the institution of sanitary works has always been followed by a decrease in the mortality from this disease. As yet, owing to the recentness of the practice, it is impossible to say how far the pasteurisation of milk will help to diminish the disease; but unless more precaution is taken in the delivery of milk so treated to the customer, much harm may result from the practice.

MORTALITY from Phthisis, quarter ending 30th June.

	1894.	1895.	1896.	1897.
City	.....	39	29	42
Suburbs	.....	73	74	69
Metropolis ...	.....	112	103	111

The mortality from typhoid fever is considerably less for this quarter than for the corresponding quarter of last year, and the mortality during the half-year is not only less, but less than half the mortality for the corresponding half-year during the last eleven years.

MORTALITY from Typhoid Fever, quarter ending 30th June.

	1894.	1895.	1896.	1897.
City	.....	2	13	4
Suburbs	.....	17	32	22
Metropolis ...	27	19	45	26

From the inspections made recently in the city it is surprising that so little typhoid fever has existed this year, and that a great epidemic has not been present. It is sufficient that owners will not remedy the defects of drainage, but when this evil is added to by individual carelessness and neglect, the probability of stamping out typhoid fever is more and more remote. The supervision of our milk supply in the milk shops, as well as the dairy, becomes daily more necessary, and it is imperative upon those in authority to see that such supervision is carried out most truly. To allow so important a food as milk to be exposed for sale in insanitary dwellings is wrong and becomes an evil to the community, especially as milk so readily absorbs the germs of typhoid fever. Some of the milk shops are a standing disgrace, and if this source of typhoid fever is allowed to exist there will certainly at some time be some terrible disaster. The necessity for municipal authorities to regulate the sanitation of these new and fast-growing suburbs, where as yet no sewerage can be provided, is very evident. Means should be taken to prevent slop-water stagnating in lanes and yards, and householders should be warned of the danger of casting slops and house refuse in the vicinity of dwellings. For a time such suburbs will be charming, but in the future disease will break out owing to a poisoned soil, which has become saturated with offensive matter through carelessness and neglect.

Another very important evil which is increasing every year is the overcrowding of small houses; 20 and 30 persons, 3 and 4 families, are found congregated in small 4 and 6-roomed houses, which are all closed up at night, and the air, which, to start with, is not sufficient for 1 or 2 individuals, is polluted by the breathing and exhalations of a dozen. This evil needs an immediate remedy.

DISTRIBUTION of Deaths from Enteric Fever in the Metropolis, according to age, quarter ending 30th June, 1897.

2 years.	9 years.	12 years.	14 to 20 years.	22 to 28 years.	34 years.	38 years.	40 to 49 years.	55 years.	59 years.
1	1	1	6	7	1	1	7	1	1

The largest number of these deaths (4) occurred at the age of 22 years.

During the second quarter of this present year 165 cases of typhoid fever were reported to the Board, as against 216 cases for the corresponding quarter of 1896.

Treated at —	April.	May.	June.	Total.
Prince Alfred Hospital	25	29	5	59
Sydney ,, ...	11	7	3	21
St. Vincent's ,, ...	8	3	2	13
Coast ,, ...	17	23	11	51
Children's ,, ...	...	7	...	7
Home	3	4	7	14
Total	64	73	28	165

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The usual inquiries were made by the Board's inspectors, with the following result:—

	April.	May.	June.	Total.
No sewers were available	36	43	17	96
Dwellings were insanitary...	21	22	7	50
Owners had complied with the regulations of the Board..	6	7	1	14
No fixed abode	1	1	3	5
Total	64	73	28	165

An analysis of the occupations of the 14 cases, coming from houses the sanitary arrangements of which were in accordance with the by-laws of the Board, shows: School children, 9; child's nurse, 2; factory hand, 1; labourer, 1; married woman, 1.

During the quarter 26 cases of enteric fever proved fatal—

At the—	April.	May.	June.	Total.	Rate per cent. of cases admitted.
Prince Alfred Hospital	2	3	1	6	10·1
Sydney „	1	...	1	2	9·5
Coast „	1	2	1	4	7·8
St. Vincent's „	1	...	1	2	15·3
Children's „	...	...	...	...	...
At home	2	4	7	13	...
Total	7	9	11	27	...

An inquiry into the surroundings of these 27 deaths showed—

No sewers were available in	19 cases.
Dwellings were insanitary in	6 „
No fixed abode for	2 „
Total	27 cases.

Distribution of the Reported Cases of Typhoid Fever, half-year ending 30th June, 1897.

	Population.	No. of Cases.	Rate per 10,000 of Population.
City of Sydney	95,850	47	4·9
Suburbs (North Western)—			
Balmain	25,500	14	5·4
Leichhardt...	15,500	29	18·7
Annandale	8,325	9	10·9
Glebe	17,500	13	7·4
West Central—			
Newtown	21,500	11	5·1
Camperdown	7,175	5	6·9
Erskineville	5,850	10	17·0
St. Peters	5,500	7	12·7
East Central—			
Redfern	24,340	20	8·2
Darlington...	3,750	1	2·6
Waterloo	9,500	13	13·6
Alexandria...	8,700	11	12·6
North Botany	3,000	3	10·0
Botany	2,500	11	44·0
Eastern—			
Paddington	19,500	6	3·0
Randwick	7,400	3	4·0
Woollahra	10,500	3	2·8
Waverley	10,250	4	3·8
Western—			
Ashfield	13,500	5	3·7
Burwood	6,500	15	23·0
Enfield	2,200	19	86·3
Concord	2,300	...	.....
Strathfield	2,500	...	.....
Five Dock	1,300	5	38·4
Drummoyne	2,200	...	.....
Marrickville	16,195	16	9·8
Petersham	12,500	14	11·2

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	Population.	No. of Cases.	Rate per 10,000 of Population.
Southern—			
Canterbury...	2,960	3	10·1
Hurstville	4,480	...	.....
Kogarah	2,800	...	.....
Rockdale	6,100	...	.....
Northern—			
North Sydney	17,840	6	3·3
Willoughby	3,700	2	5·4
Mosman	2,200	...	.....
Ryde	2,340	...	.....
Hunter's Hill	4,560	3	6·5
Gladesville	.....	3	.....
Manly	.....	...	.....
Shipping—			
Came into Port	.....	3	.....
Places beyond the Metropolis—			
Gosford	.....	1	.....
Pymble	.....	1	.....
Homebush	.....	1	.....
Cobar	.....	1	.....
Charters Towers	.....	1	.....
Coulburn	.....	1	.....
Coolgardie	.....	1	.....
Quirindi	.....	1	.....
No fixed abode	.....	2	.....

During the present quarter, therefore, only fourteen of the reported cases came from houses with proper sanitary fittings, and not one single death came from such a dwelling. The Board's operations, therefore, have been very successful, and would have been much more so had proprietors of houses taken full advantage of the sewers provided. It is to be hoped that, in the near future, middens will be abolished, and that the nightman will cease to carry on his trade in fashionable suburbs where the sewers are within a few yards of the dwelling. Such a state of affairs is deplorable, but unfortunately true.

I am, &c.

THEO. MAILLER KENDALL,
Medical Adviser.

11th August, 1897.

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Mortality from Phthisis as affected by the operations of the Board in the Metropolis of Sydney, N.S.W.

To the Secretary for presentation to the President and Members of the Board,—

Sir,

I have the honor to lay before you the results of my inquiry into the sanitary value of the operations of the Board as regards the decrease in the mortality from phthisis in the metropolis. Phthisis may occur at all periods of life, and no quarter of the globe nor race of man is known to be completely exempt from this disease. It favours all climates, but it is, probably, more prevalent in those which are temperate than in those which are very hot or very cold. It is highly necessary to distinguish between that form of phthisis which is due to industrial pursuits and that special infectious form of the disease called tuberculosis. The first form may arise from the irritation consequent on the inhalation of dust such as arises in the working of stone, steel, pearl, china, flax, &c., in the various industrial pursuits. The second form, undoubtedly, does arise from the inhalation of dust containing the desiccated spores of the tubercle bacillus, which spores are derived from the dried sputa or expectoration of infected individuals. This latter form is highly contagious, and is communicable in many ways by a special virus, and it may arise through inoculation, ingestion of food, and inhalation. Repeated catarrhs, dampness of soil, defective drainage, and deficient supply of pure air are generally supposed to be the factors of phthisis, but recent observations do not altogether confirm these suppositions, and it may be that as everything which tends to lower the resisting and recuperating power of an organism acts as a predisposing cause of disease, so damp subsoils, deficient supply of pure air, and defective drainage may also act as predisposing causes. Persons who are exposed to a vitiated atmosphere such as is rendered impure by the products of combustion and respiration soon become pale, lose their appetite, decline in muscular strength, and are very prone to contract phthisis. The infection of phthisis, or, more properly speaking, tuberculosis, may take place through the ingestion of such foods as milk and meat. Milk is the sole nourishment provided by nature for the young of man and beast, and contains all the food stuffs in the best proportion for the infant's needs. As a high state of health is needed for the production of good milk, it is most necessary that the cow—the animal which produces most milk for human consumption—should be placed amid surroundings conducive to the maintenance of good health. Cows exposed to mal-nutrition, damp soils, and bad ventilation are prone to phthisis, and, as this disease is very frequent among cows, and tubercle bacilli are frequently present in their milk, these facts point to the use of milk as one of the causes of the prevalence of tuberculosis. Brouardel, of Paris, relates a case where five out of fourteen girls residing at a boarding-school became affected with phthisis through drinking milk supplied from a tuberculous cow. Dr. Sims Woodhead agrees with the statement of Baug that the milk of tuberculous cows is only dangerous when the mammary gland is affected, but other observers are of opinion that the milk of any tuberculous cow is a dangerous food. By heating milk to a boiling temperature for a few seconds the tubercle bacillus is rendered perfectly innocuous, and Seibert, of New York, has recommended the filtration of milk through absorbent cotton, by which process he states he is able to reduce the number of micro-organisms to one-twentieth. Milk is a common and useful food, and also one of the most easy vehicles for the carriage of disease. No care, therefore, can be too great to protect this important food from contamination before delivering it to the consumer. The present system is full of danger, as milk which was pure before it left the depôt may become infected, either in the cart or in the milk-shop. Pasteurisation does not render milk germ free, and it is a question whether this process is altogether desirable, as although milk treated by this method may leave the depôt in a practically pure state, it is highly probable that it is more ready to absorb noxious particles while in the hands of the vendor than if it had not been subjected to this procedure. Hirschberger has stated that 10 per cent. of the dairy cows near large towns are tuberculous, and this statement has been confirmed by other observers, who are of opinion that tuberculosis is not a rare disease among cows. Dr. Sims Woodhead states, "It must be remembered that infection from food can only account for a small proportion of cases of tuberculosis that occur, and that this infection occurs chiefly among young children." Meat, however, has proved a danger in spreading tubercle, and there is, according to many observers, a great possibility that tuberculosis is propagated by the ingestion of cooked tuberculous material. Such joints as rolled sirloins, in which the meat is tightly rolled together and bound with string, are not often thoroughly cooked, and the result of the experiments of Dr. Sims Woodhead tends to prove that if tuberculous material is left adhering to meat that may be made up into rolls, roasting or boiling as ordinarily conducted, *secundum artem*, cannot be relied upon to destroy its infectivity. Meat may also be infected by cutting it with a knife smeared with tuberculous material from an infected portion. Like all other living things, bacteria may be killed; and on this is based the whole process of disinfection. Some bacteria, however, are more resistant than others, and the spores are always specially so; in fact, it is not known how long and under what conditions the tubercle bacillus and its spores may retain their vitality. Although a hereditary tendency to phthisis may explain some cases which have been subjected to the same environment, Dr. Payne has collected numerous cases of infection of whole families, free from hereditary taint, after residing in rooms or houses previously occupied by persons suffering from tuberculosis. These cases of Dr. Payne are evidence of the communicability of phthisis through the prolonged activity of the spores of tubercle bacilli in infected houses, and the voluminous statistical evidence collected by Dr. Georg Comet proves the truth of Dr. Payne's conclusions. One of the most objectionable and yet compulsory accompaniments of this disease is the necessity for expectoration. The unfortunate victim cannot help expectorating, but he is able, and should be compelled, to exhibit caution, so that the sputum

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sputum is not cast haphazard on the ground, where it will dry and the dried infecting material can be lifted into the air by draughts or wind, become diffused as dust, and in this form inhaled by others of the community. This matter of dealing with the expectoration is most important, as many cases of phthisis arise through carelessness in this direction. As all disease is unnatural, and ought to be prevented, so phthisis ought to be if possible prevented, and many observers are of opinion that tubercular children are those inheriting a feeble power of resisting the bacillus, which finds in them a suitable soil, and that there is no actual tubercular disease in these children at birth. Such observers, therefore, are of opinion that phthisis is a preventible disease, and that attention to general hygienic improvements, such as good ventilation, plenty of fresh air, plenty of light, dry houses, good drainage, and avoidance of over-crowding, tends to check the development of tuberculosis. There is no doubt but that the present improved social condition of the masses of people has assisted in checking the spread of this disease, and that this condition has been coincident with the progress of sanitary science. The contagion of phthisis was recognised by Galen, and in over-crowded dwellings the risk of this contagion is very great, the ratio of phthisis, according to Dr. Haldane, increasing with the amount of over-crowding and the foulness of the air. To remedy this last evil in this city a proper Building Act is necessary, which will also ensure the supply of a proper amount of light to the buildings, light having the beneficial effect of shortening the life of the tubercle bacillus. The beneficial results obtained through drying of the soil, were first noticed by Mr. Middleton, in the enormous reduction of the mortality from phthisis at Salisbury, after the removal of the ground water by drainage. Dr. Buchanan, of the Local Government Board (London), very thoroughly worked out this subject, and maintains that, with a few exceptions, he has most conclusively proved an intimate relation between the incidence of phthisis and dampness of soil. Coincidently with and independently of Buchanan, a similar series of experiments were carried out by Dr. Bowditch in America, and he states "residence near or on a damp soil, whether that dampness be inherent in the soil itself, or caused by percolation from adjacent ponds, rivers, meadows, marshes, or springy soils, is one of the principal causes of phthisis." Dr. Kelly, of East Sussex, disputes Buchanan's figures, and states that phthisis does not occur in marshy regions which are malarious, and that in Sussex the mortality from phthisis is greater upon the drier soils; but Sir R. Thorne supports Buchanan's conclusions, and points out that Dr. Kelly does not sufficiently explain the definite relation between the amount of diminution in the phthisis death-rate and the extent and permanence of the lowering of the subsoil water. Dr. Buchanan arrived at the conclusion that "the drying of the soils, which has in most cases accompanied the laying of main sewers in the improved towns, has led to the diminution more or less of the phthisis death-rate."

REDUCTION IN PHTHISIS DEATH-RATE.

	Death-rate from Phthisis per 10,000 of the Population.	
	Before Construction of Sewers.	After Construction of Sewers.
Salisbury	44	22
Ely	31	16
Rugby	43	10
Banbury	26	16
Macclesfield	51	35

While in other towns the reduction was also very great, viz.:—Worthing, 36 per cent.; Leicester, 32 per cent.; Newport, 32 per cent.; Cheltenham, 26 per cent.; Bristol, 22 per cent.; Dover, 20 per cent.; Warwick, 19 per cent.; Croydon, 17 per cent.; and Merthyr, 11 per cent.

Since the construction of the improved main sewers in the City of Sydney, the death-rate from phthisis has decreased from 13·5 per 10,000 of the population to 9·8.

Year.	Population.	Deaths.	
		Number.	Rate per 10,000 of the Population.
1890	113,870	154	13·5
1891	109,090	135	12·3
1892	107,730	144	13·3
1893	106,380	143	13·4
1894	104,380	112	10·6
1895	103,870	112	10·6
1896	100,000	98	9·8

In the various districts which have been sewered a decrease in the mortality from phthisis has been noticed since the laying of the main sewers.

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REDUCTION in the Mortality from Phthisis in the various districts since the laying of sewers.

	Density of population per acre.	Mortality— Rate per 10,000 of the Population.	
		1890.	1896.
City	44·4	13·6	9·8
Glebe	37·0	11·5	6·2
Darlington	90·9	8·0	2·6
Newtown	48·5	6·1	3·9
Redfern	55·9	12·1	5·2
Waterloo	11·7	15·9	6·4
Paddington	48·3	13·6	7·2
Woollahra	3·9	6·1	4·2

The reduction in Waterloo is to be noted, as this suburb is furnished chiefly with a water-logged sandy soil, the subsoil water being in many places within three feet of the surface. Since the laying of the main sewers the level of the subsoil water has been reduced 17 feet in many places, and wells in this district were completely drained. This, therefore, is one example of drying of soil through laying main sewers. In some of the districts, such as Erskineville, which is not yet provided with a proper sewerage system, the establishment of storm-water drains has proved a marked benefit, and in this specially named borough, the standard of health has very much improved since the laying of the storm-water sewers, and the mortality from phthisis has decreased from 15·3 per 10,000 of the population in the year 1890, to 12·9 in the year 1896. The death-rate from phthisis in the various aggregated suburbs, *i.e.*, north-western, &c., has greatly decreased since the year 1890, and this decrease can be traced to the existence of proper sewerage in one or more suburbs of a group and also to the fact that those unsewered districts, where they fringe on the sewered districts, must derive some benefit from the sewered portion. In the individual unsewered suburbs there is no appreciable difference for better or worse in the phthisis death-rate.

During the first six months of this present year 201 cases of phthisis ending in death have been registered in the metropolis; 73 were registered in the city, and 128 in the suburbs. Of the 73 cases registered in the city, 8 were traced to country districts, 2 came into port suffering from the disease, and the addresses of 3 could not be ascertained; 58 cases, therefore, really came from the city proper; that is, 5·8 per 10,000 of the population.

Metropolis.

ORDER of incidence Mortality from Phthisis half-year 30th June, 1897.

	Deaths.		Borough showing highest rate of Mortality per 10,000.
City	58	City	5·8
North Western Suburbs ...	30	Leichhardt	7·7
Western Suburbs	28	Strathfield	12·0
West Central Suburbs ...	26	Erskineville	10·2
East Central Suburbs... ...	20	Botany	20·0
Northern Suburbs	18	North Sydney	6·7
Eastern Suburbs	11	Waverley	5·2
Southern Suburbs	2	Hurstville	2·2

As regards age, the greatest mortality occurred between the ages of 20 and 30 years, 58 cases being distributed between these ages, and 11 fatal cases occurring at the age of 28 years.

DISTRIBUTION of Mortality from Phthisis in the Metropolis according to age for the half-year ending 30th June, 1897.

Under 1 year.	1 year.	16 to 19 years.	20 to 29 years.	30 to 39 years.	40 to 49 years.	50 to 59 years.	60 to 69 years.	74 years.	81 years.
3	2	17	58	57	28	17	19	1	1

Of the 201 fatal cases seventy-three came from sewered districts, and 128 from unsewered districts. In proportion to the density of population the disease proved more fatal in many of the thinly populated districts, for instance, Ryde with a density of ·2 per acre shows a mortality of 4·3 per 10,000 of the population, while in the city where the population has a density of 44·4 per acre, the mortality is 5·7, and North Sydney with a population of 8·6 per acre shows a mortality of 6·7 per 10,000. The situation of these various suburbs has of course to be taken into consideration, but it is here to be remarked that so moist and wind-swept a suburb as Waverley has only a mortality of 1·4. In instituting the comparison which he drew regarding the incidence of phthisis on what he calls permeable and retentive soils, Dr. Buchanan pointed out that the geological formation of a district must be considered, for a district will be dry in proportion as it lies high in relation to the places around it, and damp in proportion as it lies low.

As

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As before said Buchanan's researches led him to conclude that phthisis flourishes best upon a damp retentive soil, and that the same soil is moister or drier according to its height and slope. An examination of the nature of the soils of the city and suburbs of Sydney shows that the greatest mortality from phthisis occurred on the clay shale soils, although in proportion to the density of population it was greatest on the water logged sandy soils and on the sandy clay soils. Where the land was low-lying and with little slope the mortality was greater than on the high sloping land, notwithstanding the nature of the soil. Low-lying clay shale soils were found to be very wet. In Erskineville where the soil is of a clay shale formation, it was found that on many of the low-lying portions, which were formerly very wet, the mortality from phthisis had been very great, but since the establishment of the storm-water sewer the soil has become drier, and the phthisis death-rate has decreased. I have no doubt but that from our experience in this suburb the establishment of the storm-water sewers will prove of great value in diminishing the death-rate from phthisis in many of the low-lying districts. In the borough of Redfern there are many places where the soil used to be saturated with water, but since the laying of the sewer mains in these districts the soil has become much drier and the phthisis death-rate in this borough has been reduced from 12·1 per 10,000 of the population to 5·2. One of the difficulties presenting itself during this inquiry has been the determination of a definite period of residence for each patient in any locality. This determination I found to be almost impossible, and I early abandoned any attempt at fixing a definite period of residence. By massing the whole population of the city and suburbs and dividing them into groups, according to the greater or less prevalence of phthisis, I have obtained the following table:—

Groups of Districts.	Proportion of population per 10,000 residing on—	
	Permeable Soils.	Retentive Soils.
With least phthisis	825	663
With moderate phthisis	997	711
With most phthisis	129	4,595

Upon pervious soils I find the phthisis death-rate is 30·9 per 10,000 of the population, while upon retentive or impervious soils it reaches 50. The death-rate from phthisis is highest upon those soils into the composition of which clay chiefly enters. It is highest upon clay-shale soils, next highest upon clay soils, very nearly as high upon soils composed of clay with an upper stratum of sand, next upon clay soils with an under stratum of rock, next upon soils composed of sand over-lying rock, low upon true rock, and lowest of all upon pure sand. Comparing the various slopes, I find that the rate is lower as the slope increases, no matter what the nature of the soil may be. I found one exception in regard to this influence of slope in Strathfield, which shows a high death-rate from phthisis; but I am of opinion that a portion of this rate is due to the fact that this suburb is considered to have a beneficial effect in the treatment of lung diseases, and consequently many phthisical persons choose this suburb for residence. House connections do not appear to exercise the same influence upon the phthisis death-rate as the laying of the main sewers, but it is not improbable that they will also be found to have created a subordinate system of subsoil drainage, by which a certain area of land surrounding the pipes has become drier. Be this as it may, and without making any distinct assertion, the following investigation by the Board's Inspector of the 201 fatal cases of phthisis reported for the half-year ending 30th June, 1897, is very interesting:—

No sewers available	128
Houses with insanitary fittings	56
Houses properly fitted according to the Board's regulations	17
Total	201

That is, only about 8 per cent. of the total deaths occurred in dwellings the sanitary fittings of which were in accordance with the Board's regulations.

The conclusions, therefore, which I have drawn from this inquiry are:—

1. That there is an undoubted relation between the incidence of phthisis and dampness of the soil.
2. That as the phthisis death-rate has been reduced in those districts provided with proper sewerage since the laying of the main sewers, the laying of the main sewers has exercised an influence over the phthisis death-rate through drying of the soil.
3. That in view of this success which has attended the Board's operations up to the present time, the extension of these operations will prove of great benefit in coping with the disease called phthisis.

In the near future it is to be hoped that the passing of a proper Building Act will materially augment the success of the Board's operations, and that the evils of phthisis will be minimised, if not altogether checked. I have to thank the Registrar-General for the various statistical information he has kindly afforded me.

I have, &c.,

THEO. MAILLER KENDALL,
Medical Adviser.

Sydney, 20th September, 1897.

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DEATHS from Phthisis, Metropolis, half-year ending 30th June, 1897.

	Density of Population per acre.	Rate of Mortality per 10,000 of the Population.
City	44·4	5·8
Suburbs—		
North-western—		
Balmain	44·2	3·5
Leichhardt	13·8	7·7
Annandale	25·0	6·0
Glebe	37·0	6·2
West Central—		
Newtown	48·5	1·8
Camperdown	16·4	0·0
Erskineville...	35·2	10·2
St. Peters	6·1	0·0
East Central—		
Redfern	55·9	3·2
Darlington	90·6	5·2
Waterloo	11·7	1·05
Alexandria	8·4	3·3
Botany	1·1	20·0
North Botany	1·3	3·3
Eastern—		
Paddington	48·3	4·1
Randwick	·9	0·0
Waverley	5·2	1·4
Woollahra	3·9	·9
Western—		
Ashfield	6·6	5·9
Burwood	6·1	6·1
Enfield	1·3	0·0
Concord	·8	0·0
Strathfield	1·4	12·0
Five Dock	·9	0·0
Drummoyne...	4·2	9·5
Marrickville...	8·05	1·2
Petersham	16·8	4·7
Southern—		
Canterbury	·4	0·0
Hurstville	·5	2·2
Kogarah	·7	0·0
Rockdale	1·3	1·6
Northern—		
North Sydney	8·6	6·7
Mosman	1·06	4·5
Willoughby	·6	2·9
Manly	...	...
Ryde...	·2	4·2
Hunter's Hill	4·1	4·3

Annual

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Annual Report of Medical Adviser on the Health of the Officers and Employees of the Board.

Sir, 12 July, 1897.

I have the honor to report that during the financial year beginning 1st July, 1896, and ending 30th June, 1897, seventy-five of the officers and employees of the Board presented themselves for examination.

Seventeen had met with accidents.

Forty-two were suffering from general ailments.

Five were ordered to return to work.

Three were reported as having brought about their illness through some fault of their own.

Eight were examined for certificates of fitness for the Board's employment. Four hundred and fifteen days' leave of absence were recommended for cases of accident, and of these three months were granted to a man severely crushed in a trench, three months to an officer who fractured his knee-cap, three weeks to a man suffering from sunstroke, and twenty-two weeks to Lambert, a storeman, who was operated upon in the Sydney Hospital.

For general ailments, 352 days of leave were recommended, six weeks of which were granted to Mr. Tyndall, a district clerk who had contracted heart disease, and eventually died suddenly.

No single case of illness could be traced to any defect in the works of the Board, and the health of the maintenance men employed in the sewers has been of a very high standard.

THEO. MAILLER KENDALL.
Medical Adviser.

To the Secretary.

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Report of Assessor's Branch for the year ending 30th June, 1897.

Sydney, 23 August, 1897.

I HAVE the honor to submit a report on the work done in this branch during the year ending 30th June, 1897.

A number of reductions in the assessments of the City and Suburban Councils, and the effect thereby caused in the Board's revenue have again to be recorded. The amount of rates received may, however, be considered satisfactory, and the fact that the arrears of water rates on house property on 30th June, 1897, when compared with the report presented in 1896, show a decrease of about £928, is worthy of remark. This satisfactory result has been obtained notwithstanding that a number of properties have become liable for water rates for the first time during the period now under review.

Rate Notices.

279,101 notices were served upon ratepayers, including those for new mains, new sewers, and finals for payment of overdue rates.

New Mains and New Sewers.

2,784 properties became liable for rating from new mains, and 3,739 from new sewers, making a total of 6,523.

New Assessments.

1,876 assessments of new buildings, &c., were made, and fees amounting to £2,018 8s. 7d. for water used for building purposes were received.

Summons Work.

28,066 final notices were served, and 3,464 summonses issued from the various Courts as under:—

Balmain Court	253
Central Court	853
District Court	84
Glebe Court	435
Liverpool Court	12
Newtown Court	825
North Sydney Court...	314
Paddington Court	226
Parramatta Court	80
Redfern Court	412
Ryde Court	29
Water Police Court	401
Total	3,464

Properties rated to 30th June, 1897.

Water.

	Houses.	Vacant land.	Total.	Supplied with Water.
City of Sydney and Suburbs	95,211	23,588	118,799	86,389
Campbelltown	214	13	427	188
Liverpool	449	94	538	224
Richmond	226	...	226	226
Smithfield and Fairfield ...	97	3	100	63
Parish of Gordon	418	393	811	326

Sewerage.

				Connected to Sewer.
City of Sydney and Suburbs	47,830	3,985	51,815	47,593

The Secretary.

H. J. BEAUMONT,
Assessor.

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Summary of Properties Liable and Notices Delivered during 1896-7.

Ward or Borough.	No. of Properties Liable.										No of Notices delivered during 12 months ending 30th June, 1897.										
	No. of Properties liable on 1st July, 1896			New Buildings on Old Mains becoming liable during the year.		Properties becoming liable through new mains and sewers		Total No. of Properties liable to 30th June, 1897.			Water, Sewerage, and Drainage Rates.	New Buildings on Old Mains and Sewers.	New Mains, including Notices to connect.	New Sewers, including Notices to connect.	Second Notices to Connect to Sewers	Demand Notices for payment of Sewerage Expenses.	Stock Notices.	Garden Notices.	Special Fee Notices	Final Notices.	Distress Notices	Total.
	Water.	Sewerage.	Drainage.	Water.	Sewerage.	Water.	Sewerage.	Water.	Sewerage	Drainage.												
Bourke Ward..	1,170	1,106	.	19	11	.	..	1,189	1,117	.	2,335	19	..	..	..		35	9	80	165	1	2,644
Brisbane Ward ..	1,310	1,231	..	9	7	..	3	1,319	1,241	..	2,640	9	.	6	.	..	132	2	90	349	15	3,243
Cook Ward.. ...	6,209	6,129		50	43		..	6,259	6,172	.	12,363	50	.	..	..	..	650	28	50	1,472	82	14,695
Denison Ward	4,344	4,241	2	61	47	2	7	4,407	4,295	2	8,681	61	4	4	.	.	385	6	39	1,070	37	10,287
Fitzroy Ward	3,721	3,597	4	32	25	2	..	3,755	3,622	4	7,378	32	4	..		4	268	72	24	771	36	8,580
Cipps Ward	1,918	1,700	..	12	10	.		1,930	1,710	..	3,792	12		.	..		69	8	34	312	17	4,244
Macquarie Ward .	2,088	2,044	..	10	5	.		2,098	2,049		4,132	10			..		147	3	80	449	9	4,830
Phillip Ward .	2,560	2,560	..	11	6			2,571	2,563		5,117	11			.		232	5	40	602	17	6,024
Alexandria ...	2,780	1,951		44	36	5	685	2,829	2,672		5,335	44	10	924	200		264	12	9	763	23	7,580
Annandale ..	2,072	..	..	59		7		2,138	.		3,916	59	12	.	..	.	248	65	17	530	1	4,848
Appin	. .	..	..	.		..	.	....	..	.	.. .	..		..	.			..	8	..		8
Ashfield	4,098	.	3,057	60	.	13		4,171	..	3,057	7,510	60	26	.			359	205	20	637	5	8,822
Auburn	933		..	13		26		972	..	..	1,812	13	48	..	..	.	30	3		207	6	2,119
Balmain	7,181	..	1,654	121	..	55	..	7,357	..	1,654	14,068	121	100	..	..		485	156	32	1,634	43	16,639
Bankstown	16		.	..		9	.	25	..	..	25	.	18	..	..		.	.		10	.	53
Botany	664	..	..	26	..	10	..	700	..	.	1,232	26	12	..	..		66	11	3	139	3	1,492
Burwood	1,898	..	.	27	..	25	..	1,950	..	..	3,732	27	33	..	..		195	109	10	335	3	4,449
Campbelltown ..	249	..		1		7	..	257	..	..	471	1	14		..		11	5		157		659
Camperdown ...	1,697	1,230	..	15	12	.	1	1,712	1,293	.	3,325	15		2	158	70	255	16	9	508	9	4,367
Canterbury....	928	..	63	19	..	29	..	976	.	63	1,735	19	56	.	..		68	7	1	271	10	2,167
Concord	1,014	.	..	16		16		1,046	.	.	1,623	16	32	.		.	53	13	2	230		1,969
Darlington	756	751	..	2	2	.		758	753	.	1,515	2		..	..		101	1	2	134	1	1,759
Drummoyne	970			16	.	1	..	987	..		1,943	16	2			.	64	25	3	107	2	2,167
Enfield	703	.	153	19		27	..	754		153	1,337	19	50	.	.		76	11		167	6	1,663
Erskineville	1,428	495		5			900	1,433	1,395	..	2,833	5	.	903	1		129	10	12	509	7	4,414
Five Dock	484	..	..	7			.	491	..	.	931	7		..	..	.	42	2		74	1	1,057
Glebe	4,039	2,497	992	52	11	12	18	4,103	2,526	992	8,120	52	24	36	2	..	455	161	22	891	29	9,792
Gordon	856	..	.	63	..	1,000	.	1,919	.	.	1,005	63	1,454	..	..	.	2	2		175		2,701
Granville	2,116		.	13	.	41	..	2,170	.	..	3,726	13	66	.	..	.	71	15	2	440	11	4,344
Guildford	28	..	..	2	.	..		30	.	..	54	2	..	..	..		..		.	32	.	88
Homebush	330	..		5		..	..	335	..	..	677	5	..	..	..	..	10	1		90	3	786
Hoxton Park	1	..	..	.	.	.		1	..	.	2				..		..			.		2
Hunter's Hill	680	..	..	10		20	..	710		.	1,420	10	36		..		95	32	3	137	3	1,736
Hurstville	2,301		..	34	.	42	..	2,377	..	..	3,403	34	74	..			171	45	1	393	1	4,127
Islands	25	..	..	..	.	..	.	25	.	..	50	.	.	..	.		.	..	1	..		51
Kogarah	1,372	..	..	25	..	17	.	1,414	..	..	2,495	25	26	.	.		111	18	5	328	10	3,018
Lane Cove	498	.	..	13	..	30		541	.	..	988	13	60	.	.		26	12	1	63	6	1,169
Leichhardt	4,780	..	1,124	70		9		4,859	..	1,124	9,041	70	16	..	.		426	115	29	1,213	50	10,960
Liverpool.....	640	..	..	6	..			646	.		1,145	6		.			10	12	.	836		2,009
Marrickville	5,037	70	.	97	5	21	.	5,155	75	.	9,793	97	42		15	6	720	297	49	886	16	11,930
Mosman	1,250	..	.	83	.	78		1,411	.	.	2,526	83	152				69	90	5	158	4	3,087
Newtown.	5,147	2,468	584	70	35	..	700	5,217	3,203	584	10,025	70		700	2	2	525	54	50	1,014	30	12,503
North Botany ..	982	9		14	..	12	.	1,008	9		1,777	14	22	.			128	13	3	247	6	2,210
North Sydney ..	5,196		1,240	142	..	44	.	5,382	.	1,240	10,456	142	76	.			403	293	37	1,103	37	12,557
Paddington.....	4,478	3,723	14	39	39	1	.	4,518	3,763	14	8,937	39	2			4	441	97	24	1,107	22	10,673
Parramatta	20	..		..		1	..	21		.	41	.	2			.	2	2	..	13	..	60
Petersham	3,311	524	1,921	83	5	..	..	3,394	530	921	6,610	83	.	2	.	20	266	326	32	1,128	42	8,509
Prospect & Sherwood.	180		..	2	..	..		182		..	271	2	.		.		14	..	..	137		424
Randwick . . .	2,006	762	.	65	27	45	53	2,116	842		4,435	65	90	106	24	22	213	136	15	431	16	5,583
Redfern	4,726	4,709	..	38	34	.	..	4,764	4,743	..	9,574	38	.	.	.	4	551	36	42	1,489	51	11,776
Rockdale	2,558	..	..	46	.	4	..	2,608	..	.	4,900	46	6	.	..		303	112	8	549	5	5,929
Rookwood	485	..	..	6		12	..	503		.	926	6	20				72	2		166	.	1,192
Ryde	444	..	.	3	..	21	..	468	..		874	3	16	.	..		62	6	1	73	2	1,037
Silver Water ..	169		..	8	.			177	.	..	319	8	.				14	.	.	53	.	394
Smithfield and Fairfield.	116	.	..	2			.	118			224	2					8	..	2	97	2	335
St. Peters	1,807		.	12		..	.	1,819		..	3,430	12					240	16	16	275	14	4,003
Strathfield .	932			9		4		945	.	..	1,608	9	6			.	31	59	1	344	2	2,060
Vaucluse	210			6		.	.	216			420	6					15	12	1	37	1	492
Waterloo	2,367	2,044	24	14	8	.	145	2,381	2,197	24	4,656	14	..	290			305	19	13	706	31	6,034
Waverley	3,028	2,477		35	15	..	340	3,063	2,832		6,052	35		630	5	20	352	210	18	673	19	8,069
Willoughby	1,132			87		84	..	1,303		..	2,171	87	163		.		76	20	1	302	16	2,841
Woollahra	2,434	2,121	..	68	47	1	43	2,503	2,211		5,284	63		86	..	.	326	184	22	841	9	6,820
Totals	116,877	48,489	10,842	1,876	430	1,733	2,896	120,486	51,815	10,842	227,231	1,876	2,784	3,739	407	152	10,919	3,186	969	28,066	772	279,101

Stock, Gardens, and Special Fees.

Ward or Borough	Stock						Gardens						Special Fees					
	1895-6			1896-7			1895-6			1896-7			1895-96			1896-7		
	No of Stock Registered	Amount of Fees Paid for 18 months ending 30th June, 1896	Amount Outstanding on 30th June, 1896	No of Stock Registered	Amount of Fees Paid for 12 months ending 30th June, 1897	Amount Outstanding on 30th June, 1897	No of Gardens Registered	Amount of Fees Paid for 18 months ending 30th June, 1896	Amount Outstanding on 30th June, 1896	No of Gardens Registered	Amount of Fees Paid for 12 months ending 30th June, 1897	Amount Outstanding on 30th June, 1897	No of Special Fees Registered	Amount of Fees paid for 18 months ending 30th June, 1896	Amount Outstanding on 30th June, 1896	No of Special Fees Registered	Amount of Fees Paid for 12 months ending 30th June, 1897	Amount Outstanding on 30th June, 1897
		£ s d	£ s d		£ s d	£ s d		£ s d	£ s d		£ s d	£ s d		£ s d	£ s d		£ s d	£ s d
Bourke Ward	30	10 2 6	0 10 0	35	9 2 6		6	5 1 3		9	4 5 8		63	89 6 9	19 17 6	80	83 15 0	11 17 6
Brisbane Ward	89	27 12 6	1 5 0	132	32 5 0	1 10 0	2	1 10 0		2	1 0 0		51	41 16 3	5 10 0	90	36 11 11	0 2 6
Cook Ward	702	209 0 6	24 2 6	650	160 9 3	4 9 6	20	10 16 3		28	12 16 11		39	17 8 4	0 17 6	50	25 2 6	
Denison Ward	405	128 1 3	14 7 6	385	90 3 3	17 0 6	4	1 17 6		6	2 7 6		35	55 14 0	1 15 0	39	20 2 6	15 17 6
Fitzroy Ward	235	68 15 0	13 10 0	268	65 16 6	0 18 6	61	59 0 0	3 10 0	72	43 5 0	0 5 0	21	11 17 6		24	15 12 6	
Gipps Ward	51	16 16 3	2 10 0	69	15 16 6	2 7 6	6	3 10 0		8	3 5 0		16	18 11 8	0 15 0	34	24 12 6	0 15 0
Macquarie Ward	107	34 10 0	1 17 6	147	33 12 6	2 7 6	3	2 5 0					63	82 4 2	25 7 6	80	73 0 0	15 15 0
Phillip Ward	283	85 3 9	9 15 0	232	52 5 0	4 17 6	6	4 12 6		5	3 0 0		32	21 7 6	1 5 0	40	17 0 0	2 17 6
Alexandria	314	94 13 9	8 10 0	264	63 5 0	10 17 6	12	6 12 6		12	5 17 6		9	8 15 0	3 12 0	9	7 0 0	2 2 6
Annandale	233	71 10 0	1 10 0	248	60 2 6		48	32 1 11		65	32 2 6		13	9 2 6		17	6 17 6	
Appin													9	1 12 6	0 12 6	8	6 12 6	
Ashfield	269	82 1 3	5 15 0	309	71 6 8	1 0 0	150	117 14 5	4 9 6	205	115 9 11	1 15 0	22	8 3 9	1 12 6	20	9 2 6	
Auburn	25	6 13 9		30	6 3 9	0 5 0	4	2 5 0		3	1 2 6		4	0 15 0				
Balmain	386	132 12 6	13 10 0	485	120 15 0	1 0 0	129	97 18 3	2 2 6	156	107 1 5		26	14 7 6	1 7 6	32	13 7 6	1 0 0
Bankstown																		
Botany	69	23 6 3	1 2 6	66	14 12 6	1 12 6	7	3 18 9		11	5 1 3		4	3 7 6		3	3 15 0	0 2 6
Burwood	208	58 17 6	4 15 0	195	42 13 0	5 12 0	100	85 1 2	1 3 9	109	61 15 10	3 0 0	13	7 6 3		10	4 10 0	0 5 0
Campbelltown	15	3 18 9	0 10 0	11	1 5 0	2 0 0	6	3 10 0		5	1 15 0	0 10 0	1		0 5 0	1	0 5 0	0 5 0
Camperdown	276	83 1 3	7 2 6	255	57 15 9	9 13 0	10	5 7 6		16	5 1 3		10	7 6 3	1 0 0	9	2 17 6	0 12 6
Canterbury	57	13 10 9	2 8 0	68	16 12 6	0 2 6	5	3 0 0		7	2 15 0		1	0 2 6	0 15 0	1	1 10 0	0 7 6
Concord	45	12 10 0	2 6 3	53	10 6 3	3 8 9	8	2 15 5	7 6 3	13	17 14 5		2	0 5 0		2	0 5 0	
Darlington	93	29 3 9	3 0 0	104	25 17 6	1 2 6	2	1 2 6		1	0 12 6		5	1 10 0		2	0 5 0	0 5 0
Drummoyne	45	13 11 3	1 8 9	64	13 17 6	2 1 3	17	16 17 6		25	15 7 0		2	0 6 6		3	0 12 6	
Enfield	72	17 3 9	6 7 6	76	18 10 0	2 2 6	11	6 2 1	0 10 0	11	5 11 3	0 10 0	1	0 2 6				
Erskineville	143	40 18 9	2 7 6	129	29 8 9	3 7 6	7	5 1 3	0 5 0	10	4 7 6	1 10 0	10	2 7 6	0 10 0	12	3 17 6	0 12 6
Five Dock	27	7 13 9	0 18 9	42	9 7 6		2	1 12 6		2	1 5 0		1	0 2 6				
Glebe	445	133 10 0	17 7 6	455	116 17 6	9 7 6	133	97 18 2	4 7 6	161	84 2 0	3 12 6	18	10 10 0	1 10 0	22	9 5 0	1 7 6
Gordon	1	0 7 6		3	0 11 3					2	0 16 9							
Granville	73	20 11 3	3 16 3	71	16 6 3	1 10 0	9	4 15 0	1 7 6	15	7 5 0	0 10 0	1	0 7 6		2	0 5 0	
Guildford																		
Homebush	12	2 13 9	0 13 9	10	1 15 0	1 0 0				1	0 11 3		1	0 5 0				
Hoxton Park													3	3 5 0	0 5 0			0 5 0
Hunters Hill	75	22 11 3	2 1 3	95	20 17 6	1 5 0	19	18 11 3	1 10 0	32	15 19 5	3 15 0	3	1 2 6		3	2 10 0	
Hurstville	129	29 13 9	5 6 3	171	26 16 3	0 10 0	36	29 0 3		45	19 8 9	0 2 6	3	1 0 0		1	0 10 0	
Islands																		
Kogarah	51	12 5 0	1 1 3	111	22 18 9		12	4 1 3		18	10 5 0		4	0 15 0		5	1 2 6	
Lane Cove	22	4 3 9	0 13 9	26	4 8 9	1 0 0	5	4 9 5		12	4 5 0	0 12 6				1	0 10 0	
Leichhardt	445	136 0 0	4 15 0	426	101 11 3	3 10 0	90	60 11 8		115	57 14 7	0 10 0	27	16 8 9	1 0 0	29	10 5 2	0 2 4
Liverpool	11	0 16 3	3 5 0	10	3 8 0	2 7 0	15	6 5 0	0 10 0	12	5 17 6		3	3 18 9	0 2 6			0 2 6
Marrickville	548	155 0 0	12 11 3	720	142 3 8	17 18 0	226	165 2 8	4 2 6	297	161 14 2	3 1 3	56	53 13 9	4 5 0	49	17 12 6	0 12 6
Mosman	36	9 12 6	0 7 6	69	11 11 3	1 0 0	63	47 9 6	2 6 3	90	57 0 11	3 5 0				5	1 0 0	
Newtown	625	192 17 6	17 5 0	525	120 15 0	13 7 6	47	34 10 8	1 10 0	54	28 14 7	0 15 0	48	23 11 8	2 0 0	50	18 3 9	3 10 0
North Botany	115	36 3 4	0 12 6	128	23 16 3	2 5 0	10	7 10 0		13	7 5 0	0 5 0	3	3 0 0		3	1 7 6	
North Sydney	293	83 8 9	7 3 9	403	89 15 0	4 15 0	255	198 7 3	4 0 0	298	170 5 9	4 7 6	21	23 12 6	0 15 0	37	53 10 0	
Paddington	462	134 0 0	15 10 0	441	104 3 9	18 7 6	80	62 1 11	4 5 0	97	55 1 11	5 6 3	19	12 11 0		24	9 10 0	2 2 6
Parramatta				2	0 5 0					2	1 16 11							
Petersham	257	79 14 6	5 13 0	266	60 17 6	6 5 6	214	166 8 0	4 12 6	326	189 19 8	6 10 0	25	11 0 0	2 0 0	32	12 12 6	
Prospect and Sherwood	6	1 7 6	0 15 0	14	2 6 3	0 7 6												
Randwick	229	59 15 0	10 15 0	243	57 18 0	10 7 0	130	111 9 8	13 10 0	136	92 15 1	14 2 6	9	2 0 0	0 5 0	15	4 5 0	0 2 6
Redfern	435	164 2 6	19 7 6	551	121 5 0	15 0 0	28	18 15 8	0 10 0	36	14 5 0	2 10 0	42	33 2 6	3 0 0	42	20 7 6	2 7 6
Rockdale	187	49 16 8	3 11 3	303	62 7 0	2 10 6	85	70 14 11		112	53 17 6	1 7 6	3	1 0 0		8	2 12 6	
Rookwood	69	3 15 0	21 2 6	72	3 2 6	34 7 6	2	0 15 0	61 2 6	2	1 0 0	28 2 6				1	6 4 0	
Ryde	47	14 7 6	1 1 3	62	13 7 6		2	2 5 0		6	3 18 9					1	1 1 0	
Silver Water	9	2 2 6	0 10 0	14	2 10 0	0 7 6												
Smithfield and Fairfield	2	0 7 6		8	1 7 6											2	0 10 0	
St Peters	303	95 12 0	2 11 9	240	81 6 3	1 7 6	7	5 17 6	0 10 0	16	6 11 3		7	3 0 0		16	4 5 0	
Strathfield	37	9 1 9	2 19 6	31	8 17 6	1 2 0	60	73 14 8	2 6 3	59	54 2 0	1 5 0	1	5 2 3	0 2 9	1	7 0 0	
Vaucluse	15	2 15 0	0 17 6	15	4 0 0		10	7 0 0	1 2 6	12	9 17 6		2	0 10 0		1	0 10 0	
Waterloo	334	100 1 3	14 5 0	305	68 2 8	17 5 6	16	10 18 9		19	8 12 6	0 10 0	11	7 0 0		13	2 17 6	1 10 0
Waverley	344	93 11 3	17 7 6	372	81 4 6	0 17 8	176	134 0 11	6 16 3	210	125 14 7	7 13 1	10	6 12 6	0 10 0	18	6 5 0	0 5 0
Willoughby	39	11 18 9	1 13 9	76	14 2 6	0 12 6	12	4 5 9		20	10 7 6	1 0 8				1	0 7 6	
Woollahra	316	92 13 9	13 5 0	326	82 18 9	6 17 6	162	144 4 2	7 0 0	184	111 12 0	3 5 0	7	8 3 9	10 15 0	22	24 10 0	0 2 6

Summary of Rates, Fees, &c., for Water.

Ward or Borough.	No. of Properties liable.	Water Rates.	Meter Accounts.	New Mains—broken periods.	New Buildings—broken periods.	Stock.	Gardens.	Special Fees.	Building Fees	Revenue for year ending 30th June, 1897.	Less Rates cancelled or removed.	Net Revenue.	Arrears from previous years.	Total Water Rates receivable to 30th June, 1897.
		£ 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.
Bourke Ward	1,189	9,535 0 4	3,820 11 8		157 10 1	8 12 6	4 5 8	81 2 6	41 13 8	13,648 16 5	231 4 3	13,417 12 2	2,049 19 10	15,467 12 0
Brisbane Ward	1,319	6,401 13 2	2,266 13 8		15 0 9	32 10 0	1 0 0	40 1 11	21 13 0	8,778 12 6	28 15 2	8,749 17 4	1,425 12 0	10,175 9 4
Cook Ward	6,259	7,445 7 3	997 18 4		22 5 7	163 3 9	12 16 11	24 17 6	63 9 7	8,729 18 11	94 11 10	8,635 7 1	1,011 9 5	9,646 16 6
Denison Ward	4,407	6,516 6 10	6,222 14 2	0 7 11	39 7 4	96 8 9	2 7 6	34 15 0	59 5 8	12,971 13 2	69 1 1	12,902 12 1	2,702 13 1	15,605 5 2
Fitzroy Ward	3,755	6,591 19 9	872 16 1	0 10 1	18 1 11	65 2 6	43 5 0	16 7 6	36 1 1	7,644 3 11	21 14 1	7,622 9 10	859 2 8	8,481 12 6
Gipps Ward	1,930	3,828 10 10	2,444 11 5		3 12 0	16 5 0	3 15 0	25 2 6	13 4 10	6,335 1 7	48 12 2	6,286 9 5	1,099 4 5	7,385 13 10
Macquarie Ward	2,098	7,413 5 1	1,025 1 0		27 9 4	34 10 0		68 7 6	4 19 3	8,573 12 2	52 13 7	8,520 18 7	1,266 6 10	9,787 5 5
Phillip Ward	2,571	3,984 5 3	1,871 18 2		5 5 9	54 10 0	3 0 0	19 12 6	21 6 7	5,959 18 3	15 19 1	5,943 19 2	1,268 1 1	7,212 0 3
Alexandria	2,829	1,455 9 0	596 2 9	0 19 1	7 5 2	66 12 6	5 17 6	8 0 0	34 14 7	2,175 0 7	6 18 6	2,163 2 1	353 13 4	2,521 15 5
Annandale	2,138	1,353 15 0	184 12 5	1 0 5	13 3 0	60 17 6	13 15 0	7 17 6	69 9 1	1,714 9 11	10 0 2	1,704 9 9	224 19 11	1,929 9 8
Appin								6 0 0		6 0 0		6 0 0	0 12 6	6 12 6
Ashfield	4,171	3,406 14 4	610 14 4	2 18 1	22 17 1	76 1 8	121 15 5	7 10 0	68 0 1	4,316 11 0	33 2 5	4,283 8 7	862 13 5	5,146 2 0
Auburn	972	298 16 8	25 13 0	8 5 6	4 12 6	6 16 3	1 12 6		2 8 10	348 5 3	3 7 8	344 17 7	82 16 0	427 13 7
Balmain	7,357	5,046 11 1	1,467 15 0	5 10 3	35 1 8	115 17 6	107 1 5	14 7 6	122 0 2	6,914 4 7	28 14 5	6,885 10 2	844 17 0	7,730 7 2
Bankstown	25	37 13 7	87 13 5	0 8 10	9 16 2					135 12 0	5 8 3	130 3 9	22 19 11	153 3 8
Botany	700	367 5 7	556 7 11	1 9 5	3 11 11	15 15 0	5 11 3	3 17 6		958 16 8	2 0 0	956 16 8	147 18 8	1,104 15 4
Burwood	1,950	2,165 6 8	419 15 9	5 2 9	8 13 0	46 0 0	68 1 5	4 15 0	39 16 6	2,757 11 1	17 14 5	2,739 16 8	420 12 5	3,160 9 1
Campbelltown	257	271 2 3	102 9 6	2 16 5	3 12 3	2 15 0	2 5 0		1 1 6	386 1 11	5 9 9	380 12 2	110 10 10	491 3 0
Camperdown	1,712	1,354 19 2	162 6 4		1 13 3	60 16 3	5 11 3	2 10 0	25 1 10	1,612 18 1	2 11 0	1,610 7 1	285 12 9	1,895 19 10
Canterbury	976	390 9 2	88 13 4	3 2 8	13 5 2	16 0 0	2 15 0	1 2 6	5 18 2	521 6 0	14 3 5	507 2 7	165 10 3	672 12 10
Concord	1,046	509 4 1	481 5 0	6 2 11	5 8 7	11 16 3	11 9 5	0 5 0	12 18 11	1,048 10 2	7 1 4	1,031 8 10	350 18 7	1,382 7 5
Darlington	758	706 19 2	111 1 6		0 9 3	25 10 0	0 12 6	0 10 0	2 7 6	847 9 11	1 19 8	845 10 3	77 4 5	922 14 8
Drummoyne	987	521 17 9	95 4 6	0 7 0	14 2 7	15 0 0	17 4 6	0 12 6	22 15 10	687 4 8	2 15 11	684 8 9	200 1 8	884 10 5
Enfield	754	411 14 4	107 10 3	4 12 9	4 18 7	17 15 0	5 11 3		4 15 3	556 17 5	9 9 2	547 8 3	170 2 4	717 10 7
Erskineville	1,433	873 15 6	104 7 7		0 19 0	30 13 9	5 12 6	4 0 0	9 6 6	1,028 14 10	1 5 4	1,027 9 6	92 17 1	1,120 6 7
Five Dock	491	288 12 6	110 19 1		1 2 3	9 5 0	1 5 0		0 3 6	411 7 4	5 9 0	405 18 4	154 10 5	560 8 9
Glebe	4,103	4,066 19 5	606 11 6	2 3 5	12 9 3	110 17 6	89 17 0	9 7 6	67 13 4	4,965 18 11	33 5 10	4,932 13 1	567 12 9	5,500 5 10
Gordon	1,919	828 10 1	347 8 1	394 9 1	90 19 5	0 11 3	0 16 9		112 18 9	1,775 13 5	52 6 5	1,723 7 0	27 2 10	1,750 9 10
Granville	2,170	813 6 5	786 13 1	14 7 1	7 13 8	16 7 6	8 2 6	0 5 0	5 6 10	1,652 2 1	6 13 9	1,645 8 4	285 16 0	1,931 4 4
Guildford	30	44 6 0	12 14 5		3 15 8					60 16 1	3 17 9	56 18 4	51 17 7	108 15 11
Homebush	335	177 6 8	184 18 10		2 4 9	2 7 6	0 11 3			367 9 0	173 2 4	194 6 8	374 16 0	569 2 8
Hoxton Park	1	0 15 0								0 15 0		0 15 0	0 12 6	1 7 6
Hunter's Hill	710	815 9 9	308 6 7	3 11 0	4 16 11	20 5 0	19 11 11	2 10 0	12 6 6	1,186 17 8	11 5 8	1,175 12 0	356 15 7	1,532 7 7
Hurstville	2,377	739 19 10	215 16 4	6 18 11	22 12 9	27 7 6	24 11 3	0 10 0	16 2 9	1,053 19 4	32 18 5	1,021 0 11	255 1 11	1,276 2 10
Islands	25	373 16 4	389 17 0						0 8 9	764 2 1		764 2 1	267 4 8	1,031 6
Kogarah	1,414	555 9 0	128 13 2	3 14 5	8 15 10	22 17 6	10 5 0	1 2 6	14 15 5	745 12 10	14 18 11	730 13 11	203 3 8	933 17 7
Lane Cove	541	340 11 2	133 12 8	1 17 3	7 1 2	4 15 0	5 7 6	0 10 0	8 15 2	502 9 11	7 6 0	495 3 11	204 17 4	700 1 3
Leichhardt	4,859	2,509 19 1	263 8 11	1 6 9	12 11 10	107 16 3	62 9 7	10 12 6	56 15 8	3,025 0 7	35 11 10	2,989 8 9	526 16 8	3,516 5 5
Liverpool	646	610 1 4	283 19 0		1 19 9	2 10 0	5 7 6		1 18 3	905 15 10	13 17 8	891 18 2	231 19 1	1,123 17 3
Marrickville	5,155	3,622 3 11	810 3 1	3 7 4	22 0 6	148 15 5	162 17 11	17 17 6	93 2 5	4,880 8 1	42 10 10	4,837 17 3	693 3 1	5,531 0 4
Mosman	1,411	904 13 4	58 8 2	10 5 6	23 19 2	14 3 9	58 14 8	1 2 6	121 5 9	1,192 12 10	10 13 5	1,181 19 5	196 9 6	1,378 8 11
Newtown	5,217	4,506 19 0	544 12 2		27 14 3	126 10 0	30 12 1	21 13 9	90 19 2	5,349 0 5	31 3 6	5,317 16 11	581 8 9	5,899 5 8
North Botany	1,008	355 2 0	107 11 11	1 7 3	2 19 11	25 16 3	7 10 0	1 12 6	7 11 3	509 11 1	3 5 10	506 5 3	88 2 1	594 7 4
North Sydney	5,382	4,956 15 7	1,390 6 4	3 9 6	56 12 6	96 10 0	180 5 9	53 15 0	132 7 11	6,870 2 7	71 8 6	6,798 14 1	1,167 5 4	7,965 19 5
Paddington	4,518	4,790 0 2	709 13 6	0 2 11	13 3 1	110 6 3	58 11 3	12 5 0	59 5 10	5,753 8 0	16 4 2	5,736 3 10	504 12 11	6,240 16 9
Parramatta	21	11 0 4	1,225 12 9	0 9 6	0 13 8	0 5 0	1 16 11			1,239 18 2	0 13 8	1,239 4 6	369 17 10	1,609 2 4
Petersham	3,394	3,301 19 2	205 18 3		20 6 10	63 0 0	143 8 5	12 17 6	99 11 2	3,847 1 4	23 4 8	3,823 16 8	419 14 4	4,243 11 0
Prospect and Sherwood	182	113 3 1	126 16 8		0 5 8	2 8 9			2 19 9	245 13 11	11 13 6	234 0 5	41 15 3	275 15 8
Randwick	2,116	2,797 7 4	714 7 11	13 7 6	18 8 4	59 5 0	98 2 7	4 2 6	68 15 7	3,773 16 9	37 4 3	3,736 12 6	1,714 5 8	5,450 18 2
Redfern	4,764	4,544 19 4	5,248 9 10		14 16 3	127 7 6	17 7 6	21 5 0	34 15 6	10,009 0 11	24 5 9	9,984 15 2	900 12 9	10,885 7 11
Rockdale	2,608	1,231 14 2	357 2 11	0 15 8	18 5 3	62 3 9	64 18 2	2 12 6	26 1 8	1,763 14 1	67 13 7	1,696 0 6	427 14 11	2,123 15 5
Rookwood	503	353 0 2	557 7 1	5 6 2	7 15 5	17 0 0	12 10 0	6 4 0	16 13 0	975 15 10	53 7 0	922 8 10	295 0 9	1,217 9 7
Ryde	468	348 3 5	389 17 1	5 3 3	19 4 3	14 5 0	3 18 9	1 1 0	17 7 7	799 0 4	7 13 8	791 6 8	147 10 2	938 16 10
Silver Water	177	65 14 8	13 18 6		3 19 7	2 17 6				86 10 3	3 15 2	82 15 1	15 8 3	93 3 4
Smithfield and Fairfield	118	86 10 8	14 4 8		0 6 0	1 7 6		0 10 0	2 12 6	105 11 4	8 19 6	96 11 10	25 14 11	122 6 9
St. Peters	1,819	827 5 0	61 1 10		4 1 7	84 10 0	8 6 3	4 5 0	8 14 6	998 4 2	9 14 6	988 9 8	167 15 4	1,156 5 0
Strathfield	945	1,009 3 0	318 19 0	5 4 6	5 3 6	7 2 6	54 15 9	7 0 0	12 13 7	1,420 1 10	11 11 9	1,409 10 1	325 11 6	1,735 1 7
Vaucluse	216	298 18 4	13 10 11		1 16 3	3 10 0	8 15 0	1 0 0	1 9 9	329 0 3	2 19 3	326 1 0	72 9 2	398 10 2
Waterloo	2,381	1,722 17 5	591 13 4		3 8 8	72 17 6	9 2 6	4 7 6	7 9 8	2,411 16 7	15 3 9	2,396 12 10	376 8 10	2,773 1 8
Waverley	3,063	2,955 1 4	465 8 6		14 3 10	85 12 6	129 6 5	6 5 0	76 10 4	3,732 7 11	25 7 5	3,707 0 6	637 11 8	4,344 12 2
Willoughby	1,303	776 10 1	481 2 11	14 15 11	32 8 11	13 16 3	11 8 2	0 7 6	64 13 5	1,395 3 2	10 16 4	1,384 6 10	305 6 11	1,689 13 9
Woollahra	2,503	3,530 17 3	659 1 5	0 6 1	23 13 5	79 8 9	112 17 0	14 2 6	97 16 10	4,518 3 3	38 16 2	4,479 7 1	959 15 7	5,439 2 8

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General Summary of Rates, Fees, &c.

Ward or Borough.	Summary of Sewerage and Drainage Rates. No. of Properties liable. Sewerage.	Drainage.	Sewerage Rates.	New sewers (broken periods).	New buildings (broken periods).	Drainage Rates.	New drains (broken periods).	Revenue for year ending 30th June, 1897.	Less rates cancelled or removed.	Net Revenue	Arrears from Previous Years.	Total Sewerage and Drainage rates receivable to 30th June, 1897	General Summary for Rates, Fees for Water and Sewerage, for 12 months ending 30th June, 1897. Gross Total Water and Sewerage rates receivable to 30th June, 1897.	No. of Summonses Issued.	Amount sued for during 12 months ending 30th June, 1897.	Amount paid without Summonses.	Total paid during 1896-7.	Arrears to the 30th June, 1897.
			£ 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.
Bourke Ward ..	1,117	...	12,159 11 6	.....	71 10 8	.....	.....	12,231 2 2	4 13 7	12,226 8 7	558 10 2	12,784 18 9	28,252 10 9	26	324 8 0	25,184 16 11	25,509 4 11	2,743 5 10
Brisbane Ward .	1,241	....	6,979 18 11	3 6 8	22 9 8	.....	....	7,005 15 3	4 15 0	7,001 0 3	564 13 9	7,565 14 0	17,741 3 4	49	277 0 3	15,568 11 8	15,845 11 11	1,895 11 5
Cook Ward ..	6,172	....	7,396 2 11	.....	23 0 8	.....	.....	7,419 3 7	53 1 8	7,366 1 11	670 18 7	8,037 0 6	17,683 17 0	205	343 19 1	15,596 5 5	15,940 4 6	1,743 12 6
Denison Ward .	4,295	2	6,859 11 1	2 7 4	42 8 11	9 10 9	....	6,913 18 1	84 6 3	6,829 11 10	950 16 8	7,780 8 6	23,385 13 8	132	230 6 7	19,953 10 0	20,183 16 7	3,201 17 1
Fitzroy Ward	3,622	4	6,019 17 8	.....	24 3 0	18 9 8	....	6,062 10 4	7 5 4	6,055 5 0	426 6 10	6,481 11 10	14,963 4 4	130	267 0 2	12,927 16 1	13,194 16 3	1,768 8 1
Gipps Ward ...	1,710	....	3,232 13 5	0 13 8	2 7 8	.....	.....	3,235 14 9	50 2 3	3,185 12 6	491 13 2	3,677 5 8	11,062 19 6	50	157 14 11	9,024 8 9	9,182 3 8	1,880 15 10
Macquarie Ward..	2,049	..	8,412 17 4	.....	38 0 9	..	....	8,450 18 1	12 15 10	8,438 2 3	799 0 1	9,237 2 4	19,024 7 9	71	463 4 5	16,350 7 3	16,813 11 8	2,210 16 1
Phillip Ward ...	2,566	..	4,916 15 11	.....	5 14 8	...	...	4,922 10 7	3 0 0	4,919 10 7	744 11 0	5,664 1 7	12,876 1 10	28	48 9 6	10,749 19 11	10,798 9 5	2,077 12 5
Alexandria	2,672	..	1,122 2 11	44 0 6	6 7 7	124 0 11	....	1,296 11 11	1 12 2	1,294 19 9	107 12 1	1,402 11 10	3,924 7 3	74	74 6 7	2,992 18 5	3,067 5 0	857 2 3
Annandale	..	....	.....	.....	.....	.....	..	.....	.....	.....	.....	.....	1,929 9 8	27	22 12 10	1,652 2 9	1,674 15 7	254 14 1
Appin	...	...	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6 12 6	..	...	6 12 6	6 12 6	.....
Ashfield	....	3,057	.....	.....	.....	1,406 16 11	6 5 8	1,413 2 7	4 19 6	1,408 3 1	149 8 7	1,557 11 8	6,703 13 8	50	55 8 0	5,537 15 9	5,593 3 9	1,110 9 11
Auburn	..	..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	427 13 7	35	13 13 10	293 15 5	327 9 3	100 4 4
Balmain	....	1,654	.....	.....	.....	422 9 8	2 3 7	424 13 3	115 11 3	309 2 0	18 18 3	328 0 3	8,058 7 5	232	132 0 1	6,987 14 9	7 118 14 10	939 12 7
Bankstown	...	...	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	153 3 8	1	6 1 6	42 3 7	48 5 1	104 18 7
Botany	..	..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,104 15 4	23	4 18 4	862 8 6	867 6 10	237 8 6
Burwood	....	....	.....	.....	.....	593 6 6	1 3 11	594 10 5	6 18 7	587 11 10	.....	587 11 10	3,748 0 11	12	16 13 1	2,849 4 1	2,865 17 2	882 3 9
Campbelltown ..	..	....	.....	.....	.....	.....	... ..	.....	.....	.....	.....	.....	491 3 0	..	...	386 16 2	386 16 2	104 6 10
Camperdown	1,293	....	1,322 5 4	2 14 6	1 15 5	.....	.....	1,326 15 3	1 8 9	1,325 6 6	847 3 9	2,172 10 3	4,068 10 1	49	61 19 5	2,716 8 3	2,778 7 8	1,290 2 5
Canterbury	....	68	.....	.....	.....	12 12 8	.....	12 12 8	3 6 3	9 6 5	2 6 10	11 13 3	684 6 1	40	28 13 11	444 16 8	473 10 7	210 15 6
Concord	..	.	.....	.....	.....	..	.....	.....	.....	.....	..		1,382 7 5	20	13 5 7	988 16 10	1,002 2 5	380 5 0
Darlington	753	....	735 6 2	....	0 12 3	.. ....	. ....	735 18 5	0 9 8	735 8 9	35 12 10	771 1 7	1,693 16 3	4	19 1 4	1,515 4 6	1,535 5 10	159 10 5
Drummoyne . ..	..	..	.. ..	. ....	.....								884 10 5	17	19 16 3	638 1 3	657 17 6	226 12 11
Enfield	.	158	. ....	.....	.....	86 8 1	0 16 0	87 4 1	0 0 6	87 3 7	19 0 3	106 3 10	823 14 5	20	28 6 10	597 17 3	626 4 1	197 10 4
Erskineville .	1,395	.. .	599 1 4	1 7 0	0 9 1	283 3 8	0 10 8	884 11 9	1 1 6	883 10 3	39 15 7	923 5 10	2,043 12 5	52	48 0 4	1,842 19 6	1,890 19 10	152 12 7
Five Dock . ..	....	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	560 8 9	11	13 7 1	390 9 7	403 16 8	156 12 1
Glebe...	2,526	992	2,702 13 5	15 6 2	8 0 9	685 0 4	3 17 0	3,414 17 8	2 4 11	3,412 12 9	132 17 5	3,545 10 2	9,045 16 0	161	221 1 1	8,180 9 6	8,401 10 7	644 5 5
Gordon	.		.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,750 9 10		..	1,298 8 6	1,298 8 6	452 1 4
Granville	.	.	....	.....	.....	..	.....	.....	.....	.....	.....	.....	1,931 4 4	64	16 15 10	1,488 3 2	1,504 19 0	426 5 4
Guildford .. .	. .		.....	.. ...	.. .	..	.. .	.. ..	. .	. ..	. .		108 15 11	1	0 11 8	41 8 8	42 0 4	66 15 7
Homebush	....	.	.. ..	.....	. ...		..	. ...	....	... . .	. ...	..	569 2 8	5	3 17 4	461 12 10	465 10 2	103 12 6
Hoxton Park .	.. .	.. .	.. .	.. ..	.. . .	. ...		....	....	....	..		1 7 6					1 7 6
Hunter's Hill .	. .	....	.	.. ...	.....	. ...	.	..	. ...	. ....			1,532 7 7	19	27 5 5	1,141 11 9	1,168 17 2	363 10 5
Hurstville . ..	.. .	.. .	.	.....	.		. .	.	...		....		1,276 2 10	29	15 6 7	993 2 6	1,008 9 1	267 13 9
Islands	.. .	.. .	... ..	.. ..	..	... .	. .	. ....	. .	. .	.	.. .	1,031 6 9			915 19 8	915 19 8	115 7 1
Kogarah	....	.. .	.....	.....	. ..	. .	....	.	. ....	.. ...	.	..	933 17 7	15	8 1 8	687 16 9	695 18 5	237 19 2
Lane Cove	..	....	. . .	.....	.....	.	.	..	..	..	..	.	700 1 3	6	7 16 10	420 16 10	428 13 8	271 7 7
Leichhardt . . .	. .	1,124	....	.. ..		117 14 2	0 6 6	118 0 8	0 4 7	117 16 1	37 6 6	155 2 7	3,671 8 0	211	124 13 4	2,882 14 8	3,007 8 0	664 0 0
Liverpool	....	.. .	.....	.....	.....		.... .	.. .	.. .	..	..		1,123 17 3			916 5 3	916 5 3	207 12 0
Marrickville	75	.. .	112 19 0	.... ..	1 9 7		..	114 8 7	0 19 8	113 8 11	7 12 7	121 1 6	5,652 1 10	112	91 10 0	4,492 2 5	4,583 12 5	1,068 9 5
Mosman	.	.	.	. .	.....								1,378 8 11	24	33 15 11	1,107 14 3	1,141 10 2	236 18 9
Newtown	3,203	584	2,875 12 2	.....	22 8 9	237 15 6	3 9 1	3,139 5 6	8 14 6	3,130 11 0	215 17 0	3,346 8 0	9,245 13 8	176	236 10 4	8,278 15 3	8,515 5 7	730 8 1
North Botany. ..	9	.. .	7 12 0	.....	.. ..			7 12 0	. .	7 12 0	0 17 6	8 9 6	602 16 10	23	12 14 6	468 9 8	481 4 2	121 12 8
North Sydney	. .	1,240	....	.....	.....	1,118 10 1	8 8 2	1,126 18 3	3 12 6	1,123 5 9	27 1 8	1,150 7 5	9,116 6 10	227	240 3 4	7,759 8 4	7,999 11 8	1,116 15 2
Paddington	3,762	14	4,907 6 11	2 2 2	14 10 6	38 3 1	. .	4,962 2 8	77 9 8	4,884 13 0	320 3 11	5,204 16 11	11,445 13 8	92	182 13 8	10,380 0 11	10,562 14 7	882 19 1
Parramatta	..	..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,609 2 4		..	1,299 4 7	1,299 4 7	309 17 9
Petersham	530	1,921	757 12 9	0 13 8	2 14 4	642 12 9	3 13 11	1,407 7 5	2 12 3	1,404 15 2	61 17 9	1,466 12 11	5,710 3 11	195	179 8 3	4,905 4 10	5,084 13 1	625 10 10
Prospect and Sherwood.	....	. .	. ... .	.. ..	.. ....		.. .	.... .	. . ..	.... . .	.. ..	.. .	275 15 8	7	4 13 2	218 19 1	223 12 3	52 3 5
Randwick	842	. .	1,087 12 2	9 6 0	4 10 5		.	... ..	1,101 8 7	8 13 6	1,092 15 1	127 6 7	1,220 1 8	6,670 19 10	67	139 16 8	4,405 4 11	4,545 1 7	2,125 18 3
Redfern	4,743	....	4,749 14 0	.....	17 5 2	...	... ..	4,766 19 2	13 2 3	4,753 16 11	252 17 3	5,006 14 2	15,892 2 1	207	270 15 2	14,381 14 11	14,652 10 1	1,239 12 0
Rockdale	...	.	.. ....	. . ...	. ..		.	. ...	. .	..	.. ..	.	2,123 15 5	47	51 8 8	1,460 8 5	1,511 17 1	611 18 4
Rookwood	....	..	. ....	.....	. ..		.	. ...	. .	.....	.....	.. .	1,217 9 9	10	3 7 4	777 13 0	781 0 4	436 9 3
Ryde ..	....	....	.....	.....	.....	....	....	. . ... .	. .....	.. ..		..	933 16 10	10	10 15 10	755 5 7	766 1 5	172 15 5
Silver Water ..	...	.	.. . .	. . .	. .. ..	. .	..	.....	.....	.. .			93 3 4	..	... . .	78 6 9	78 6 9	19 16 7
Smithfield and Fairfield	....	...	.. ... .	.....	.. ..	.. ..	.....	.....	.....	.. ....	. .	. .	122 6 9	12	6 2 5	95 3 6	101 5 11	21 0 10
St. Peters.....	....	....	.....	.....	....	.... ..	... .	.. ..	.. .	....	.		1,156 5 0	28	24 10 5	964 18 10	989 9 3	166 15 9
Strathfield	....	....	.....	.....	.....	95 11 0	.. . .	95 11 0	. . .	95 11 0	. . . ..	95 11 0	1,830 12 7	35	48 11 11	1,396 12 10	1,445 4 9	385 7 10
Vaucluse	....	..	.....	.....	.....		.....	.....	.....	.....	. . .	.....	398 10 2	3	13 16 11	289 19 0	303 15 11	94 14 3
Waterloo	2,197	24	1,481 4 4	18 0 0	3 7 0	16 15 10	.....	1,519 7 2	14 14 5	1,504 12 9	114 14 3	1,619 7 0	4,392 8 8	89	106 14 3	3,701 19 5	3,808 13 8	583 15 0
Waverley	2,832	. ..	1,445 7 0	83 14 0	4 1 11	... ..	.. .	1,533 2 11	1 18 7	1,531 4 4	104 12 7	1,635 16 11	5,980 9 1	101	118 12 7	5,037 12 4	5,156 4 11	824 4 2
Willoughby. ...	....	..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,689 13 9	55	34 6 11	1,131 19 3	1,166 6 2	523 7 7
Woollahra	2,211	.. .	2,606 15 0	30 8 2	17 12 3	.....	.....	2,654 15 5	2 10 0	2,652 5 5	269 3 7	2,921 9 0	8,360 11 8	74	103 5 11	7,050 18 4	7,154 4 3	1,206 7 5

Summary of Arrears to 30th June, 1897.

Ward or Borough.	House Properties.			Vacant Land.			Churches and Charities.			Government.			Municipal.			Meters.	Total.			Increase on Previous Years.			Decrease on Previous Years.		
	Water.	Sewerage.	Drainage	Water.	Sewerage.	Drainage.	Water.	Sewerage	Drainage.	Water.	Sewerage	Drainage.	Water.	Sewerage.	Drainage.	Water.	Water.	Sewerage.	Drainage	Water.	Sewerage.	Drainage.	Water.	Sewerage.	Drainage.
	£ 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	£ s d	£ s d	£ s d	£ s d	£ s d	£ s d.	£ s. d.	£ s d	£ s d.
Bourke Ward	272 1 0	176 15 0	.	291 9 7	318 9 9		28 17 6	83 7 6	. .	0 5 5	157 15 5	....	. ..	.	.	1,402 7 2	1,995 0 8	736 7 8	..	.. ...	177 17 6	..	34 11 8	.		
Brisbane Ward	113 3 1	83 11 2	. ..	178 4 9	199 17 2		187 16 5	197 10 0	..	.	.	....	.	. ..	. ..	933 16 4	1,413 0 7	480 18 4	..	. ....	.	. .	5 16 5	83 15 5	
Cook Ward	386 9 8	370 4 5	...	47 16 2	52 8 2	.	235 18 11	284 3 6	.	99 2 11	3 14 3	.. .	.	.	...	259 5 0	1,028 12 8	710 10 4		42 3 3	39 11 9	. ..	.	. ..	
Denison Ward	174 14 8	156 15 2	....	197 17 2	144 16 4	. .	171 12 8	233 4 11	.	34 15 6	37 14 10	.. .	54 14 0	72 0 3	.	1,890 13 7	2,524 7 7	644 11 6	. .			. ..	162 6 0	306 5 2	..
Fitzroy Ward .	149 8 7	137 2 8	.	22 9 2	39 11 0		182 16 10	194 6 0	. .	564 3 6	.		. .	. .	.	477 6 10	1,396 4 11	370 19 8	. .	554 2 3	.	..	.	54 0 6	..
Gipps Ward	157 19 0	133 7 5	. .	287 2 1	213 2 11	.	114 3 1	188 15 0	. ..	.. .			.	. .	.	783 3 10	1,342 8 0	535 5 4		246 8 7	43 12 2	.	.	. .	.
Macquarie Ward	293 8 2	374 1 10	.	18 9 2	31 17 11		381 6 3	405 9 2	. .		52 10 0	....	.	. .	.	635 11 1	1,328 14 8	863 18 11		90 2 10	64 18 10	..		..	
Phillip Ward .	157 1 9	171 17 6	..	116 2 3	124 10 0		259 10 11	465 1 7	. .			. ..	.	.	.	775 13 4	1,308 8 3	761 9 2		51 7 2	16 18 2			. .	.
Alexandria . .	80 19 5	62 18 2	1 0 5	150 6 7	78 10 6	26 6 6	24 12 11	14 11 6	. .			..	1 3 4	1 3 4	..	402 9 7	659 11 10	157 3 6	27 6 11	318 0 1	71 10 7	5 7 9		.	..
Annandale	60 7 1	.....	. ..	46 16 11	.....	.	47 12 11	.. .		....	.. .	..	3 10 0	.. .		96 7 2	254 14 1	.. . .		31 4 2	. ...			.	..
Appin.....	. .	.... .	..	.	.			.. ...		.	.	..	.	. .		.....	. ...	..	.. ...	. ..	.		.	.	..
Ashfield.....	187 11 6	.. .	77 16 4	160 16 7	..	84 18 11	160 1 5	..	25 16 10	.	.	.	3 11 2	.	2 17 4	404 4 10	916 5 6	. ...	191 9 5	65 9 1	42 0 10	.	..	.	..
Auburn	15 6 2	.	..	58 6 9	. .		13 18 0		..	..	.	.	.	.	.	12 8 5	99 19 4	.. ..	.	17 3 4	.....	.	.. . .	.	.
Balmain	74 11 3	.	5 15 6	198 17 2	.	15 19 0	180 6 1	.....	2 3 8	8 7 6	....	....	....	.	. .	451 12 5	913 14 5	.	23 18 2	85 17 5	.. ...	4 19 11	..		.
Bankstown . .	8 18 3	.	...	2 11 8	. .. .	. .	..	.	. .	.. .	.	..	....	..	....	93 8 8	104 18 7	..	.	81 18 8	. .	.	..		...
Botany ...	3 19 8	. . ..	.	28 17 7	. ..	. .	20 1 8	.		.	.	.	.	.	.	182 14 7	235 13 6	. ..		88 17 4	. .		..	.	...
Burwood .	161 18 11	. ..	163 12 3	120 13 7	. . .	30 5 8	72 11 9	. ..	3 0 4	.	.	.	1 9 2	.. .	.	319 15 1	676 8 6	. .	196 18 3	261 14 10	..	196 18 3	.		
Campbelltown	20 0 3	.	.. .	0 17 9	.		56 7 1	....	.	4 4 6	..		15 11 3	...		4 11 0	101 11 10	.		.			..	.	
Camperdown	68 3 1	34 0 10		44 17 11	20 1 3		25 12 2	930 3 8		.			.			156 18 0	295 11 2	984 5 9		18 0 11	137 2 0		8 4 0		
Canterbury .	55 19 11	. .	1 8 9	56 6 11	.. ...	3 16 4	35 16 6	.	. ..				4 2 3		.. .	52 14 10	205 0 5		5 5 1	42 13 2	. ...	5 5 1	. ....	.	..
Concord . ..	19 9 7	20 16 4	..	36 5 10	....		28 3 1			0 16 11	.	.	1 10 11	.. .		200 9 11	376 16 3		. .	35 10 2		..	. . .		.
Darlington ..	20 15 8	.	. ..	3 10 10	3 10 10	...	6 9 0	49 9 1				...		. .		53 11 2	84 6 8	73 16 3		10 2 3	38 3 5		. . . .		
Drummoyne ..	12 7 0	..	. .	130 4 6	....		8 0 5	... .		.		.	1 13 3	..	.	72 6 6	224 11 8			25 18 9		..	.... .		
Enfield	39 1 3	. .	2 12 0	56 15 2	.	13 14 4	12 11 2	. . .	.	0 11 8	0 11 8	..	2 18 4	. ..	.	60 14 4	172 0 3		22 17 7	8 15 5		3 17 4	..		
Erskineville ..	6 18 3	5 17 1	0 16 10	24 12 11	11 10 2	20 16 10	13 14 8	0 15 9	4 19 2	..	..	..	..			57 0 11	102 6 9	0 18 3	26 12 10	12 12 2			.... .	8 5 5	4 0 11
Five Dock.....	42 3 7	. . ...		36 17 8	.	. .	4 18 9	.. ...	..	5	0 11 8	..	10 15 10		.	61 16 3	156 12 1			3 0 5		.			
Glebe	62 18 4	23 7 1	9 0 3	26 1 3	9 3 8	16 8 11	147 18 0	50 4 5	8 8 4	5 5 0	..	..				275 4 4	512 13 7	83 6 10	33 17 6				31 14 2	9 10 5	5 18 8
Gordon	87 17 6	.....	....	204 8 0	.....	..	6 15 3	..	. .							147 15 7	452 1 4	... ..		424 18 6	..	.	.... .	.	
Granville ...	39 15 10	.	. ..	153 0 10		..	58 13 0	....	.. .							172 15 8	424 5 4	. .	.	143 13 1	. ..	.	.. ...		
Guildford	48 12 0		....	4 0 6		.	. .	.. .	.. .	..			...	....	. .	14 3 1	66 15 7	... ..		14 18 0					
Homebush .	6 14 10	..	....	68 8 0		.	..	.. .	...	. .			. .	.	.	27 9 8	102 12 6	.	. .		. ..	... .	271 9 9	. ..	
Hoxton Park .	1 2 6	.....	....			.				. .				.	.		1 2 6	.....		0 15 0	..	. .		. .	
Hunter's Hill .	10 2 5	.....	....	31 17 4	..	.	39 19 2	. .	.	..				.	.	276 11 6	358 10 5	. . .	.	5 6 1	.	. .		. .	
Hurstville.....	85 6 11	.. ..	. .	86 9 2	.. .	.	15 19 1	.		..						79 6 1	267 1 3	. ...	. .	17 5 7	.	.			
Islands	. .	.. . .	..	.... .	. . .	..				..						115 7 1	115 7 1		..			..	151 17 7	..	.
Kogarah	36 4 6	..	.	85 14 4	.....	.	41 7 6	. .		..	..	..	.	.	.	74 12 10	237 19 2	.. .	.	15 16 9	.	.			
Lane Cove	22 19 10	. .. .	. .	160 9 1	.. ..	.	8 11 3	.. .		.	.	.	.	.	.	77 14 11	269 15 1	.		65 9 6	..	.		..	
Leichhardt . .	118 13 7	.	5 5 11	136 0 10	. . .	39 0 0	96 16 11	.	1 8 9	0 5 10	..	0 2 6	38 2 5	. .	.	224 9 11	614 0 6	.....	45 17 2	92 18 10	..	8 10 8			
Liverpool	90 3 0	. .	...	31 0 8	..	.. .	44 16 10	...	. .	.	. ..	..	2 0 0	.	. .	37 2 0	205 2 6	.	.				22 19 1		
Marrickville .	141 1 10	4 16 7	. .	246 19 1	2 15 3	..	160 9 4	. . .	....	.	. .	.	.	....	. .	500 15 7	1,049 5 10	7 11 10	.	377 1 6	. .			0 0 9	..
Mosman	46 16 4	.....	. .	115 13 2	....	.	19 18 0	. ...		.	..	.	2 11 3			47 15 0	232 13 9		. .	38 18 0	.				..
Newtown	70 13 4	55 0 1	0 10 9	140 5 9	31 5 4	6 16 9	178 10 3	47 0 5	12 12 8	. .	. .	. .	3 3 9	2 11 4	. .	164 5 2	556 18 3	135 17 2	20 0 2				3 15 6	46 7 5	13 12 3
North Botany	9 0 9	1 3 7	....	55 11 10	0 10 4	. .	3 15 0	.....	. .	. .	. .	. .	0 5 0	. .	. .	48 16 2	117 8 9	1 13 11	..	27 19 2	0 16 5				
North Sydney .	209 4 3	. ...	15 11 5	273 8 5	.....	27 1 3	114 14 5	.....	0 10 3	8 13 1	.	.				458 9 7	1,064 9 9		43 2 11						
Paddington .. .	140 2 8	150 18 0	0 4 7	36 10 4	24 15 9	2 12 9	106 14 4	101 18 5	....	0 5 0	0 5 0	. .	4 17 2	5 2 8	. .	282 16 2	571 5 8	282 19 10	2 17 4	66 7 9	. .	1 8 4			
Parramatta ...	. .	.	.	6 13 0	. .		.	.		..		..	.	.	..	303 4 9	309 17 9						16 1 3	90 16 10	
Petersham .	97 10 1	5 18 8	24 14 0	99 0 11	9 17 3	31 16 8	174 15 11	7 17 11	15 6 6	.		.	4 13 9	4 16 3	.	136 7 5	512 8 1	28 10 1	71 17 2	105 19 3	4 0 4	34 8 11	.	35 15 1	
Prospect & Sherwood.	8 1 7	. . .	..	5 7 11	.	....	.	. ...	..	.	.	..	.	.	..	33 6 5	51 15 11		.	10 15 8	. .	....			..
Randwick	112 5 6	22 18 5	. ..	435 12 2	60 4 1	. .	92 14 9	41 11 0	....	951 17 2	28 19 4	. ..	2 16 9	.	. ..	352 7 1	1,947 13 5	153 12 10	. .	257 17 9	26 6 3	. .	....		
Redfern .	86 3 6	84 7 9	...	30 16 11	50 1 1	.	139 0 9	112 9 9	. ..	.	.		..	.	..	712 14 9	968 15 11	246 18 7	. .	91 0 8	...	. .	.	6 0 8	
Rockdale	125 9 10	. ..	. .	209 7 2	...	.	19 15 6	...	.	.	.	. .	.	. .	....	253 7 10	608 0 4	. .	. .	183 16 8	...	. .			
Rookwood.. .	23 16 3	. .	....	24 13 2	. ....	.	9 10 8	. .	.	83 11 11	. .	. .	.	. .	....	232 7 3	373 19 3	.	.	161 3 6	.. ...	..			
Ryde	25 18 6	. . .	...	50 15 9	.. .	..	28 16 3	...	..	.	.	. .	. .	. .	....	67 4 11	172 15 5	...	....	26 6 6	.	. .			
Silver Water .	7 13 11	.. .	.	5 11 2	.	..	. . .	. .	.	.	.	. .		..	..	6 4 0	19 9 1	. .		4 10 10	....	.			
Smithfield and Fairfield.	3 18 8	. ....	....	0 4 4	..	...	8 10 0	.	. .	1 7 0	....	....	....	. ..	....	7 0 10	21 0 10	. .	.. .	.	.	.. .	3 6 1	.	.
St. Peters	25 5 9	. ....	....	75 6 3	.... .		26 2 1	.....	. ..	.	...	. .	....	.. .	....	38 14 2	165 8 3	. . .	. .	0 16 8	. . .				
Strathfield	40 13 4	. . ..	25 6 3	68 4 9	. .	0 14 7	28 16 5	... ..	. .	.	....	. .	.	. .	. .	219 5 6	357 0 0		26 0 10	37 0 0	. ....	26 0 10	.	. .	.
Vaucluse	23 4 9	. ..	. .	40 8 10	. ...	...	13 17 6	....	.			. .	..	....	. .	17 3 2	94 14 3		.	24 5 1	....	....			
Waterloo . ..	37 5 11	35 12 7	0 1 6	151 18 2	19 2 7	...	77 4 7	65 3 1	.. .			.		....	.	178 1 1	444 9 9	119 18 3	0 1 6	82 5 11	5 4 0	0 1 6	.	.	. .
Waverley .	149 11 1	48 8 9	....	132 3 11	44 0 6	....	93 14 7	53 5 2	...	78 8 8	. .	...	0 17 6	....	....	197 10 5	652 6 2	146 11 11	. ..	39 8 3	41 19 4	. ..	.	.....	....
Willoughby . .	43 19 6	. ..	....	204 18 5	. . .	....	14 7 8	..	....	....	. ..	.. .	. ..	....	. .	258 8 10	521 14 5	.. .	.	218 1 3	... .	....	. ..	... ..	....
Woollahra	181 19 2	97 2 10	....	192 10 4	24 8 4	....	188 19 4	148 18 11	....	....	1 6 3	.. .	....	....	. .	360 17 3	924 6 1	271 16 4	....	.....	2 12 9	....	4 9 6	. ..	....

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Annual Report of Stores Branch.

Sir, Stores Branch, 12 August, 1897.

I have the honor to report on the work of this Branch for the financial year ending 30th June last. It comprises the transactions in the receipt and issue of all contract supplies of general stores and cast-iron work for the Water Department. It does not include castings for sewers, office requisites, purchases out of contract, meters, timber, or road materials.

The subjoined table indicates the extent of the contract work for the year:—

Article.	Contractor.	Rate.	Value.
			£ s. d.
General stores	Briscoe, Drysdale, & Co.	26¼% below schedule	1,596 0 1
Uniforms	Hordern Bros.	Schedule	185 0 9
Pig lead (six months only)	Briscoe, Drysdale, & Co.	£11 19s. 6d. per ton	1,036 14 6
do do	Sydney Lead Works	£11 18s. 6d. do	942 14 1
Cement do	Cullen Bullen Cement Co.	9s. 11½d. per cask	213 2 2
C I. pipes up to 8″ diameter	Pope, Maher, & Co.	£7 2s. 6d. per ton	11,521 18 9
do 8″ to 18″ do	G. and C. Hoskins	£7 12s. do	36,412 4 10
do 20″ do	do	£7 2s. 6d. do	
Castings	do	£9 17s. 6d. do	
Steel pipes, &c.	do		9,035 14 10
Stop-valves	Milne Brothers	5⅝% below schedule	647 4 5
Ball hydrants	Pope, Maher, & Co.	4½% above schedule	214 14 9
Special castings for water service only	Triggs and Marr	13⅜% below schedule	154 0 10
do do	do	21½% do	302 9 6
Job cartages	D. Ward	1s. per hour	165 8 6
do	W. O'Brien	1s. do	186 3 9
			£62,613 11 9

With the exception of about £1,600 imported under stores and cement contracts the whole of the above (say; £60,700) represents manufactures or work within this Colony, chiefly from imported pig and plate iron; but the lead supplies that were wholly imported up to four years back are now entirely a local product. Cement of local manufacture has been steadily improving of late years, and we have now our first contract specially designed by the Engineer to admit local supplies under equal conditions of test with the imported article.

Cartage.

This is provided for in several ways. The Board maintains a few carters for day-work in sewer maintenance, and one for water service. Material for main-laying in the suburbs is conveyed by the pipe-laying contractor at schedule rates. Cartage of all material for mains laid within the city and the conveyance of all old mains taken out of ground together with the transit of stores and removal of ashes is done by the contract job carter, if of a light nature, or by special tender, if the work require four-wheeled vehicles.

Material out of ground.

The work of restoring pipes and specials taken up on replacement by larger mains has considerably developed, and is a work that finds no parallel in the older cities from which comparisons are usually drawn. By far the greater portion of this work takes place in the older suburbs, where population has been augmented by new industries or environed by new settlements, that call for an enlargement of the intermediate trunk mains. The material is cleaned and recoated equal to new, at an average cost of about £1 per ton, which is debited to revenue, while the pipes, &c., are credited and charged out on reissue at the value of new goods. Of the old city mains, recovered after upwards of thirty-years' use, some few, of obsolete design and pierced with numerous service-holes, are condemned for sale as scraps; but the greater portion of these old mains give promise of at least doubling their age. The total value of the mains thus treated during the year was £7,220 4s., at a cost of £274 15s. 3d. for fettling by casual labour.

Stock-taking.

The first biennial stock-taking was conducted in September last by myself in company with an audit officer, and showed that the lengthening of the period of check over the scattered and heavy iron goods, for official economy, was justified by results. The actual count brought into comparison with the stock-book balances showed the customary net surplus, arising partly in value of old goods taken into the various depôts without record, and partly from the breaks in weighing and measuring on receipt and issue being taken in favour of the stores.

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Stock Balance.

Exclusive of cost of large mains charged direct to the works.

	£	s.	d.		£	s.	d.
Stock in hand, 30th June, 1896	19,235	6	8	Issues...	31,221	19	3
Receipts	28,732	15	1	Stock in hand, 30th June, 1897	16,746	3	6
	£47,968	2	9		£47,968	2	9

The total value of all issues for the year was £64,751 2s. 8d.

Pay Branch.

Payments of fees, salaries, wages, compensations, refunds, and petty cash amounted in the aggregate to about £80,000. The mail brought in 33,253 letters, of which 11,097 were found to contain remittances to a value approximating £50,000.

The scheme of compulsory life insurance inaugurated two years ago now embraces fifty officers. That it is appreciated may be inferred from the fact that a few have voluntarily come within its provisions.

During the year 370 tenders were opened in relation to sixty-six contracts. Personal sureties are not accepted, and guarantees must take the form of cash, which is chiefly in fixed deposits at Bank. The value of the securities held at any given time ranges from £4,000 to £5,000.

The library, which is augmented from time to time by purchase of new works as they reach Sydney, now comprises 430 volumes—scientific, engineering, and legal—specially selected for the study and guidance of the staff, to whom they are accessible without fee.

A. ELLICE FLINT,
Paymaster and Comptroller of Stores.

The Secretary.

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Engineer's Report.

Sir, Engineer's Department, 30 August, 1897.

I have the honor to submit, for the information of the Board, my report on the working of the Engineer's Department for the year 1896–7.

Upper Canal and Prospect Reservoir.

With the exception of Sections Nos. 8 and 9, the upper canal and tunnels are in good order. Owing to the low level of Cataract and Nepean Rivers during last summer advantage was taken of same to examine and clean out the supply tunnels. In the case of the Cataract tunnel the work was heavy, on account of the large accumulation of debris which had from time to time fallen from the roof. The Board took the opportunity to visit the tunnels, and instructed that no time should be lost in preparing for the expected rains.

The most of the wrought-iron aqueducts were cleaned out and painted, and a considerable amount of work done in connection with painting and repairing bridges and flumes and flattening slopes. An additional length of relining of canal to extent of 87 feet was carried out by day-labour, making a total of 3,445 feet lineal dealt with by the Board.

In lieu of continuing the work by day-labour a contract was let embracing 5,000 lineal feet of relining of canal and 600 feet of covered way. This work has been pushed on as much as possible under the circumstances, as the work had to be stopped at times to allow water to come down to replenish Liverpool and Prospect dams. Of the above length 1,161 lineal feet has been executed. A portion of Section No. 9 in the quick race has been put in better order by pointing up and removal of defective stone.

New fencing to extent of 30 miles, together with thirty new light iron gates, have been erected during the year.

Liverpool dam was emptied and thoroughly cleared of decayed vegetable matter; several large holes, which accumulated rubbish, were filled up. The Superintendent reports that these operations have resulted in a great improvement in the conditions of the water. It is intended to plant ornamental trees in this reserve.

The intake race of Prospect Reservoir has been further strengthened by backing reservoir embankment. An excessive settlement having taken place at the angle of embankment at T.S. No. 44, extending over a length of 800 feet, it was necessary to take immediate steps to repair same; and the Board having authorised the necessary expenditure, the Superintendent was instructed to at once strip off pitching and rebuild the puddle-core and bank. This work is now well on to completion.

The bank has been put to the severest test that it has had to stand since its construction, owing to water having been drawn off to R.L. 183–85, or 11·15 feet below top water level; beyond this defect the embankment proved to be stable. The beneficial effect of the adits which were put in bank on outer slope was noticeable during the rainy season which followed the late drought.

The intake-house and valve-house are in good order, and valves kept in working condition. It was deemed necessary to strengthen the outlet pipes at intake-house by surrounding them with strong concrete, as in the event of any of them bursting the rush of water from reservoir could not be checked. This work places this portion of the supply beyond a doubt.

The low level of water in reservoir at end of drought enabled the Superintendent to see whether water-weeds had developed to any extent. The examination proved satisfactory, as no serious growth was reported.

The trout-hatching conducted by the Fisheries Department continues to be a source of interest to visitors to Prospect works.

A considerable amount of underscrubbing and timber-thinning has been carried out on the reserve, about 70 acres being added to available agistment area.

The new avenue from Veteran Hall to Main Western road is making good progress, and will in time form an ornamental approach to Board's property.

Owing to the severe drought which prevailed during the warm season of the year, the Superintendent exercised his discretion in not overstocking, and, considering the circumstances, the receipts are not discouraging, the total amount received in agistment fees being £298 3s. 1d., as against £336 13s. 4d., the average of previous eighteen months.

Supply from Prospect Reservoir.

The quantity of water supplied to different areas under Board's control for twelve months ending 31 June, 1897, was 6,445,665,328 gallons, or an average of 17,659,357 gallons per day, or 42·2 gallons per head.

Lower Canal and other Works below Prospect Reservoir.

Additional wire-fencing has been fixed to prevent dogs finding access to the canal.

A slip occurred at 45½ miles and was attended to by the staff, and appears now quite secure.

The girders supporting gear of scour valves have all been renewed, and considerable repairs to traffic bridges affected.

A new offtake was fixed for the supply of the district of Prospect and Sherwood, and the water districts were supplied *pro tem* from Potts Hill balance reservoir.

On the 72-inch main a defect showed itself and it became necessary to shut off the water and supply from Potts' Hill while a covering-plate was put on; this was satisfactorily performed by the staff, and water from the canal sent through to replete Potts' Hill Reservoir.

Several

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Several leaks have been stopped on canal and at aqueduct, and the whole of the lower canal works may be said to be in a better state than ever they were, as far as being water tight.

At Potts' Hill the renewal of gauge for screening purposes is being carried on as required. The whole of the valves and electric communications are in good order. The reservoir is in good condition and well attended to—no further movements have been noticed in the banks.

As the whole of the foregoing works come under the immediate supervision of the Superintendent at Prospect I think it only just to place on record the services of the late Superintendent, Mr. William Wakeford, who was always actuated by a high sense of duty in protecting the interests of the Board combined with a large and varied experience in carrying out work of a similar nature, and his demise was a great loss to the Board. Mr. Wakeford was succeeded by Mr. A. F. Jacob, Assoc. M.I.C.E., who has been associated with these works from their inception.

Trunk Mains.

No bursts are recorded on either the trunk or duplicate mains, but some partly drawn joints were discovered which had to be fetled up and made secure.

General Reticulation.

The condition of reticulation mains, hydrants, &c., is good. The work of the branch during past twelve months has been brisk, as will be seen from the following figures. Nearly 11 miles of mains have been cleansed in position, 2·93 miles lowered to suit new grades, 7·73 miles removed for improved sizes, ·16 miles taken up and relaid, and 55·54 miles of new mains laid. Of the latter 20·78 miles are of sizes ranging from 9 inches to 20 inches diameter.

A duplicate 18-inch main was completed between Chatswood tanks and North Sydney *via* Mowbray-road; this main provides for expansion of the district in the vicinity of the above road and supply to North Sydney generally in the event of a break to original main.

The new trunk main for supply of heights of Randwick and Woollahra has been completed, the supply being taken from Waverley Reservoir—this was tested last summer, and fulfilled our expectations, and satisfied the residents.

The Illawarra suburbs supply has also been materially improved by laying a new trunk main for same varying in size from 10 inches to 20 inches diameter; this includes a new pumping main to Penshurst new tank.

Work is also in progress for providing a second trunk main for the low levels of suburbs of Leichhardt and Balmain. This will be completed before the summer sets in, and enable the Department to isolate the high from the low levels to the benefit of the former. The high zone cannot, however, be considered dealt with until connected with the Centennial Park Reservoir.

The high levels of Ashfield, Homebush, Strathfield and surrounding locality have had improved supply, the small mains being substituted by those of larger diameter connected direct to 48-inch trunk main. The supply to the districts of Canterbury, Belmore, and Enfield, has also been improved by laying larger mains; the higher zones will benefit thereby.

It will be seen that the operations of the Board have extended over a considerable area, and it is considered that the wants of the districts will be met for years to come. The mains above referred to have all been connected to the trunk main, so that they have the full head available at Pott's Hill. The duplicate main is kept for the supply to Crown-street for low level supply of city and pumped water.

During last summer it was found that the mains supplying Ryde and Granville interfered with that from the 48-inch duplicate main, and Board approved of the necessary expenditure to cut off the connection with the 48-inch main, and supply direct from the screening chamber by a 36-inch outlet, which was originally intended for the supply of Penshurst and Illawarra suburbs, but would not be required for some years to come. Under present conditions there are now three (3) separate outlets from the screening chamber, instead of two as heretofore.

It is to be hoped that steps will be soon taken by the Legislature to make funds available for improving the supply from Prospect to Potts' Hill.

A considerable amount of work has been done in improving the supply within the city boundaries, especially in Pyrmont district and the Haymarket and Christchurch district.

The mains replaced by larger ones have been cleaned, tarred; and will be used in other places.

The number of bursts which occurred during the year were 140, which, considering the mileage of mains in use, aggregating 946 miles, is very satisfactory. The total number of screw-down hydrants fixed was 107 and ball hydrants, 839. The number of service pipes disconnected to prevent waste of water was 697.

House Services.

During the year, 3,134 permits for drillings for private services were applied for, and 10,193 extensions in connection with new and old buildings were carried out—a large proportion being in the districts of Hornsby, Gordon, and North Sydney.

The Inspectors made 784 inspections in connection with investigating complaints, applications for connections under deferred system of payment, and for special permits *re* stopcocking.

Meter Branch.

The operations of this branch show a satisfactory result on the year's transactions.

The number of meters received from the contractor, and passed test satisfactorily, are viz., 625 ¾-in., 131 1-in., 30 1¼-in., 35 1½-in., and 5 2-in. meters. The number of meters sent to Crown-street for examination and test was 67 and for repairs, 348, showing a marked decrease on former years. This decrease must follow as a natural sequence to the general adoption of the Board's pattern.

Over 90 old meters removed from private services and tested at Crown-street were condemned as not fulfilling Board's requirements. The number of meters issued from stock on the hire system was 849 of various sizes, and 39 were sold.

During the year the work done for country districts was 273 meters examined and tested and 34 repaired. The Hunter River Board having made other arrangements the work hitherto done by this Board is not carried out. This reduces the country issues.

The

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The number of water fittings examined and tested totals 59,720, of which 3,030 were returned as defective, and 167 condemned.

The branch has also carried out all repairs and maintenance of electrical indications, instruments. &c., connected with the services. The meter clerk's branch shows a satisfactory increase on the year's work, the net increase in meters fixed being 789.

The total number of meters now in operation in the Metropolitan area is 6,780; at Richmond, 38; and Campbelltown, 26; or a total of 6,844.

The number of meters on the rental system is 2,161, of which 849 have been rented this year. This increase cannot be considered other than highly satisfactory.

The number of meters which became inoperative during the year was 391, these were promptly repaired, or replaced with new ones.

The financial return on meterage shows a substantial increase for the year. The revenue in excess of accounts being £43,823 17s. 8d., as against £41,400 3s. 4d. for the previous year, or an increase of £2,423 14s. 4d.

The amount earned by the Board's hired meters (less rents), included in above amount, was £5,336 14s. 3d., showing an increase of £2,604 15s. 1d. over previous year.

The amount returned as rent for hired meters was £910 7s., being an increase of £322 1s. 7d. over previous year.

The Board decided to reduce the rent on meters of all sizes by about 25 per cent.; this course will, I have no doubt, increase the revenue on this head, but will reduce that on special fees. Supply by meter to gardens is a wholesome check on waste, although it would in the main cause a reduction in revenue on special fee account.

Free Supply of Water.

The quantity of water supplied free to charitable institutions and public parks and gardens, as recorded by meters was 64,604,250 gallons, which represents, at 1s. per 1,000 gallons, the sum of £3,230 4s. 3d.

Fires.

The number of fires that occurred in the city and suburbs during the year was 40; no complaints having been received as to scarcity of water. During the previous eighteen months no less than 511 fires occurred.

During the last drought, it became necessary to restrict the use of water in the city and suburbs for street-watering and washing the wood-blocked areas. An inquiry into this question showed that restriction was necessary irrespective of state of water supply, as the water was used in such a lavish manner as to amount to waste. The various councils responded to the request of the Board, and it is to be hoped that the action then taken will continue.

Pumping Plant.

The three engines forming the plant at Crown-street have been thoroughly overhauled and painted, and are in good working order. The details of work done in overhauling and repairs will be found in the report of the Chief Mechanical Engineer.

The boilers have been regularly attended to, and are in efficient order.

The fire service of establishment has been tested monthly, and kept in efficient order for any emergency.

The Ryde engines have been overhauled during the winter by the staff, and are in good condition. It was necessary to further strengthen one of the original valve chambers, as a small crack started in one of the pump-necks. A strong job was made which obviates the necessity for providing a new chamber.

At Carlton, the old Blake pumps have stood the test of a trying season—the pumps were kept going for three shifts continuously during the hot season. The new pumping plant by the Washington Company, having a capacity of 30,000 gallons per hour, has been completed and taken over by the Board, the trial test fully realising the guaranteed duty. This plant will now take up the work, and old pumps will be overhauled and kept as a stand-by in case of accident to new pumps.

Chatswood.—The existing pumping plant has had, during the hot seasons, to work almost continuously to meet demand. The pumping, owing to the small storage capacity of tanks, is intermittent, causing a loss of coal for banking fires.

A new packed plunger was fitted in lieu of existing one, which resulted in pumps doing more work, as slip was materially decreased.

Ordinary repairs incidental to such plant have been carried out, and cogs renewed as they became worn.

A contract for new installation has been let, the boiler being already in position, and foundations for engine being in progress preparatory to arrival of engine, which is shortly expected. This plant, being of compound condensing type, will ensure greater economy than existing pump and engine.

Electric Light Installation.

The contract for the electric light at Crown-street Depôt and Pumping Station is all completed, and a trial run was satisfactorily carried out. Great difficulty was experienced in getting a suitable engine; but, after considerable delay, a Chandler compound self-contained engine was forwarded and fixed in position. The work reflects credit on the contractors, both for installation and steam connections.

Richmond Pumping Station, North Richmond.

The pumping plant at this place is in good order, and nothing of import occurred during the year. Some spare gear was provided in case of accidents.

Cost

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Cost of Pumping.

The cost of pumping at the various stations is given below:—

Pumping Station.	Name of Reservoir to which water is raised.	Total volume Pumped during year.	Cost of Lifting 1,000,000 gallons 100 feet high.	Cost of Lifting 1,000 gallons 100 feet high
		gallons.	£ s. d.	d.
Crown-street	Paddington	1,810,904,600		
	Woollahra	446,529,340	1 8 9	·345
	Waverley	277,802,880		
Ryde	Ryde Village	131,463,000		
	Chatswood	333,354,000	1 6 0	·312
Carlton	Penshurst	61,617,500	4 2 0	·984
Chatswood	Wahroongah	27,096,853	4 5 5	1·025
North Richmond	North Richmond	13,050,000	6 1 0	1·452

Coal Consumed.

	Tons	cwt.	qrs	lb.
Crown-street pumping station	2,831	10	3	22
Ryde ,, ...	1,187	3	0	14
Carlton ,, ...	385	8	0	0
Chatswood ,, ...	228	10	2	0
Richmond ,, ...	60	15	3	0
Total for year	4,693	8	1	8

In comparing the results the cost of pumping water shows a decrease all round, except at Chatswood, where there are no previous returns to compare with.

The coal received at Crown-street during the year was inferior to that delivered in 1895, and I feel sure, under the circumstances, that it is due to the Engineer-in-charge that such good results have been obtained.

I hope at end of the present contract to be able to obtain coal equal in steaming qualities to that delivered under 1895 contract.

Duties of Engines.

The duties of pumping engines, as given below, are the average for the year:—

From Crown-street to Paddington	59,850,000 ft.-lb. per 112 lb. of coal.	
,, ,, Woollahra	58,000,000	,, ,,
,, ,, Waverley	52,000,000	,, ,,
,, Ryde to Ryde Village	60,120,000	,, ,,
,, ,, Chatswood	66,380,000	,, ,,
,, Carlton to Penshurst	18,415,000	,, ,,
,, Chatswood to Wahroongah	20,909,000	,, ,,
,, North Richmond to North Richmond Tank	22,210,000	,, ,,

The reduction in duties at Crown-street station is owing to the coal not being of the same quality as that supplied last year.

The quantity of water pumped during the year was 3,088,768,173 gallons, or nearly 50 per cent. of the quantity sent from Prospect.

Length of Mains under Board's Control.

The length of mains, exclusive of trunk mains, under the Board's control is 946·8 miles, and number of screw-down hydrants, 1,715; ball-hydrants, 17,743.

Service Reservoirs and Tanks.

The service reservoirs and tanks connected with the system are in good order and clean condition. The new steel tank at Penshurst, having a capacity of 1,000,000 gallons, has been completed and taken into use. This tank, together with new pumping plant, will meet the requirements of this district for years to come.

A contract has been let for a similar tank to be erected at Wahroongah, which, when completed, will serve the district for some time. It is contemplated erecting others at different parts of the district when local development justifies expenditure.

New Districts.

During past year two large districts have been added to the Board's control, viz., Beecroft and vicinity, and Prospect and Sherwood. In both cases the Board made concessions as to the interests to be paid on capital expended, anticipating that the revenue would increase in the near future, and also with regard to the interests of health of the locality. The works in both cases are in an advanced stage towards completion, and a supply of water before hot season sets in is assured.

Owing to the failure of the local water supply at Parramatta during late drought, a large quantity of water was supplied by the Board to the town. As the Board's mains practically surround this town, it must be only a question of the near future when the local supply must become unsuitable for potable purposes.

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A scheme has been prepared for extending the water to Eastwood, Mobb's Hill, Brush Farm, and surrounding locality—the water being pumped from Ryde pumping station; the present revenue, however, does not show a reasonable return on expenditure.

The residents of Narellan and Camden were desirous that the Board should extend the benefits of the water supply to these towns. Plans and estimates were prepared, and the necessary rate to cover interest on capital and working expenses was struck, and residents informed. As the Board had no power under existing Act to rate property outside the county of Cumberland, it was necessary that the owners should guarantee the rates as above; this they did not seem inclined to do, and the matter was dropped pending the passing of an amending Bill, which, among other things, included the power to extend the supply of water outside the limits of the county of Cumberland and rate property.

Country Towns' Supplies under Board's control.

The various works, &c., in the towns of Liverpool, Campbelltown, Richmond, Smithfield, are in good order, no work of special import being carried out during the year. The approach to Richmond pumping station has been improved by planting and new fencing.

Botany Reserves.

An abundant water supply was available for the Board's lessees, and all the establishments were in full swing during the season.

The whole of the old machinery has been removed from the Botany pumping station, and the building is available for other purposes. The outbuildings are dilapidated, and require considerable repair before being of any use.

Contracts let.

The contracts let during year comprise:—Pipe-laying; pipe-making, cast-iron and steel; stop-valves of sizes from 4-inch to 20-inch; ball hydrants; special castings, and general ironwork; electric plant at Crown-street; pumping plant for Carlton; Wahroongah Tank; pumping plant at Chatswood, and engine house.

The work done by day labour comprises:—Pipe-laying in the city; extensions to caretaker's cottage at Chatswood; ventilation, Waverley Reservoir; fixing outlets, Waverley and Petersham Reservoirs; and numerous small jobs.

Expenditure on Loan Vote.

	£	s.	d.
New mains, including arterial mains, &c.	82,438	0	10
Buildings, machinery, and other works	8,514	2	1
	£90,952	2	11

Expenditure on Maintenance Vote.

The expenditure on maintenance of works during the past twelve months was £25,679 6s., being an increase of £1,965 over previous year. This is accounted for by extra maintenance on casual works and clearing of mains in the city and suburbs.

Report of Chief Mechanical Engineer.

Sir, The Waterworks Reservoir, Crown-street, 13 July, 1897.

I have the honor to submit the following report upon the working of pumping engines, &c., and water supply for the year ended 30 July, 1897:—

No. 1 Engine is now laid up for general overhaul, being due for internal examinations and renewals were found necessary.

No. 2 Engine was laid up for general overhaul, renewals, &c., on 22nd July, till 29th August, 1896,—and which overhaul consisted of opening out cylinders, valve casings, and pumps; drew pistons, reset and fitted H. and L. piston rings; took out all pump valves, scaled and painted pumps internally; air-pumps drawn and fitted with new brass studs and valves; main pumps fitted with 250 new brass spring-caps, in the place of defective cast-iron ones; compensator pistons and glands rebushed, new gland-bolts &c.; all steam valves examined and adjusted; valve and pump gear stripped and adjusted; steam joints made good where defective, after which it was externally renovated with paint &c.; the steam pipe joints were made good throughout. The whole machinery has since been working satisfactorily.

No. 3 Engine was laid up for general overhaul 3rd June to 17th,—drew L.P. pistons, reset and adjusted rings; remade defective slide-valve casing joints; adjusted valves; drew air-pump buckets, re-set and adjusted bucket rings; fitted new V.I. valves throughout (8) and 4 new head-valves; jacketing sack-valves all done-up; repaired hot-well and drain-pipes leading thereto; stripped connections, let together and adjusted all working parts; boilers have been cleared out periodically as required, and several header-covers scraped up that became leaky.

The hydrant connections for protection of buildings in case of fire have been periodically tested throughout the year in order to their being kept in efficient order and condition.

Water pumped during the year and for the quarter is shown in tabulated form herewith attached, viz:—Water pumped by Crown-street pumps during the year to Paddington Reservoir was 1,796,250,200 gallons, being somewhat less than the year previous, and for the quarter 406,872,200 gallons, being also less than the corresponding quarter of the year previous.

The quantity of water pumped to Woollahra Reservoir during the year was 442,713,050 gallons, being slightly less than the previous year, and for the quarter 103,493,200 gallons, being an increase of 1·82 million gallons on corresponding quarter of previous year.

The quantity of water pumped to Waverley Reservoir during the year was 281,267,150 gallons, being an increase on the previous year of 26·74 million gallons, and for the quarter 66,862,400 gallons, being 9·3 million gallons more than for corresponding quarter of previous years. The

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The quantity of water pumped at Ryde works for the year—to Ryde Hill was 131,463,000 gallons, being 22·81 million gallons increase on the previous year, and to Chatswood, 331,248,000 gallons, being an increase of 65·28 million gallons on the previous year. The pumping for the quarter to Ryde Hill was 31,455,000 gallons, and to Chatswood 75,504,000 gallons, showing an increase on the whole, 7·83 million gallons on the corresponding quarter of the previous year.

The quantity of water pumped at Carlton for the year was 60,932,320 gallons, and for the last quarter 16,358,820 gallons, being an increase on the year previous of 20·59 million gallons, and for the quarter 5·72 million gallons increase on the corresponding quarter of year previous.

Chatswood pumping for Gordon–Wahroongah supply was 23,823,192 gallons, and for the last quarter 6,759,612 gallons, the increased consumption from this supply next year will be found to have fully doubled that of the present year.

All the pumping works are in fair working order and condition.

J. FYFE,
Chief Mechanical Engineer.

The Engineer-in-Chief.

RETURN of water pumped and coal consumed for the year ending 30th June, 1897.

From.	To Reservoir.	Water Pumped.	Coal Consumed.
		gallons.	tons cwt. qr.
Crown-street Works	Paddington	1,796,250,200	1,403 2 0
,, ,,	Woollahra	442,713,050	668 7 0
,, ,,	Waverley	281,267,150	738 2 0
Ryde Works	Ryde Hill	131,513,000	1,186 6 0
,,	Chatswood	331,248,000	
Carlton	Penshurst, &c.	60,932,320	336 5 0
Chatswood	Wahroongah, &c.	23,823,192	233 18 0
For heating up slowly in changing boilers, Crown-street			12 0 0
For house use			12 0 0

RETURN for quarter ending 30th June, 1897.

From.	To Reservoir.	Water Pumped.	Coal Consumed
		gallons.	tons. cwt. qr.
Crown-street Works	Paddington	406,872,200	338 5 0
,, ,,	Woollahra	103,493,200	163 11 0
,, ,,	Waverley	66,862,400	181 10 0
Ryde Works	Ryde Hill	31,455,000	279 16 0
,,	Chatswood	75,504,000	
Carlton	Penshurst, &c.	16,358,820	85 16 0
Chatswood	Wahroongah, &c.	6,759,612	61 17 0

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Superintendent's Report, 1896–7.

Prospect, 17 July, 1897.

I HAVE the honor to report that the whole of the works have been maintained as well as the defective character of much of them would admit. In addition to ordinary maintenance, the following are the more important of the additional works carried out or in hand at the end of the year:—

At Potts' Hill, renewal of the gauze on the screens is in hand.

On the 72-inch main a defect showed in one of the pipes, a piece flaking off; a covering-plate was put on.

On lower canal an off-take was put in at Sydney-street to supply residents of Guildford.

Girders of scour valves have all been renewed, and considerable repairs to bridges effected. A slip which occurred at 45½ miles was treated, and now appears quite secure.

Additional wire netting has been erected to prevent dogs gaining access to the water.

At Prospect, the cottage recently occupied by the Controller of Valves was removed, and put in order for one of the maintenance men. A much needed improvement was commenced by under-scrubbing and thinning the timber on the watershed, about 70 acres being dealt with.

An excessive settlement having taken place at the angle at T.S. 44, for a length of 800 feet, the work of restoring the puddle and rebuilding the disturbed portion has been put in hand, and is now about half finished. The bank has been put to the severest test that it has had to withstand since construction, owing to the water being drawn down to R.L. 183·85, but, beyond the settlement above mentioned, developed no defects.

An examination of the water's edge while low showed that water-weeds have not, so far, made any serious growth.

The pipes at the bottom of outlet tower have been embedded in concrete, as between the tower wall and the valves the pipes were unprotected and under no control in case of a burst.

Agistment fees do not amount to so much as last year, totalling £298 3s. 1d. On account of the dry season care had to be exercised not to over-stock.

On the upper canal, 3 miles of fencing which was in very bad order have been replaced by a wire fence, and thirty iron gates erected where required.

Liverpool Dam was emptied and thoroughly cleaned out, and some deep holes which existed at its upper end filled up, as they accumulated decayed vegetable matter, &c., and could not be drained. This has resulted in a great improvement to the condition of the water.

A further length of 87 feet of canal was relined, making a total of 3,445 feet carried out by day labour, and a contract has been let for relining about 5,000 feet, and putting in 600 lineal feet of covered way. Of this 1,161 feet of relining has been completed. 56 chains of the quick race on section 9 has been pointed up, any faulty stones being taken out and replaced with concrete.

Most of the aqueducts were cleaned out and painted, and a great many minor jobs, as flattening slopes, repairs, and painting bridges and flumes, attended to.

The Nepean and Cataract Tunnels have been thoroughly cleaned out. In the case of the Cataract this was a heavy job, a very large quantity of debris fallen from the roof having accumulated.

The Engineer.

A. F. JACOBS,
Superintendent.

SUMMARY

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SUMMARY of Mains laid from the 1st July, 1896, to the 30th June, 1897.

District.	Length of each sized Main laid, in Yards.													
	3′	4″	6″	8′	9′	10″	12″	15″	18″	20′	24″	30	36″	Total
Alexandria	...	387½	356	...	...			2	...	...	...	...	...	745½
Annandale		61	4	...	802	.	...	..	.. ..	...	...	.	...	867
Ashfield	...	311½	161	...	..	12½	3	2	1,311	..	..	..		1,801
Auburn	...	851	.	.	....	...		...	...	...	...	...	...	851
Balmain	4	464½	838½	..	.....	16½	1,132½	...	1,311½	...	...	...	...	3,767½
Bankstown	...	3,178		..	... .	.	...		... .	.	..	...	.	3,178
Beecroft	.	740½	2,375	.	... .		..	...	.	...	...	..	..	3,115½
Botany	..	1,640½	... ..	..	..	...		...	...	...	.	..	...	1,640½
Burwood	..	333½	291		732	...	1,055	...	... ..	...	.	...	.	2,321½
Campbelltown	...	864	.....	..	...	.	.	.	.....	...	.	...	...	864
Canterbury	..	703	3½	..	.		1,787½		.. .	..		...	..	2,494
City	13½	1,204½	3,823	117½	23	1,352	690	2	...	...	...	...	.	7,230½
Concord	...	689	493	...	... .	.		.	.....	..	..	...	.	1,182
Drummoyne	.	145	..		...	.			..	...	...	...	...	145
Enfield	...	759	.. .	.	..		..		. .	.	..	...	...	759
Erskineville		... .	12	..	...	.		...	..	...	...	.	...	12
Glebe	.	222½	27		141	.	.	...	... ..	..	...	...	...	393½
Gordon	3	9,038	3,176½		.	1½	...	..	. ...	...	...	...	...	12,219
Granvil'e	1	3,003	...	...	.	..	.	...	.	...	.	..	..	3,003
Hun'er's Hill	.	903	..	.	.....	..	.	...	... .		..		...	908
Hurstville	.	791	809	5	..	2,011	4,918	...	11	...	.		.	8,548
Kogarah		325	591	..	. .	.	7	46	...	...	...	...	...	969
Lane Cove	.	745			..	.	...		.	.	...	...	.	745
Leichhardt	.	171	11	.	... .	.	...		748					933
Marrickville	32	437	19		..	.	.	..	..	1,768			...	2,256
Mosman		2,884½	862	.			...		.. ..	.	.	...		3,746½
Newtown	3	110			.. ...			..	. ..	...	.	...	...	113
North Botany	.	295	. ....		.	.	.	..		...	..	...		295
North Sydney	.	1,394	78	.	5½	6	...	.	834	.	..		...	2,317½
Paddington	...	250	1			.	.		..	.	..	.		251
Petersham		176	..	...	. .		.		. ..	37		...		213
Randwick	.	1,963	26½		.	4	2,652					..	..	4,645½
Redfern		149	112½	1½	.	.		...		.	...	...	.	263
Rockdale	..	304	68	2	1	12	61		. .	3,645	.		...	4,093½
Rookwood	.	931½		.	... .	.	.		21	...		6	35	1,046½
Ryde	.	1,211	898	.	... .		.		.. ..		...		...	2,109
St Peters	...	.	34	...	2		42		..	2,411		..		2,489
Strathfield	.	174	104	.	1,430	.	973	...	.	6	...		..	2,687
Vaucluse	.	134	. . ..	.	... ..	.	...	.	..	...	.	...	.	134
Water'oo	...	8	.		....		.	.	.	.	.		.	8
Waverley	.	...	5	.	2	.	1,265	200	4	1	20	..	...	1,497
Willoughby	..	5,511½	705		15	45	3		4,289	36	...	..	...	10,604½
Woollahra	...	292		...	1	...		..	.. ..	.	..	.	...	293
Total	56½	43,818½	15,799½	126	3,157½	3,461	14,589	252	8,529½	7,904	20	6	35	97,754½

II.—SEWERAGE BRANCH.

DURING the past twelve months the following storm-water drains, constructed by the Government Sewerage Branch, have been transferred to the Board, under the provisions of the amending Act of 1894, viz. —

Iron Cove Creek, Upper Ashfield branch.
Point Piper road to Rushcutter Bay.
Iron Cove Creek, Carshalton-street branch.
Long Cove Creek, Petersham branch.
,, ,, Leichhardt branch, lower section.
,, ,, ,, upper section.
,, ,, Smith-street branch.
,, ,, Henson-street branch.
Eastern Park channel, Balmain.

No sewers have been transferred during the past year.

The following storm-water sewers, constructed by Municipal Councils, and taken over by the Board in terms of amending Act of 1889 :—

Neutral Bay—South-west sewer.
Careening Cove—South-west sewer.

The total length of storm-water sewers transferred during the year aggregates 3·22 miles, and are shown in Appendix A, Tables 1A and 2A.

Surveys, &c.

Surveys have been made to determine the position and level of side inlets for information of Government Sewerage Construction Branch in connection with the following main ducts, viz. :—

Western branch—Third division.
Dobroyd branch of northern sewer.
Long Cove—Sub-branch of northern sewer.
Randwick main sewer.
Eastern branch (low-level).
Balmain—Branch, north-west slopes.
Waverley and Bondi—Eastern slopes.

Surveys

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Surveys have also been made for extension of stormwater drains in Johnston's Creek and Rushcutter Creek, and for reticulation sewers in Woollahra, Waverley, Alexandria, and Waterloo, and in connection with the sewerage of western suburbs at Annandale, Leichhardt, Balmain, Newtown, Petersham, and Marrickville. Surveys are also in progress for completion of the southern part of North Sydney, and area between cemetery and St. Leonards Park.

New Sewers.

The length of sewers constructed by the Board during the past twelve months aggregates 25·56 miles, and the length of stormwater drains constructed during same period ·766 miles. The total length of sewers—foul and storm water—under the Board's jurisdiction, is 274·16 miles (*see Appendix* B).

The construction of the reticulation sewers has been pushed on so as to be available simultaneously with the main outfalls constructed by the Government Sewerage Department. Up to the present this anticipation has not been realised, as several miles of sewers are awaiting the completion of outfall works, and no benefit, either financially or sanitarily, can be obtained from the reticulated area.

The low-lying areas of Erskineville and Alexandria have been sewered, pending the completion of the low-level system of Marrickville. The storm-ejectors imported for this work have been working for some months past, and, with exception of stoppages incidental to new plant, especially of this type, the sewage has been satisfactorily disposed of. This is the first installation of this system actually at work in the colonies.

Out of 1,600 houses within the zone dealt with, representing 8,000 persons, 50 per cent. of the houses are now connected, and I have no doubt that in a few years the existence of the stormwater and foulwater sewers will have a beneficial effect on the health of the locality, as the lowering of the ground water and aeration of the soil will become an important factor in reducing the sick and death rates.

Contracts in Progress.

The contracts in progress number twenty-two, embracing 140,640 lineal feet of sewers of various sizes; construction of wrought and cast iron work for sewers; also construction and erection of ventilating shafts in city and suburbs; together with construction of effluent drains on the sewage farm.

Stormwater Sewers.

Revised rates had to be struck on the area draining into Iron Cove Creek in order to cover annual charges for interest and maintenance. The loss on stormwater sewers in the aggregate amounts to £1,285 per annum. As the Minister now refers all proposals of this nature to the Board before entering upon construction there is no danger of the debit balance being increased without the Board's knowledge.

Outfall Sewers.

The various outfalls have been inspected during the year and incidental repairs effected. The automatic flow-gauges have proved useful in recording the varying daily flow of sewage. Penstocks and valves are in good working order.

Reticulation Sewers.

The various sections have been flushed and attended to by the maintenance men. Considering the excessive rainfalls which occurred on the breaking-up of the drought the cases of flooding through sewers being surcharged have been few. In two cases the matter was amicably settled by paying a small amount of compensation, remedial measures being taken to prevent a recurrence of the damage. Arrangements have been made to take over the section of Glebe sewerage discharging into Blackwattle Bay, with the intention of ultimately intercepting same and discharging the sewage into Bondi Outfall.

Removal of Silt from Sewers and Drains.

The quantity of silt removed from the old system of sewers was 1,668 tons, of which 1,400 tons were disposed of on Government reclamation works. The quantity from main outfalls on new system was: Bondi, 629 tons; Botany, 120 tons. This shows a marked decrease on previous year. The quantity of silt removed from the stormwater sewers was 3,530 yards, showing a considerable increase in quantity over last year. Until proper gullies are constructed in connection with these ducts, the cost of cleansing will be heavy, but it is hoped that with the new flushing apparatus some diminution of cost will be obtained.

The punt "Ino" has had the annual overhaul and painting, and is in serviceable condition.

Repairs to Sewers.

Repairs have been carried out in connection with Pitt-street sewer, which have placed it in good condition.

The amount of work done since work of repairing was started is:—

	Invert repaired. Feet super.	Pointing. Feet super.	Arch repairs. Feet lineal.
1897–7	1,418	1,255	nil.
1891 to 1896	35,817	209,351	1,817
	37,235	210,606	1,817

This work is paid for out of revenue. The bricklayers have also during the year executed requisitions for other branches.

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Outlet Works, Cook's River.

The buildings, screens, valves, and oil engine hoist are in good condition. No stoppage occurred during the twelve months. The quantity of silt removed during the year was 1,975 cubic yards, as against 1,960 cubic yards in 1895-6 (eighteen months).

The quantity of lime used was 2 tons. This is used for cleansing purposes only, and not for precipitating, but I find that restricting the lime has to some extent affected the growth of crops on the farm. The absence of lime made the sewage too strong for growing crops, and the foreman has been instructed to increase the quantity to its original weight per annum.

The cottages are all in good condition, and required no repairs during the year.

The locomotive is in good running order. The bridge across river has had some girders renewed. There is now doubt as river becomes scoured and deepened the bridge will become unsafe. The contract for disposal of sludge by compressed air is nearly ready for tendering, and will be pushed on.

New dolphins had to be fixed to protect the opening span of bridge.

Sewage Farm.

The disposal of the sludge has been carried out without difficulty, as what was not required on the cultivation beds was used for topping the roads and banks near main carrier extension. The farm has now assumed its former appearance; the crops look healthy and promising.

Tree-planting is carried on where possible, and the appointment of a man with knowledge of the work will ensure good results. The trees already planted are thriving, and in a few years will considerably enhance the appearance of the farm.

The piggeries are kept in good order and clean. The Board's stock is thriving, and I hope to see a substantial return from this source.

The expenditure on the farm, since taken over from late lessee, has been somewhat heavy, as the planting had to be begun over again and permanent improvements carried out. Out of the total expense of £847 18s. 2d., the sum of £624 19s. 10d. was for maintenance and ploughing and harrowing; the balance is for plant, material for fences, &c., seeds, and stock.

The manager reports that the amount expended for stock was £65 1s. 11d., and the value of same at present time is £93 2s. 6d. The receipts for agistment was £102 12s., and £17 1s. for sale of produce, or total of £119 13s.

I anticipate a substantial increase in the returns for the current year.

The average daily flow of sewage into the farm is 2,361,600 gallons, as against 2,059,200 gallons last year, the increase being due to extension of sewage system in Erskineville and Alexandria.

The various leases on Rockdale Farm have been overlooked, and are in a satisfactory state; some of the lessees have carried out substantial improvements at their own expense.

The effluent water from farm is analysed by Mr. Hamlet quarterly, and he reports that it maintains its usual character.

House Drainage Connections.

The number of houses connected with the Metropolitan and Suburban Sewers under the control of of the Board is as follows:—

	1890.	1891.	1892.	1893.	1894.	1895-6.	1896-7.	Total.
City	961	541	1,070	1,223	1,050	1,384	971	7,200
Suburbs	3,804	3,578	3,148	3,437	2,853	3,113	2,160	22,393
								29,593
Connected to City Sewers prior to Board's control								18,000
								47,593

The subjoined list shows the number of properties connected during the past twelve months:—City, 971; Alexandria, 274; Camperdown, 158; Glebe, 170; Erskineville, 385; Marrickville, 17; Newtown, 392; Petersham, 59; Paddington, 64; Redfern, 72; Randwick, 56; Waterloo, 98; Waverley, 233; North Sydney, 83; Leichhardt, 2.

The Board carried out the drainage of properties under the compulsory powers of the Act as follows:—Waverley, 10; Glebe, 11; Randwick, 11; Paddington, 2; Petersham, 13; Camperdown, 36. And under the system of deferred payments:—Waverley, 5; Glebe, 4; Randwick, 4; Petersham, 8; Camperdown, 12; Alexandria, 1; Newtown, 3; Erskineville, 1; City, 17.

The total number of houses connected by the Board and average cost per house, is as follows:—

	1891.	1892.	1893.	1894.	1895-6.	1896-7.
City	19	6	4	.....	.....	17
Suburbs ...	245	240	32	91	84	121
Cost per house. .	£14 14s.	£12 10s.	£18 14s.	£9 14s.	£9 10s.	£6 14s.

The number of estimates prepared for work to be done under the system of deferred payments was 69.

House Drainage Plan Fees.

The fees received for house-drainage plans, and number of plans prepared, were—

	1890.	1891.	1892.	1893.	1894.	1895-6.	1896-7.	Total.
Plans ...	2,213	2,303	2,485	2,669	2,119	2,624	2,557	16,970
Fees ...	£1,033.	£1,088 15s.	£1,087 13s. 6d.	£1,107 6s. 6d.	£818 15s.	£869 5s.	£708 7s. 6d.	£6,713 2s. 6d.

The number of houses surveyed and charted on permanent records was 1,164, and the number of building plans lodged was 207.

As an illustration of the insanitary condition of some old city properties the following instance may be quoted:—

The premises are situated in George-street, and used as a restaurant, having a cellar under the dining-room. Complaints were made of obnoxious smells arising, and it was found on examination that the house-drain was carried along the wall of the cellar about 4 feet above the ground level. In

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In order to get rid of any water which accumulated in the cellar, a hole was made in the pipe, and the water from the cellar was pumped into it. This arrangement left a free vent for the foul air from the main sewer into the house.

In addition to this, the house-drain between the point where the hole was made and the main sewer became choked, and the sewage from the house, instead of flowing to the sewer, was deposited over the floor of the cellar to a depth of 12 inches.

The nuisance thus caused was so intolerable that the inmates were obliged to remove from their bedroom to another part of the house.

The fittings also were found to be in a very defective condition.

A new system of drainage was carried out by the Board, and the premises were left in a thoroughly sanitary state.

Since the beginning of 1897 a very marked increase in the number of applications for house drainage in the city has taken place, chiefly owing to the notices which have been served by the City Council, in conjunction with Health Board, both of which authorities are working harmoniously with the Board for the public good.

The Board is seeking legislative authority under a further amending Act for same compulsory powers in connection with old city sewerage as with the suburban sewers, as the present system under the Health Bill is complicated, and may lead to nothing being done in the way of altering defective sanitary fittings.

House Drainage Certificates.

The number of official certificates issued to owners in connection with house-drainage since inception of the Board is, viz.:—

	1891.	1892.	1893.	1894.	(18 months.) 1895-6.	1896-7.
City	251	272	265	294	345	243
Suburbs ...	1,140	843	1,148	500	544	334

Defective Drainage.

The examination of premises with defective drainage by the Board's inspectors has been carried out with fair results as to reconstruction of same. first notices and final notices to alter or repair defective drains were served on properties; of the number, houses were attended to by the owners.

houses were smoke-tested, and were mostly found defective.

Since the inception of the new Board of Health Act the Board is in a far better position to take action in connection with old drainage and obsolete fittings. The Board of Health is empowered to move the municipal authorities, who in turn serve the necessary notices specifying that the work must be done in accordance with the regulations of this Board.

The reports received from the Board's Medical Officer are dealt with by the inspectors, and where sanitary conditions are defective, notices are served to have the premises placed in a sanitary condition.

Sanitary Plumbing.

During the past twelve months 2,058 jobs have been inspected and passed, and 658 certificates issued for same. Ninety-four notices have been served, of which 32 have been attended to; 15 cases were smoke-tested, and 186 soil-pipes tested hydrostatically. Of some of the cases investigated, a water-closet was discovered, the existence of which was not known, the seat being nailed down; and as there was no water in the trap, and no disconnector trap on drain, nor same ventilated, the nuisance, as described by inspector, was "something terrible."

In some of the better residences, where the soil-pipe and traps were not properly ventilated, when the closets were flushed the bath and other traps were unsiphoned, thus allowing the sewer air to permeate the whole of the building.

One of the worst cases reported was that of a public school. In this case the waste-pipe from urinals was choked, and a hole had been made through the end of the trough into which the waste-pipe discharged to allow urine to escape, the same discharging over yard in front of w.c.'s used by the children, thence to a D-trap some 12 feet away. The water used for drinking purposes was supplied from a lead-lined cistern, which also supplied the closets and lavatories, the pipe supplying same being defective, and repaired with rags and twine. The w.c.'s were also found defective, having insufficient water supply.

Another glaring case occurred in Newtown, where an upstairs closet was found discharging on to the scullery roof.

As showing the necessity for hydrostatically testing new work which appeared to have been well carried out, there was a case reported of where two w.c.'s were fixed upstairs, the lead soil-pipe being flanged over floor; a socket-piece to take traps had been wiped on to each and pan set. Although the work looked well, when the test was applied the joints leaked badly, owing to bad wiping. This would not have been discovered but for the test.

Ventilation of Sewers.

A statement of the annual tests of the shafts is attached hereto (*Appendix* C). The complaints now received as to smells are very few.

The maintenance staff has been busy in effecting the usual repairs—repairing cowls, refastening bands, painting, attending to water-sprays and flushing-tanks, altering sites of shafts where new buildings necessitate alteration of same. During the past twelve months only one case has been reported where damage was done to property by the ventilating shaft, although gales with a velocity of 72 miles were experienced, and 2,000 shafts were erected. This shaft was quickly restored to satisfaction of the owner of said property.

The

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The combined induct water-spray and flushing-tank at Darling Point has proved a great success. In this case, the water used for ventilation is intercepted by means of a suitably-designed chamber, fitted with ball-cock, which allows the water to be discharged automatically through a siphon, thus assisting the ventilation and reducing the cost of the maintenance of the sewers. This system, where convenient and advisable, will be adopted in the future.

Wherever possible the dead-ends of existing sewers have been connected up, thus ensuring through ventilation.

Advantage has been taken of the large chimney-stack at the Kerosene Works at Alexandria to ventilate the southern outfall sewer. The work done by this shaft is 63,965 cubic feet of air extracted from the outfall sewer per hour.

Another similar case occurred at Sussex-street, the result being 21,087 cubic feet per hour.

Special Shafts.

Steam-shafts, Water-sprays, and Stacks, 1896.

Date.	Instrument.	Time.	Anemometer.			Lineal Feet per Hour.	Cubic Feet per Hour.	Miles per Hour.	lb Pressure per Square Foot.	Locality.
			Start.	Finish.	Difference.					
1897.		h. m.								
5 Mar...	11	19 0	165,000	737,000	572,000	30,105	53,199	5·7	·1624	Induct 18-in. water-spray, Pitt-street.
11 May...	10	0 20	252,600	270,000	17,400	52,200	32,625	9·88	·488	Exhaust 9-in. x 10-in. stack, Hordern's, Great Buckingham-st.
11 „ ...	9	0 20	219,500	236,400	16,900	50,700	31,688	9·6	·4608	„ „ „
11 „ ...	4	1 30	554,400	614,000	59,600	39,732	7,801	7·52	·2827	„ 6-in. steam, Cameron's Factory.
11 „ ...	2	0 45	568,700	607,300	38,600	51,464	10,105	9·74	·4743	„ 6-in stack, New York and Brooklyn Factory.
14 „ ...	2	0 15	610,200	633,200	23,000	92,000	40,480	17·42	1·5172	„ 9-in. „ Tooth's Brewery.
4 June..	2	0 30	886,300	940,000	53,700	107,400	21,088	20·34	2·0685	„ 6-in. „ McCorquodale's Mill, Sussex-street.
7 „ ...	2	1 0	944,300	980,500	36,200	36,200	63,969	6·85	·2346	„ 18-in. „ Kerosene Works, Botany.
8 „ ...	2	1 0	980,700	1,006,700	26,000	26,000	45,945	4·92	·121	Induct 18-in. water-spray, Purves-lane, Glebe.
8 „ ...	1362	1 0	893,500	911,000	17,500	17,500	30,924	3·31	·0547	„ 18-in. „ Toxteth-road.
12 „ ...	10	1 0	138,800	177,800	39,000	39,000	7,657	7·38	·2723	Exhaust 6 in. stack, Cornwell's Brewery.
2 July...	2	0 5	1,126,000	1,137,000	11,000	132,000	449,962	25·0	3·125	Induct 25-in. water-spray, Busby Bore.
15 „ ...	10	1 40	183,200	250,600	67,400	40,440	71,462	7·65	·2926	Exhaust 18-in. „ Liverpool and Elizabeth streets.
15 „ ...	3	1 20	.....	62,500	62,500	46,875	82,833	8·88	·3942	„ 18-in. „ St. James'-road.
15 „ ...	2	0 10	1,305,700	1,310,400	4,700	28,200	49,832	5·34	·1426	„ 18-in. „ Castlereagh-street.
15 „ ...	2	0 10	1,296,600	1,305,700	9,100	54,600	96,484	10·34	·5345	„ 18-in. „ Elizabeth-street.
19 „ ...	10	2 0	250,600	400,000	149,400	74,700	32,868	14·15	1·0011	„ 9-in. stack, Crown-street (new).
19 „ ...	10	0 10	400,000	403,100	3,100	18,600	32,863	3·52	·0619	Induct 18-in. water-spray, Harrington-street.
19 „ ...	10	0 15	403,100	407,600	4,500	18,000	31,808	3·4	·0578	„ 18-in. „ Macquarie-street.
19 „ ...	10	0 10	407,600	412,300	4,700	28,200	49,832	5·34	·1426	„ 18-in. „ Loftus-street.
20 „ ...	10	0 45	412,700	424,500	11,800	15,732	3,088	2·98	·0414	Exhaust 6-in. stack, Crown-street (old).
20 „ ...	10	1 30	423,700	486,000	62,300	41,532	194,951	7·86	·3089	„ 26-in. x 26-in. water-spray, Obelisk.
20 „ ...	2	1 0	1,310,300	1,356,100	45,800	45,800	8,992	8·67	·3758	Induct 6-in. water-spray, Edgecliffe-road.
21 „ ...	10	0 10	486,000	493,900	7,900	47,400	37,228	8·97	·4023	„ 12-in. „ Erskine-street.
21 „ ...	10	0 20	493,900	502,400	8,500	25,500	45,061	4·82	·1162	„ 18-in. „ Kent street.

Exhaust Work.—1,196 6-in. shafts, 29 9-in. shafts, and 15 stacks, steam-shafts, and water-sprays.
Exhaust per hour, 4,633,880 cubic feet of air; per day, 111,213,360 cubic feet; per week, 778,493,520 cubic feet.
Induct Work.—626 6-in. shafts, 8 9-in. shafts, and 10 water-sprays.
Induct per hour, 3,091,057 cubic feet of air; per day, 74,185,368 cubic feet; per week, 519,297,576 cubic feet.

New Works.

The erection of vent-shafts and arrangements for inducing a current of air into the sewers has been pushed on during the past year. Although objections were raised by owners of property in the first instance, satisfactory arrangements have always been made. The relations between the Board and Municipal Councils have been of the most satisfactory nature. Although 2,630 openings were made in streets or footpaths, no case of complaint occurred as to defective restoration or failure in giving notice before work was commenced.

The total mileage of sewers ventilated is 210 miles. The total length of vent-shafts erected is 99,397 lineal feet, as against 182·5 miles of sewers, and 87,505 lineal feet of shafts up to end of last year.

The existing shafts have been examined and tested during the year, and the working of same is satisfactory. (See returns.)

There are now 298 pillar-shafts erected, some of which are 66 feet high, and 9 inches diameter. Although storms of considerable velocity have occurred, none of the shafts were injured.

Drawings, &c.

During the year the Chief Draftsman reports that 163 sheets of drawings and 408 tracings have been prepared, and in the Heliotyping Room 1,382 heliotypes were printed, 984 plans mounted, and 223 photographs taken.

Expenditure

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Expenditure on Loan Vote.

The amount expended from Loan Vote during the year was £61,120 5s. 9d.

Expenditure on Revenue Vote.

The amount expended for maintenance and wages during the year from Revenue Vote was £20,117 19s. 5d.

Testing-rooms.

Record of tests made at Departmental testing-rooms, viz.:—

Portland cement, tested 21 parcels, representing 8,958 casks, 15,000 bags—18 passed, 3 rejected.
Stoneware pipes, tested 43—34 passed, 9 rejected.

Bricks	„	3
Paving material	„	2
Sands	„	14

Diagrams.

Sewerage reticulation.	Sewage-discharge diagram.
Zymotic death-rate.	Silt removed.
Death-rate, city and suburbs.	Combined automatic.
Death-map.	Water-spray ventilator.
Temperature of sewers.	Flushing tank.

The information furnished by the Government Astronomer and Government Statistician has been of the greatest assistance to the Department, and I take this opportunity of returning my thanks for the courtesy shown by the above gentlemen.

The Assistant Engineers and officers of both Branches have ably assisted me in carrying on the duties of the Department, and I wish to record my thanks to them for same.

Appendices and diagrams herewith.

I have, &c.,

JOHN M. SMAIL, M. Inst. C.E.,
Board Engineer.

The Secretary.

APPENDIX A.

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APPENDIX A.

TABLE No. 1.

MAIN SEWERS and Pipe Sewers constructed by the Government Sewerage Department and transferred to Board.

Size of Sewer.	Pipes. 24″	21″	18″	16″	12″	9″	6″	Total Length.
1 July, 1896, to 30 June, 1897.	.....	.....	.....	.....	.....	.....	.....	Nil.
1 January, 1895, to 30 June, 1896.	.....	.....	.....	.....	.....	29,672	.....	29,672 lin. ft. = 5·62 miles.

Total length of Sewers transferred ... 313,386 lin. ft. = 59·35 miles.

A. H. STARLING,
Surveyor-in-charge.

T. GRIFFITHS,
Assistant Engineer.

TABLE No. 1A.

STORMWATER DUCTS constructed by Government Sewerage Department and transferred to Board.

Size of Duct.	Elliptical. 9′ 3 1/16″ x 5′ 0″	7′ 3½″ x 5′ 0″	6′ 8″ x 5′ 0″	5′ 8½″ x 4′ 0″	Covered, not Elliptical. 7′ 0″ x 3′ 6″	Open. 14′ 6″ x 4′ 4″	13′ 8″ x 4′ 4″	Size varying from 9′ 3 3/32″ x 5′ 0″ to 9′ 0″ x 4′ 4″	9′ 0″ x 4′ 4″	7′ 9 1/2″ x 5′ 9″	7′ 3½″ x 4′ 6″	6′ 1⅝″ x 5′ 1″	Circular. 5′ 8″	5′ 0″	4′ 7″	4′ 4″	4′ 0″	3′ 9″	3′ 7″
July, 1896, to 30 June, 1897.	67	102	247	89	1,226	655	323	164	334	166	30	433	536	429	938	349	749	69	408

Size of Duct.	Circular. 3′ 5″	3′ 4″	3′ 3″	3′ 0″	2′ 8″	2′ 6″	Pipes. 24″	21″	18″	15″	12″	Total Length.
1 July, 1896, to 30 June, 1897.	65	339	512	2,037	484	276	476	622	357	141	160	12,783 lin. ft. = 2·42 miles.

Total length of Stormwater Ducts transferred .. 76,247 lin. ft. = 14·44 miles.

A. H. STARLING,
Surveyor-in-charge.

T. GRIFFITHS,
Assistant Engineer.

TABLE 2A.

STORMWATER DUCTS constructed by Municipal Councils and transferred to the Board.

Size of Duct.	Open Rock-cutting.	Open. 4′ 0″ x 2′ 0″	Covered. 7′ 0″ x 4′ 0″	6′ 8″ x 3′ 2″	5′ 3″ x 4′ 0″	5′ 0″ x 4′ 0″	Irregular Section.
1 July, 1896, to 30 June, 1897.	528	264	1,323	150	96	33	330

Size of Duct.	Circular. 5′ 0″	Pipes. 16″	12″	Total length.
1 July, 1896, to 30 June, 1897.	264	594	660	4,242 lineal feet = 0·803 miles.

Totals ... ... 4,242 lineal feet = 0·803 miles.

A. H. STARLING,
Surveyor-in-charge.

T. GRIFFITHS,
Assistant Engineer.

APPENDIX B.

APPENDIX B.

Sewers and Stormwater Drains constructed by the Board

Sewers.

	Open.										Arched.			Elliptical	U shaped.				Circular.								Oval.		Pipes.										Total length in feet.	
	8′ 6″ x 6′ 0″	7′ 6″ x 5′ 6″	6′ 7″ x 4′ 9″	5′ 9″ x 4′ 9″	5′ 7″ x 3′ 9″	5′ 3″ x 3′ 9″	5′ 0″ x 3′ 9″	4′ 3″ x 3′ 9″	3′ 9″ x 3′ 9″	3′ 3″ x 3′ 6″	2′ 10½″ x 3′ 3″	10′ 0″	7′ 10″	7′ 3″	6′ 4″	10′ 0″ x 5′ 0″	4′ x 3′	4′ 6″ x 2′	4′ x 1′ 6″	3′ x 2′	5′ 6″	4′ 0″	3′ 11″	3′ 10″	3′ 6″	3′ 4″	3′ 0″	2′ 6″	2′ 4″	3′ 3″ x 2′ 2″	3′ x 2′	24″	21″	18″	16″	12″	9″	6″	Cast iron—6″	4″	Cast iron—9″	Cast iron—10″		
Alexandria	.																												.		..	..	190	132	8	286	195			.	.	805	
Annandale	.			..		.		.					..		.		..		..	..	..		.	..	.	.	.	.	.		..	..	..	448	..	10,914	452			.		11,814	
Balmain	..			.			..		.									..													.	..				.					
Camperdown		.			.												.														..	..			.		209			209	
City			..	.		.											..														32	596	279	643	643	3,907	2,301		87	44		8,532	
Darlington				.			..										..														.											
Erskineville				.				..									..																			1,299	793			.		2,092	
Glebe					.				.	.																										894	246					1,140	
Leichhardt		.				.											..																			..						
Marrickville			.				.																								.	.	..	109	262	14,590	514		75		15,550	
Newtown				..	..	..	..	..	..																						.	.	..	..	1,423	33,616	1,528	.	.		36,567	
North Sydney					..																										.	..	.	144	1,116	22,181	1,152			.	24,593	
Paddington																															.	.	.		650	10,350	426	131		.	11,557	
Petersham																																..	.	..	.	125	389		14		528	
Randwick																															.	..	.	.	.	2,155	257		.	..	2,412	
Redfern																															.	.	464	..		4,359	187		.		5,010	
Waterloo																															..	..	.	..		140	20	.		..	160	
Waverley																															.	.	1,009		.		76		.	138		1,223	
Woollahra				..			..																								40	.	..		..	3,104	523		.	388	.	4,050	
																															.	..				5,741	2,999					8,740	
1 July, 1896, to 30 June, 1897 — Total																															72	596	1,942	1,476	4,102	113,655	12,267	131	101	640		= 134,982 feet	Pipe Sewers, or 25·56 miles.
1 Jan., 1895, to 30 June, 1896 — do																															2,653	755	763	4,141	4,509	103,490	3,050		.		148	= 119,509 ,,	,, 22·63 ,,
1894																																651	669	2,922	7,003	81,685	3,957		.			= 96,887 ,,	,, 18·35 ,,
1893																															.	75	.	720	17,944	4,248			.	..	= 22,987 ,,	,, 4·35 ,,
1892																															724			1,678	3,974	107,835	4,532				= 118,793 ,,	,, 22·50 ,,
1891																															2,776	688	309	449	7,345	101,157	954			.	= 113,678 ,,	,, 21·53 ,,
1890																															1,220	660	1,227	302	1,024	1,559	2,359	39,890	961	..			= 49,202 ,,	{ Concrete sewers, 1,880 feet = 0·36 miles. { Pipe sewers, 47,322 ,, = 8·97 ,,

Stormwater Drains.

1 July, 1896, to 30 June, 1897 — Total	44	716	238	278	19	116	805	185	144	74	222	88	75	175	80	..	.	.		.		126	150	.	221		.		14	.	42			..	201	.	.	35			.	= 4,034 lin. ft	= { 3,670 feet Concrete sewers, or ·695 miles. { 378 ,, Pipe sewers, or ·071 ,,
1 Jan., 1895, to 30 June, 1896 — do	.	.	.		.		.		.							..	.				.		.					.					.	..	..	..		..			.....	
1894	..	.	.		.		.		.						..	84	250			.			.						.		..				.							334 ,,	Composite and Concrete sewers, or ·063 ,,
1893		.	.		.		.		.							..	..		.		.			.	.					..			158	363	.	..	..					521 ,,	Pipe sewers, or ·10 ,,
1892			..		.											..		38	28		429			.	478		841	310	400	..		1,162	41	515	1,168	577	.	1,300				7,787 ,,	{ 3,024 feet Concrete sewers, or ·57 ,, { 4,763 ,, Pipe sewers, or ·90 ,,
1891			..	.			.				.					..	.						.		.	.	.	..			.		.		.	.	..	.		.		.....	Nil.
1890				.													.	..		298	696	822		.	.		.	924		.	..	782	.	47	260	239	..	.	.	..			4,068 ,,	{ 2,740 feet Concrete sewers, or ·52 ,, { 1,328 ,, Pipe sewers, or ·25 ,,

A. H. STARLING,
Surveyor-in-charge.

T. GRIFFITHS,
Assistant Engineer.

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ANALYSIS of a Sample of Water received from effluent from Sewage Farm

		Results expressed in—	
		Grains per gallon	Parts per 100,000
Appearance in 2 ft tube	Well C, E	Peaty, with organic matter in suspension	
Chlorine as chlorides	C	10 3	
	E	10 9	
Nitrogen existing as free ammonia	C		80 00
	E		66 00
Organic nitrogen, or "Albuminoid Ammonia"	C		4 00
	E		3 50
Oxygen absorbed in 15 minutes at 80° Fah	C		7 20
	E		8 90
Do 3 hours at 80° Fah.	C		13 00
	E		16 50
Total solid residue dried at 220° Fah	C	37 52	
	E	35 56	

General observations on the character of the water.—May be allowed to flow away into tidal rivers.

W. M. HAMLET,
Government Analyst

Government Laboratory, Sydney, 20 January, 1897

VENTILATION OF SEWERS.

DISTRICT OF SYDNEY AND SUBURBS.

Exhaust Shafts

Year	Number of Shafts Tested	Lineal Feet per Hour	Cubic Feet per Hour	Cubic Feet per Day	Cubic Feet per Week	Average Time of Test	Average Wind in Miles per Hour
1891	500	5,074,061	996,232	23,911,108	167,377,056	14 min	9 62
1892	515	5,631,370	1,105,719	26,537,256	185,760,792	16 ,,	13 95
1893	538	5,614,700	1,102,416	26,457,984	185,205,888	30 ,,	8 72
1894	613	6,159,430	1,209,404	29,025,696	203,179,872	10 ,,	7 80
1895–6	1,026	14,892,875	3,008,985	72,215,640	505,509,480	11 ,,	10 72
1896–7	1,225	19,187,320	3,836,909	93,287,016	653,009,112	25 ,,	11 19

Induct Shafts

Year	Number of Shafts Tested	Lineal Feet per Hour	Cubic Feet per Hour	Cubic Feet per Day	Cubic Feet per Week	Average Time of Test	Average Wind in Miles per Hour
1891	240	3,493,272	685,963	16,463,112	115,241,784	14 min	9 62
1892	241	3,863,800	758,657	18,207,768	127,454,376	15 ,,	13 95
1893	231	3,844,163	754,801	18,115,224	126,806,568	30 ,,	8 72
1894	289	4,183,740	822,409	19,739,016	138,173,112	10 ,,	7 80
1895–6	520	10,288,505	2,037,054	48,889,296	342,225,072	13 ,,	10 72
1896–7	634	11,567,085	2,305,238	55,325,712	387,279,984	27 ,,	11 44

Average Work of One Exhaust Shaft

Year	Lineal Feet per Hour	Cubic Feet per Hour	Cubic Feet per Day	Cubic Feet per Week	Miles per Hour	Average Wind Velocity	Percentage of Wind	lb. Pressure per Sq. Foot
1891	10 148	1,992	47,808	334,656	1 87	9 62	19 52	0710
1892	10,934	2,147	51,528	360,696	2 07	13 95	14 83	0214
1893	10,436	2,049	49,176	344,232	1 97	8 72	22 59	0194
1894	10 048	1,972	47,328	331,296	1 90	7 80	24 35	0180
1895–6	14,515	2 932	70,368	492 696	2 74	10 72	25 55	0375
1896–7	15,663	3,173	76,152	533,064	2 96	11 19	26 45	0438

Average Work of One Induct Shaft

Year	Lineal Feet per Hour	Cubic Feet per Hour	Cubic Feet per Day	Cubic Feet per Week	Miles per Hour	Average Wind Velocity	Percentage of Wind	lb. Pressure per Sq. Foot
1891	14 555	2,858	68,592	480,144	2 75	9 62	28 52	0378
1892	16,032	3,148	75,552	528,864	3 03	13 95	21 72	0459
1893	15,315	3,007	72,168	505,176	2 90	8 72	33 25	0420
1894	14,494	2,845	68,280	477,960	2 74	7 80	35 12	0375
1895–6	19,785	3 917	94 015	658,120	3 74	10 72	34 88	0702
1896–7	18 244	3,636	87,264	610,848	3 45	11 44	30 15	0595

Total number of shafts tested, 1,959—exhausts, 1,225, inducts, 634

[Ten Plans.]

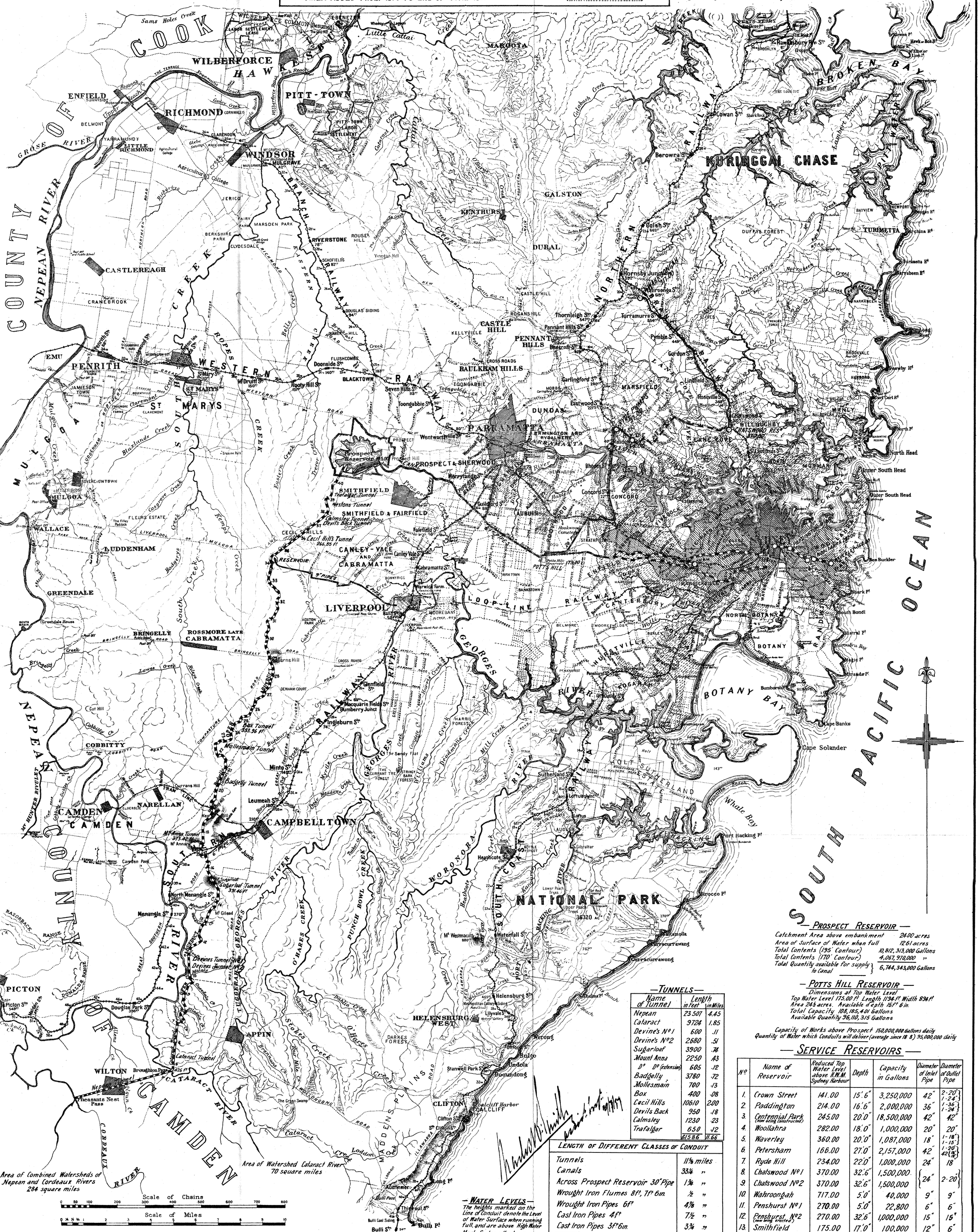
Sydney: William Applegate Gullick, Government Printer.—1898

METROPOLITAN BOARD OF WATER SUPPLY AND SEWERAGE. SYDNEY.

PLAN SHOWING THE GENERAL SCHEME OF WATERWORKS UNDER THE CONTROL OF THE BOARD

AREA SUPPLIED WITH WATER		
PREVIOUS TO THE BOARD'S CONTROL	SHOWN THUS	
EXTENSION OF AREA BY BOARD TO END OF JUNE 1896	"	"
AREA ADDED FROM 1896 TO END OF JUNE 1897	"	"

J. M. Smail Engineer



— PROSPECT RESERVOIR —

Catchment Area above embankment	24.00 acres
Area of Surface of Water when full	1261 acres
Total Contents (195' Contour)	10,812,313,000 Gallons
Total Contents (170' Contour)	4,067,970,000 "
Total Quantity available for supply to Canal	6,744,343,000 Gallons

— POTTS HILL RESERVOIR —

Dimensions at Top Water Level
Top Water Level 175.00 ft. Length 1194 ft. Width 834 ft.
Area 24½ acres. Available depth 15 ft 6 in.
Total Capacity 108,185,401 Gallons
Available Quantity 96,110,315 Gallons

Capacity of Works above Prospect 150,000,000 Gallons daily
Quantity of Water which Conduits will deliver (average since 18 8) 95,000,000 daily

— TUNNELS —

Name of Tunnel	Length in Feet	Length in Miles
Nepean	23501	4.45
Cataract	9724	1.85
Devine's N° 1	600	.11
Devine's N° 2	2680	.51
Sugarloaf	3900	.74
Mount Anna	2250	.43
D° D° (extension)	605	.12
Badgelly	3780	.72
Mollesmain	700	.13
Box	400	.08
Cecil Hills	1061.0	2.00
Devils Back	950	.18
Calmsley	1230	.23
Trafalgar	650	.12
	61586	11.66

LENGTH OF DIFFERENT CLASSES OF CONDUIT

Tunnels	11⅝ miles
Canals	33¼ "
Across Prospect Reservoir 30" Pipe	1¾ "
Wrought Iron Flumes 8 ft, 7 ft 6 in.	½ "
Wrought Iron Pipes 6 ft	4⅞ "
Cast Iron Pipes 4 ft	7½ "
Cast Iron Pipes 3 ft 6 in.	3¾ "
Total	63¼ miles

— WATER LEVELS —

The heights marked on the Line of Conduit denote the Level of Water Surface when running full, and are above High Water Mark Sydney Harbour

— SERVICE RESERVOIRS —

N°	Name of Reservoir	Reduced Top Water Level above H.W.M. Sydney Harbour	Depth	Capacity in Gallons	Diameter of Inlet Pipe	Diameter of Outlet Pipe
1.	Crown Street	141.00	15'.6"	3,250,000	42"	2-20" / 1-24"
2.	Paddington	214.00	16'.6"	2,000,000	36"	1-36" / 1-24"
3.	Centennial Park (now being Constructed)	245.00	20'.0"	18,500,000	42"	42"
4.	Woollahra	282.00	18'.0"	1,000,000	20"	20"
5.	Waverley	360.00	20'.0"	1,087,000	18"	1-18" / 1-15"
6.	Petersham	166.00	27'.0"	2,157,000	42"	1-20" / 42{18" 18"
7.	Ryde Hill	234.00	22'.0"	1,000,000	24"	18"
8.	Chatswood N°1	370.00	32'.6"	1,500,000	24"	2-20"
9.	Chatswood N°2	370.00	32'.6"	1,500,000		
10.	Wahroongah	717.00	5'.0"	40,000	9"	9"
11.	Penshurst N°1	270.00	5'.0"	22,800	6"	6"
12.	Penshurst N°2 (now being erected)	270.00	32'.6"	1,000,000	15"	15"
13.	Smithfield	175.00	17'.0"	100,000	12"	6"
14.	Richmond	206.00	13'.0"	225,000	6"	6"

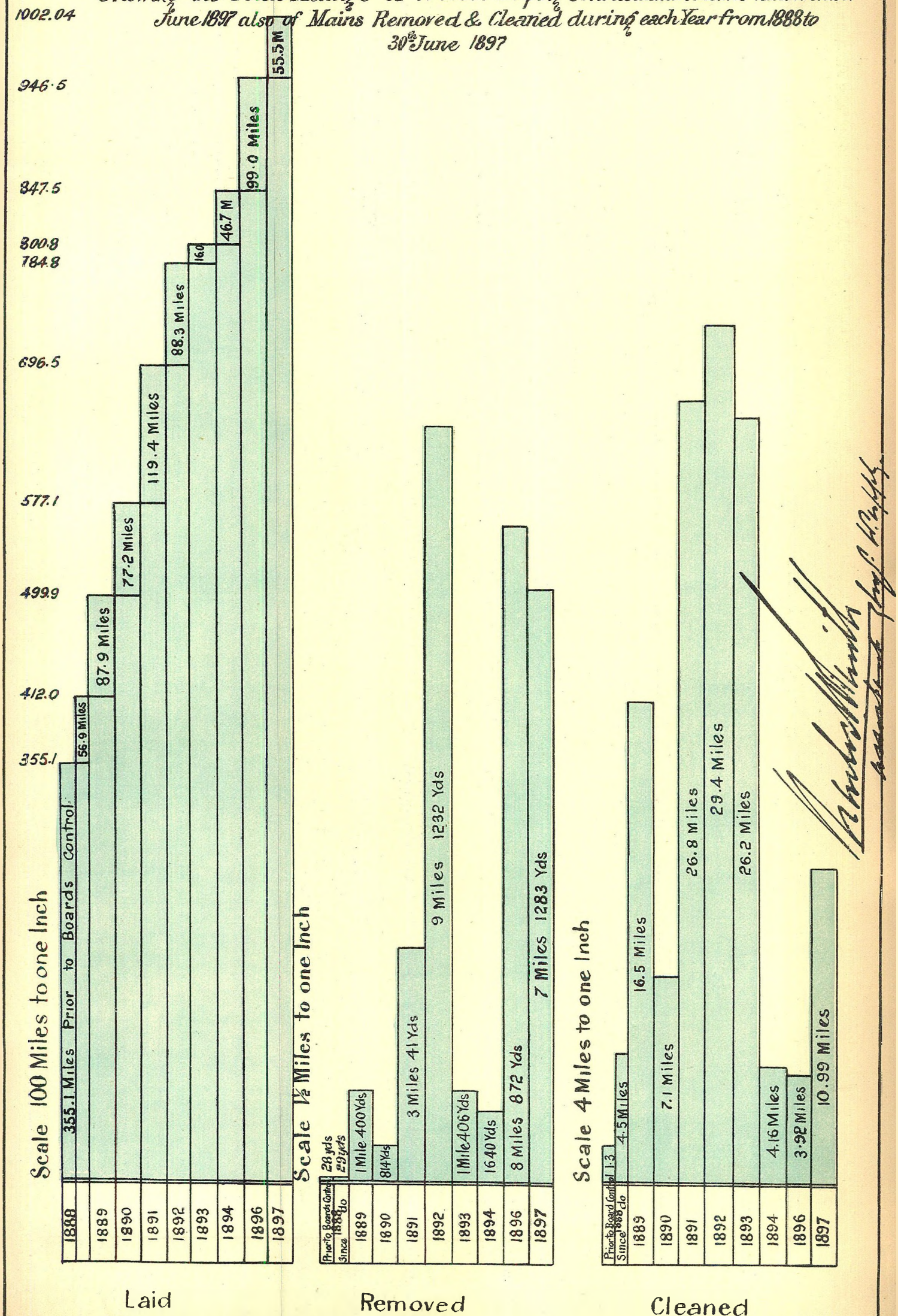
E. M. Smith Assistant Secretary

SIG. 312 12960

PHOTO-LITHOGRAPHED AT THE GOVT. PRINTING OFFICE, SYDNEY, NEW SOUTH WALES.

DIAGRAMS

Showing the Total Mileage of Trunk Pumping & Reticulation Mains laid to end of June 1897 also of Mains Removed & Cleaned during each Year from 1888 to 30th June 1897



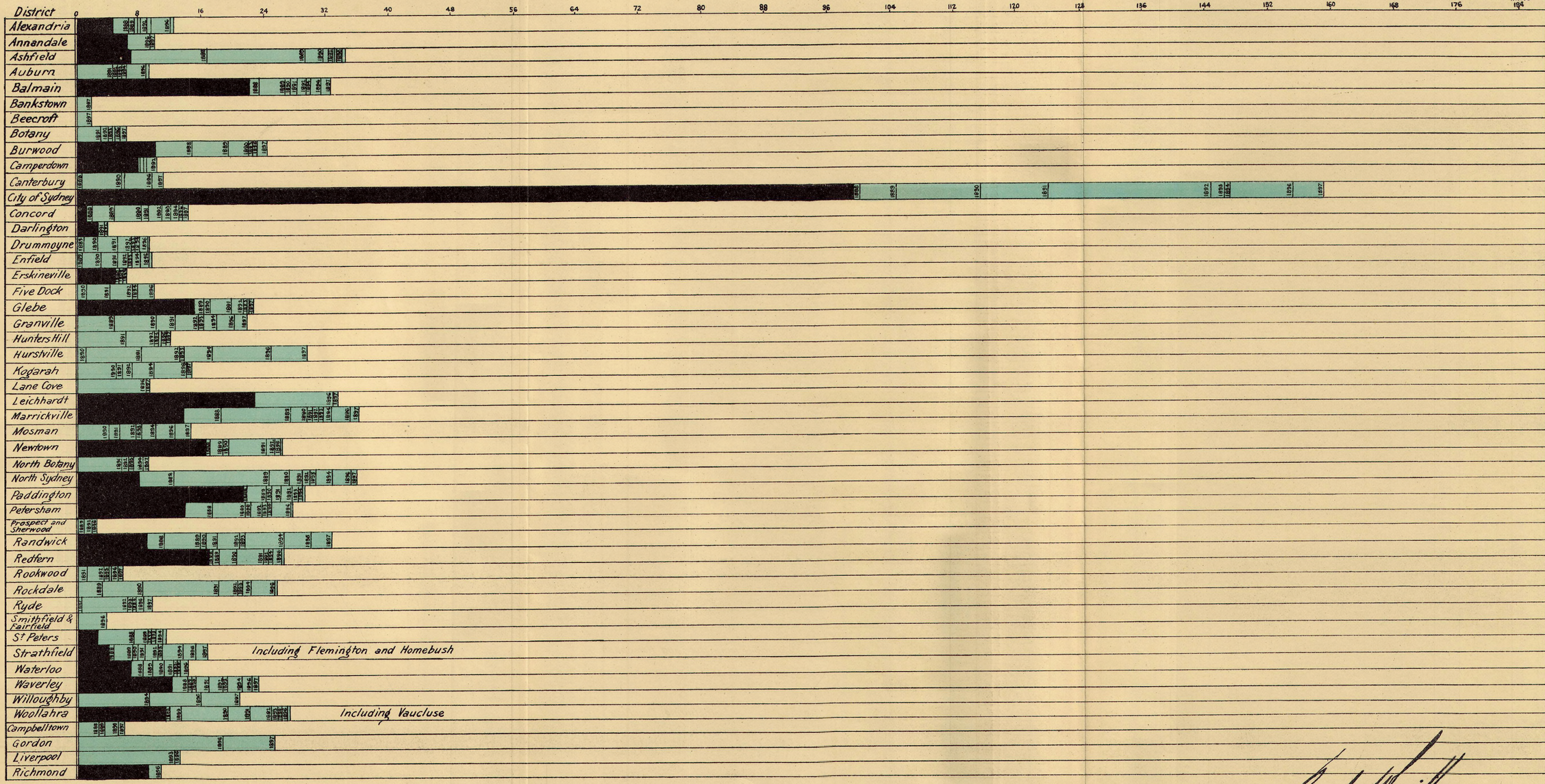
WATER MAIN RETICULATION

DIAGRAM

Shewing Mileage of Water Main Reticulation of the City of Sydney & Suburbs etc.

Mains laid Prior to the Control of the Board shown in Black

Do Since Do Do Do Blue



Prior to	Since	Totals
4.5	7.26	11.76
6.3	3.69	9.99
7.0	28.46	35.46
	9.95	9.95
22.1	11.49	33.59
	1.80	1.80
	1.77	1.77
	6.36	6.36
10.0	14.37	24.37
7.8	2.23	10.03
	12.05	12.05
99.5	59.64	159.14
1.0	12.61	13.61
2.6	.93	3.53
	8.95	8.95
	9.01	9.01
4.5	1.19	5.69
	9.59	9.59
15.0	7.69	22.69
	21.04	21.04
	11.01	11.01
	29.18	29.18
	14.25	14.25
	9.27	9.27
22.5	10.78	33.28
13.6	22.49	36.09
	14.57	14.57
16.6	9.84	26.44
	8.69	8.69
7.8	27.81	35.61
21.6	6.93	28.53
13.8	13.21	27.01
	1.79	1.79
8.8	23.22	32.02
16.8	8.79	25.59
	8.30	8.30
	25.16	25.16
	8.73	8.73
	3.57	3.57
2.25	8.33	10.58
3.8	12.03	15.83
6.8	6.72	13.52
12.0	10.52	22.52
	20.80	20.80
11.25	15.87	27.12
	5.81	5.81
	25.57	25.57
	13.12	13.12
9.0	1.81	10.81
346.9	608.25	955.15

Sig. 312 - 12960.-

Charles Smith
Assistant Engr. W. Supply

N.B. The above does not include Trunk or Pumping Mains or Repairs etc.

PHOTO-LITHOGRAPHED AT THE GOVT. PRINTING OFFICE, SYDNEY, NEW SOUTH WALES.

SEWERAGE RETICULATION

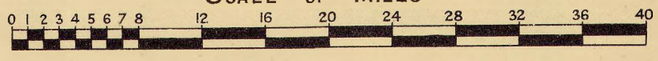
DIAGRAM

Showing Mileage of Subsidiary Sewers in the City of Sydney and Suburbs

Sewers laid prior to the Control of the Board shown in Black

Sewers laid during the Control of the Board shown in Green

Scale of Miles



BOROUCH	Prior to Board's Control	During Board's Control	Totals.
Alexandria		9·10	9·10
Annandale		2·24	2·24
Balmain			
Camperdown		4·59	4·59
City of Sydney	70·27	7·28	77·55
Darlington	1·90		1·90
Erskineville		7·04	7·04
Glebe		10·34	10·34
Leichhardt		2·94	2·94
Marrickville		8·08	8·08
Newtown		16·77	16·77
North Sydney		5·59	5·59
Paddington ◉	10·39	4·89	15·28
Petersham		5·81	5·81
Randwick	4·45	5·52	9·97
Redfern ◉	3·20	7·15	10·35
Waterloo		5·71	5·71
Waverley		9·96	9·96
Woollahra ◉	3·31	10·84	14·15
Grand Totals of Mileage.	93·52	123·85	217·37

◉ *The whole of the sewers in these Boroughs prior to 1890 were carried out by Government in accordance with the Act.*

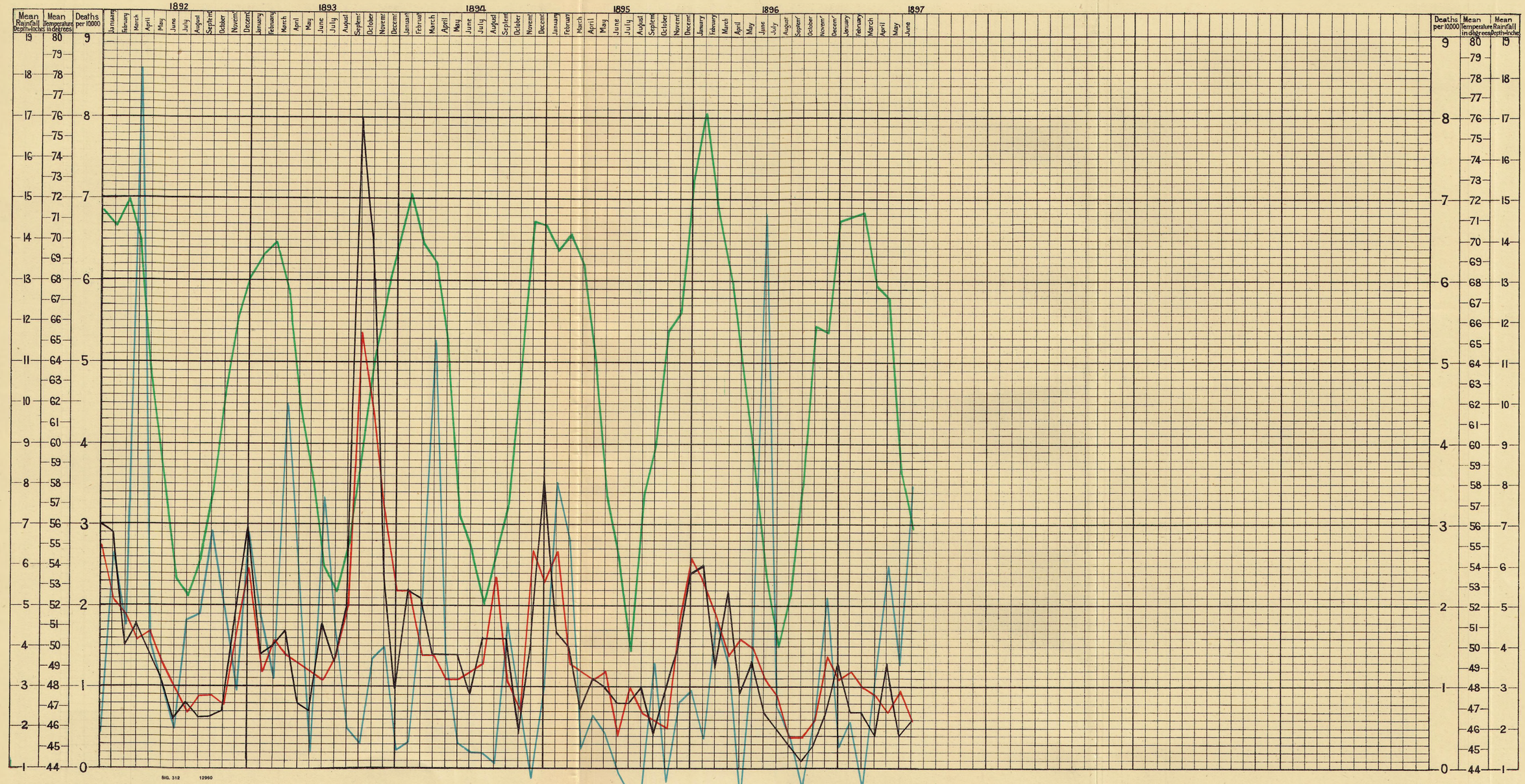
A H Starling
Surveyor in Charge

SIG. 312

PHOTO-LITHOGRAPHED AT THE GOVT. PRINTING OFFICE, SYDNEY, NEW SOUTH WALES.
12960

Adult and Infantile
Zymotic Death rate of the Metropolis

PER 10.000 OF THE POPULATION



BIG. 312 12960

NOTES. The Black line indicates the city rate
" Red " " " " suburban "
" Blue " " " " rainfall
" Green " " " " temperature

J.G.S. Purves
Chief Draftsman

Griffith
Assist Engr.

PHOTO-LITHOGRAPHED AT THE GOVT. PRINTING OFFICE, SYDNEY, NEW SOUTH WALES

DIAGRAM

SHOWING MEANS OF EXTERNAL TEMPERATURE, TEMPERATURE IN SEWERS 10 AND 40 Ft. DEEP, AND HUMIDITY, FROM THE YEAR 1889.

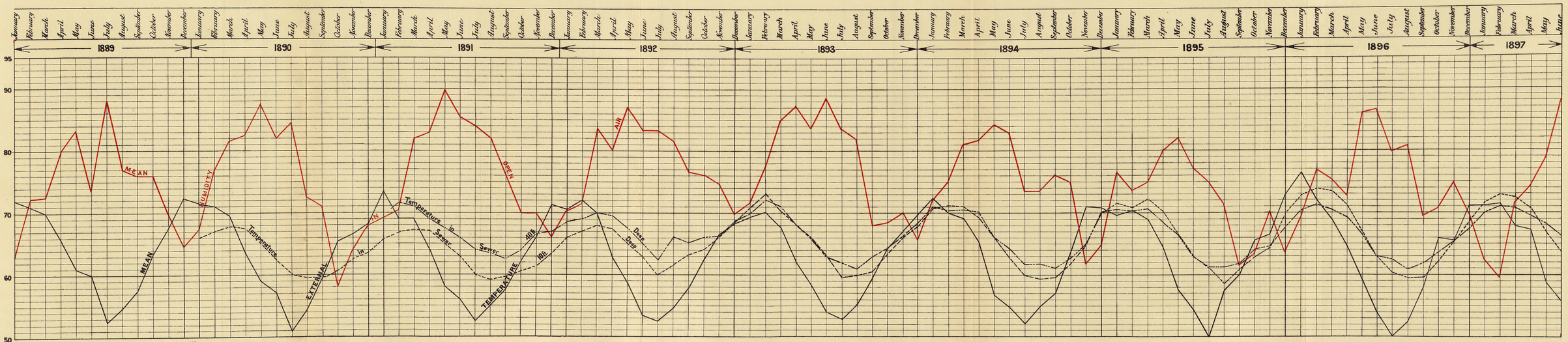


PHOTO-LITHOGRAPHED AT THE GOVT. PRINTING OFFICE, SYDNEY, NEW SOUTH WALES.

Chief Draftsman.
30/8/97.

AREA SUPPLIED WITH WATER

PREVIOUS TO THE BOARD'S CONTROL.	SHOWN THUS	
EXTENSION OF AREA BY BOARD TO END OF JUNE 1896	"	"
AREA ADDED FROM 1896 TO END OF JUNE 1897	"	"

Richmond

Smithfield

Liverpool

Campbelltown

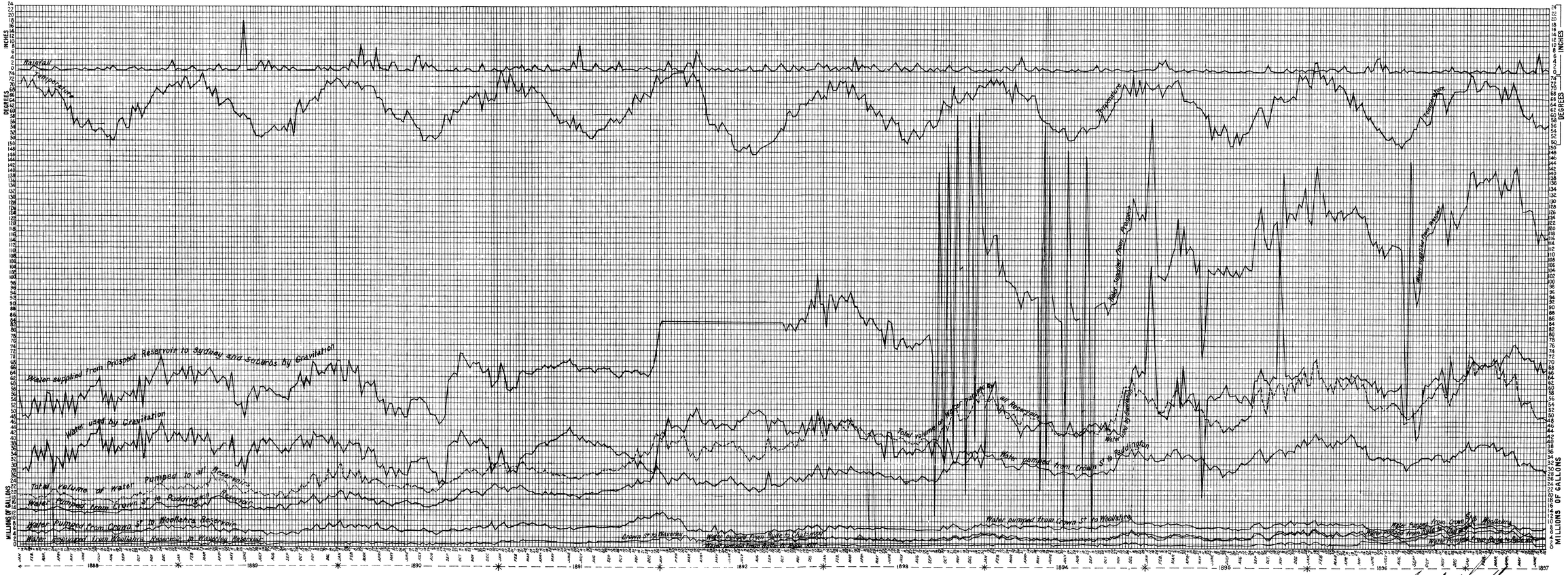
CHATSWOOD

SIG. 312 12960

PHOTO-LITHOGRAPHED AT THE GOVT. PRINTING OFFICE,
SYDNEY, NEW SOUTH WALES.

BOARD OF WATER SUPPLY AND SEWERAGE, SYDNEY.

Table showing the Volume of Water supplied weekly from Prospect Reservoir by Gravitation to Sydney and Suburbs, from 1st January, 1888, to 30th June, 1897; the distribution of this Water by Gravitation and by Pumping; the mean Shade Temperature, and the Rainfall for each week.



(SIG 312) 12960

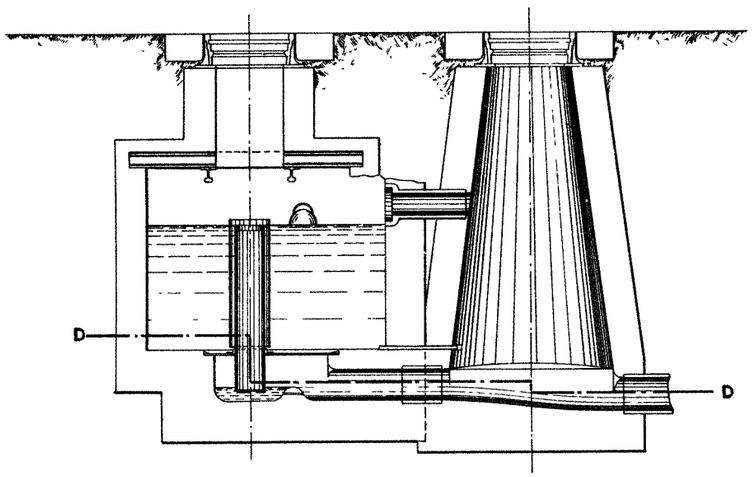
PHOTO-LITHOGRAPHED AT THE GOVT. PRINTING OFFICE, SYDNEY NEW SOUTH WALES.

Assistant Engr B.W.S.

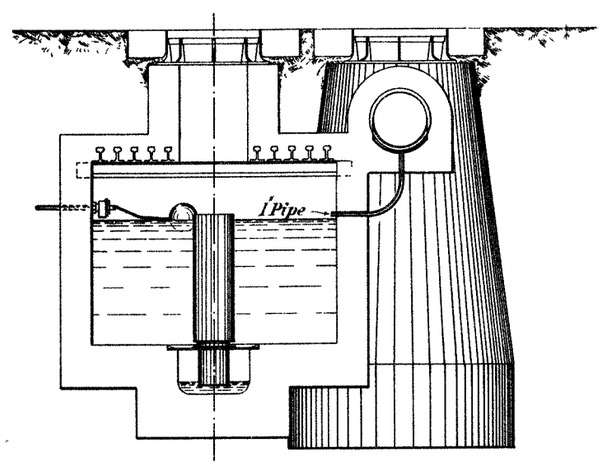
AUTOMATIC FLUSHING STATION

FOR SEWERS

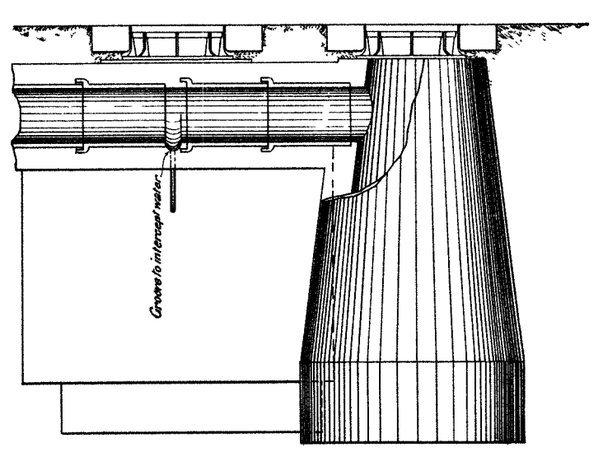
Scale Inches 2 4 0 1 2 3 4 5 Feet



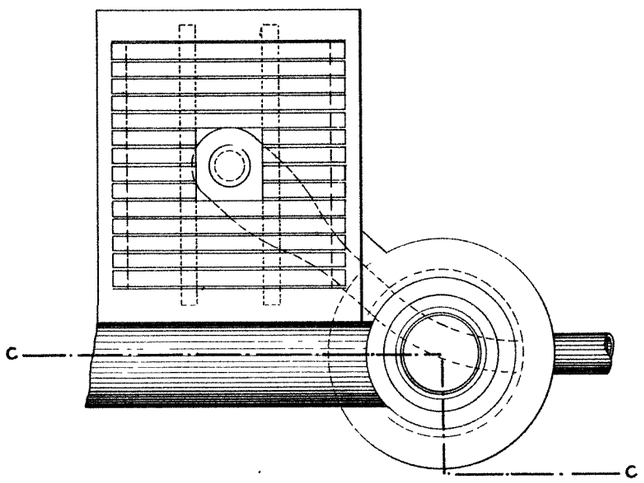
SECTION ON LINE-A A



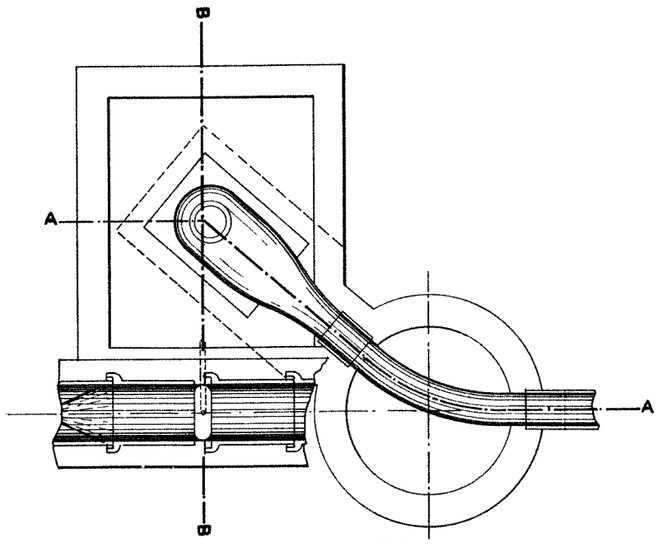
SECTION ON LINE-BB



SECTION ON LINE-C C



PLAN



SECTION ON LINE-D D

SIG 312. 12960

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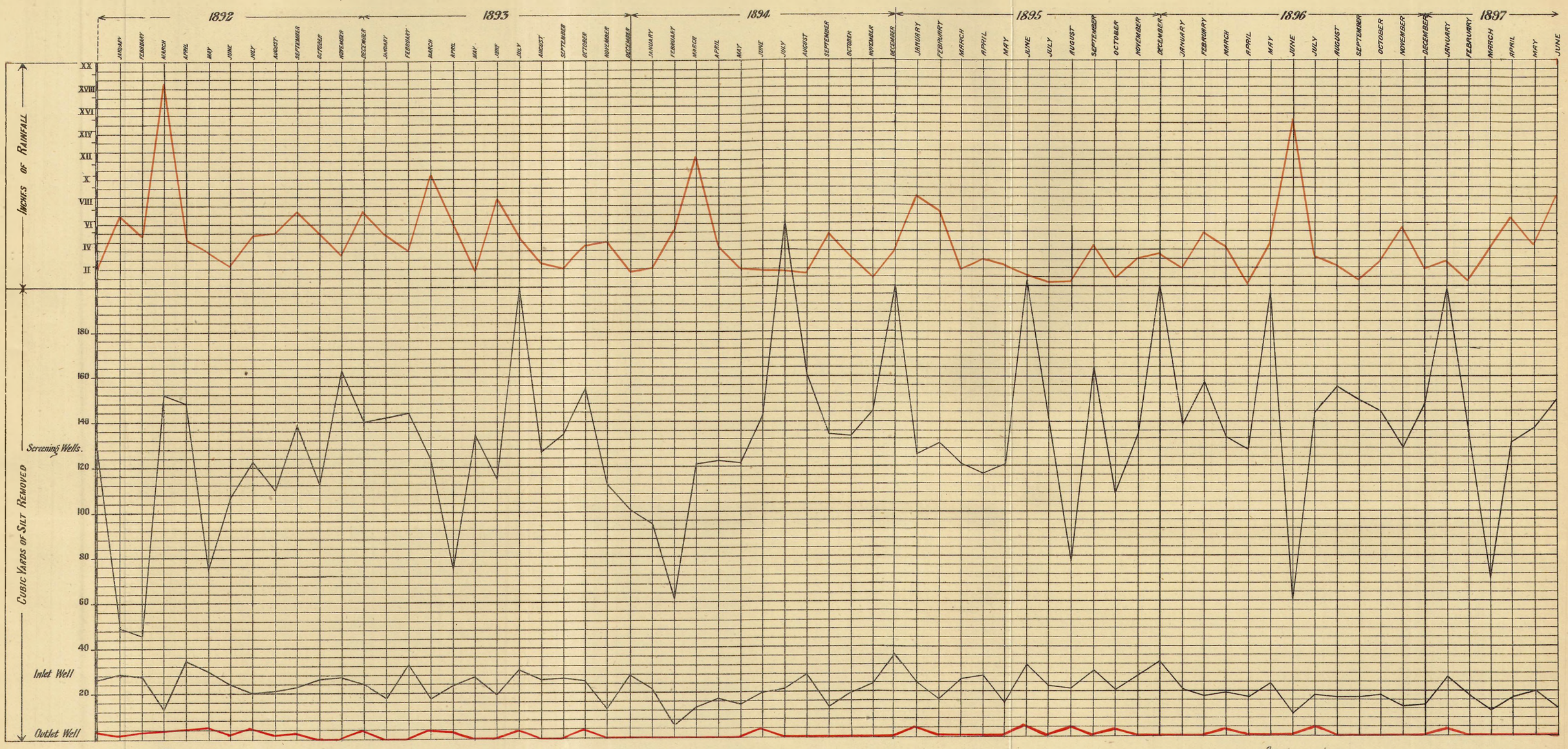
J.G.S.P. 1.9.97.
Chief Draftsman.
N.M. 13.7.97

Botany Sewage Farm.

Diagram showing quantities of Silt removed from Inlet and Outlet Houses.

G. W. Quart
Engineer

10



SIG. 312 12960

PHOTO-LITHOGRAPHED AT THE GOVT. PRINTING OFFICE, SYDNEY, NEW SOUTH WALES.

Niffitt
Assist Eng.

J.G.S.P.
Chief Draftsman.
30/8/97.

1897.

LEGISLATIVE ASSEMBLY.

NEW SOUTH WALES.

REPORT

OF THE

ROYAL COMMISSION

TO INQUIRE INTO THE MANAGEMENT OF

THE METROPOLITAN WATER SUPPLY AND SEWERAGE BOARD;

TOGETHER WITH

MINUTES OF PROCEEDINGS, EVIDENCE,

AND APPENDICES.

Presented to Parliament by Command.

Printed under No. 20 *Report from Printing Committee,* 21 *October,* 1897.

SYDNEY: WILLIAM APPLEGATE GULLICK, GOVERNMENT PRINTER.

1897.

278—*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—

JOSEPH BARLING, Esquire, one of Our Justices of the Peace of Our Colony of New South Wales, Associate of the Institution of Civil Engineers, and Chairman of the Public Service Board;

TIMOTHY AUGUSTINE COGHLAN, Esquire, one of Our Justices of the Peace of Our said Colony; and

GEORGE ALEXANDER WILSON, Esquire, one of Our Justices of the Peace of Our said Colony,—

Greeting:—

KNOW ye, That We, reposing great trust and confidence in your ability, zeal, industry, discretion, and integrity, do, by these presents, authorise and appoint you, or any two of you, as hereinafter mentioned, to make a diligent and full inquiry into the management of the Board of Water Supply and Sewerage, incorporated under the provisions of the Metropolitan Water and Sewerage Act of 1880, and to report whether, and if so by what means, that Department can be placed upon a more efficient and economical basis: And We do, by these presents, grant to you, or any two 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 Chief Secretary, under your or any two of your hands and seals, what you shall find touching the premises: And We hereby command the said Board of Water Supply and Sewerage, and all persons employed by them, and 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 JOSEPH BARLING, Esquire, 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 said Colony of New South Wales to be hereunto affixed.

Witness Our Right Trusty and Well-beloved Cousin, HENRY ROBERT, VISCOUNT HAMPDEN, 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 fourth day of February, in the year of Our Lord one thousand eight hundred and ninety-seven, and in the sixtieth year of Our Reign.

By Deputation from His Excellency,

(L.S.) FRED. M. DARLEY,
Lieutenant-Governor.

By His Excellency's Command,
JAMES N. BRUNKER.

Entered on Record by me, in REGISTER OF PATENTS No. 18, page 308, this sixth day of February, one thousand eight hundred and ninety-seven.

For the Colonial Secretary and Registrar of Records,
CRITCHETT WALKER,
Principal Under Secretary.

VICTORIA,

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—

JAMES POWELL, Esquire, Deputy Member of the Public Service Board, and one of Our Justices of the Peace of Our Colony of New South Wales,—

Greeting:—

WHEREAS by an instrument under the Great Seal of Our Colony of New South Wales, bearing date the fourth day of February, one thousand eight hundred and ninety-seven, We did appoint certain gentlemen therein named to be Commissioners, to make a diligent and full inquiry into the management of the Board of Water Supply and Sewerage, incorporated under the provisions of the Metropolitan Water and Sewerage Act of 1880, and to report whether, and if so by what means, that Department can be placed upon a more efficient and economical basis: And whereas it hath appeared to Us to be expedient to appoint an additional Commissioner: Now therefore know you, that We, of Our special 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 said Colony of New South Wales to be hereunto affixed.

Witness Our Right Trusty and Well-beloved Cousin, HENRY ROBERT, VISCOUNT HAMPDEN, 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-second day of May, in the year of Our Lord One thousand eight hundred and ninety-seven, and in the sixtieth year of Our reign.

(L.S.) HAMPDEN.

By His Excellency's Command,
JAMES N. BRUNKER.

Entered on record by me, in register of patents No. 18, page 428, this twenty-sixth day of May, one thousand eight hundred and ninety-seven.

For the Colonial Secretary and Registrar of Records,
CRITCHETT WALKER,
Principal Under Secretary.

ROYAL COMMISSION TO INQUIRE INTO THE MANAGEMENT OF THE BOARD OF WATER SUPPLY AND SEWERAGE.

WHEREAS it is necessary to extend the time within which the Commissioners are to make their return in the above matter: Now therefore, I do hereby, with the advice of the Executive Council, extend the time within which the said Commissioners are to make such report for a period of three months,—to take effect from the 4th instant.

Given under my hand, at Government House, Sydney, this fourth day of May, one thousand eight hundred and ninety-seven.

HAMPDEN.

By His Excellency's Command,
JAMES N. BRUNKER.

ROYAL COMMISSION TO INQUIRE INTO THE MANAGEMENT OF THE BOARD OF WATER SUPPLY AND SEWERAGE.

WHEREAS the time appointed for the return of the Commission in the above matter was by an instrument dated the fourth day of May last extended for a period of three months: And whereas it is necessary to extend the same still further: Now, therefore, I do hereby, with the advice of the Executive Council, extend the time within which the Commissioners are to make their return to and for a further period of three months beyond the time in and by the aforesaid instrument appointed for the purpose,—to take effect from the 4th instant.

Given under my hand, at Government House, Sydney, this fourth day of August, one thousand eight hundred and ninety-seven.

HAMPDEN.

By His Excellency's Command,
JAMES N. BRUNKER.

ROYAL COMMISSION ON METROPOLITAN WATER SUPPLY AND SEWERAGE BOARD.

REPORT.

To His Excellency the Right Honorable Henry Robert, Viscount Hampden, Governor and Commander-in-Chief of the Colony of New South Wales and its Dependencies.

MAY IT PLEASE YOUR EXCELLENCY,—

We, the Members of the Royal Commission appointed by your Excellency on the 4th February and the 22nd May, 1897, to make a full and diligent inquiry into the management of the Board of Water Supply and Sewerage, incorporated under the provisions of the "Metropolitan Water and Sewerage Act of 1880," and to report whether, and if so, by what means, that Department can be placed upon a more efficient and economical basis, have the honor to submit the following Report:—

Our inquiry was commenced on 15th March, 1897, but, owing to the interruptions arising from the many other urgent matters which peremptorily claimed the attention of your Commissioners, it became necessary to request an extension of the time granted within which to make our Report, and your Excellency was pleased, on the 4th day of May, to grant an extension to the 4th day of August, and, from that day, a further extension to 4th November, 1897.

We have held 21 meetings, and examined 12 witnesses. A number of visits have also been made by us, together or separately, to the offices of the Board, with the object of gaining an insight into the system and working of the Department. We have to acknowledge the willing assistance afforded to us in these investigations by the President, Chief Engineer, Secretary, and other prominent officers of the Board.

MUNICIPAL CONTROL OF WATER SUPPLY AND SEWERAGE WORKS.

Before entering upon the discussion of the subject submitted to us for report, we desire to draw attention to the evidence of the Right Worshipful the Mayor of Sydney and Mr. Alderman Jeanneret, who strongly advocate that the municipalities should have the control of the works within their boundaries and the administration of the rates. But as we were informed that this issue did not come within the scope of our Commission, we express no opinion on the question raised by these gentlemen.

MAGNITUDE OF OPERATIONS ENTRUSTED TO THE BOARD.

The Metropolitan Board of Water Supply and Sewerage was established in March, 1888, under the Act 43 Vic. No. 22 as amended by the Act 51 Vic. No. 28. The management of the Water Supply was transferred to the Board on the 25th May, 1888, and that of the Sewerage on the 30th September, 1889. Excluding those works carried out by the Sydney City Council, and one or two of the suburban municipalities, the whole of the Water Supply and Sewerage Works have been constructed by the Government. The operations of the Board embrace the management and maintenance of the entire system, and the carrying out of the subsidiary reticulation of both Water Supply and Sewerage, the Government still continuing to construct all the main works.

The following tabulated statements will serve to show the magnitude of the works, and the large expansion that has taken place since the Board assumed control :—

WATER SUPPLY.

Date.	Capital Cost of Works.	Number of Boroughs and Districts reticulated.	Estimated Population supplied with Water.	* Mileage of Water-main reticulation.	Number of Properties rated.	Annual Revenue.	Annual Working Expenses.
	£					£	£
Year ended 31 December, 1888 ...	3,004,557	24	296,246	346	58,887	125,486	19,205
Year ended 30 June, 1897	4,244,550	57	418,512	925	120,901	175,984	40,821
Increases during period of Board's control	£1,239,993	33	122,266	579	62,014	£50,498	£21,616

* Exclusive of some 40 miles of trunk and pumping mains.

SEWERAGE AND STORM-WATER CHANNELS.

Date.	Capital Cost of Works.	Number of Boroughs and Districts sewered.	Estimated Population served.	Mileage of Sewers and Drains.	Number of Properties rated.	Annual Revenue.	Annual Working Expenses.
	£					£	£
Year ended 31 December, 1890 ...	1,281,045	5	106,843	94	22,259	81,800	22,249
Year ended 30 June, 1897	2,018,120	24	228,446	274	62,657	87,652	29,680
Increases during period of Board's control	£737,075	19	121,603	180	40,398	£5,852	£7,431

The total capital debt of the Board at 30th June, 1897, is thus shown to be £6,262,670, which amount, however, does not include a sum of £64,793, which represents the cost of their new offices.

The aggregate revenue of the Board since the date of its inception up to 30th June, 1897, has been as follows :—

	£
From Water Supply	1,486,414
From Sewerage	654,072
Making a grand total Revenue of	£2,140,486

The combined working expenses during the same period have amounted to £552,698

From the foregoing statements it will be seen how great are the interests controlled by the Board. These affect, on the one hand, the Government, which has constructed the works at a cost of £5,499,978 out of State funds, and has also taken over from the Municipalities concerned debts amounting to £385,310, making a total of £5,885,288, which is raised to the £6,262,670 shown in the tabulated statements given above by the addition of the City Council Water Fund of £377,382; and, on the other, a large population (numbering some 420,000), whose health and welfare are intimately dependent upon a perfect system of water supply and sewerage.

CONSTITUTION AND DUTIES OF THE BOARD.

The Board consists of seven members, three of whom are nominated by the Government, two elected by the City Council, and two by the various Suburban Councils conjointly. The President is one of the Government nominees, and receives a fixed salary of £600 per annum; the other members are paid a fee of £5 each per sitting, the total amount payable to any one member during the twelve months being limited to the sum of £250. The annual cost of the Board in salaries and fees accordingly reaches the sum of £2,100. The total cost since its inception in March, 1888, up to 30th June, 1897, has amounted to the sum of £18,604. [*Vide Appendix* A.]

A meeting of the Board is held at least once a week, and lasts, on the average, for about two hours. A specimen of the business-sheet of the Board will be found in the Appendix. [*Vide Appendix* B.]

The members are also called upon to attend occasional Committee meetings, and they likewise make visits of inspection to the various works, either completed or in course of construction.

Position and Special Duties of President of Board.

The special duties attaching to the position of President are manifold, and of great importance. To him are entrusted the general oversight and management of this large State Department, and it will be readily understood that the duties and responsibilities of the position are varied and onerous.

A careful perusal of the lengthy list of duties devolving on the President, as detailed in the evidence given by Colonel Rowe, will be sufficient, your Commissioners think, to show that it is impossible for any gentleman, without giving all his time and energies to the task, to satisfactorily carry out these multifarious and important duties, which require for their efficient discharge a large business experience. Having a private business to engage his attention, Colonel Rowe can give only a portion of his time to the supervision of the Department, and as a rule he devotes from two to three hours in each working-day to this purpose.

At present the holder of this office is appointed for a term of four years, but your Commissioners are of opinion that it would be advisable to alter the term, and to make the appointment a permanent one, to be held during good behaviour. There is, your Commissioners submit, good reason for recommending that fixity of tenure be given to the holder of this important office, and that, in view of the fact that the Government is responsible for the large capital debt, the appointment, as hitherto, should vest in the Governor.

Reorganisation of the Board.

As regards the duties performed by the Board generally, examination shows that a large portion of the business brought before it consists of routine matters which could be satisfactorily dealt with by the President after consultation with his responsible officers. We are, therefore, of opinion that the number of members can with advantage be reduced to three, namely, a permanent President appointed by the Government, one member elected by the City Council, and one by the suburban municipalities.

The annual salary which we would suggest as a proper remuneration for the office of President is £1,000. The fees to be paid to each of the two elected members should not, your Commissioners think, exceed the sum of £3 3s. per sitting, the total amount receivable by each member in any one year being limited to £150.

Under such an arrangement, the cost of the Board would be reduced from £2,100 to £1,300 per annum, and we are of opinion that its efficiency would be largely increased, mainly by reason of an officer being at the head of the establishment whose whole time would be devoted to the management.

In submitting these recommendations, your Commissioners do not wish to be considered as casting any reflections on the present members of the Board, who have, doubtless, given their best attention to the complicated business entrusted to their administration.

Number and Character of the Engineering and Clerical Staff.

The Staff employed in the business of the Department has attained to large proportions, and is classed in two divisions, namely, those employed under the direction of the Chief Engineer and those under the Secretary. The organisation of the Department under these two officers, and the general method of working carried out by them are, in the opinion of your Commissioners, satisfactory. The system

system now adopted of regulating admission into the Board's service by means of competitive examination has proved successful in obtaining officers possessing the proper qualifications.

The first-named division includes 329 officers and workmen of all grades, costing annually in salaries and wages about £50,600. Their duties consist in the construction of all subsidiary reticulation in both water supply and sewerage schemes, and in the oversight and maintenance of the entire system. A considerable portion of the above-mentioned sum, viz., £17,500, being the salaries and wages of engineers and others engaged on new works, is charged to the capital cost of the works, and, accordingly, does not appear in the item giving the Board's annual working expenses.

With regard to the Engineer's Branch generally, your Commissioners have seen nothing to lead them to suppose that this Branch is either overmanned or overpaid. Mr. Smail, the Chief Engineer, is an efficient officer, and speaks of his staff in terms of praise. Your Commissioners see no reason to disagree with his opinion.

The Clerical Staff consists of 115 officers, and costs annually in salaries about £17,900. It may be asked whether so large a staff is really required to administer this branch of the Department. It deals with a yearly revenue of £263,500, and a total expenditure of £222,400, but as compared with other establishments which conduct operations on an equal or even larger scale, the staff seems unusually large. It must, however, be taken into account that the work of the Board involves an immense amount of detail, arising partly from the requirements of the Acts. The number of rate notices issued during the year 1896–7 was 279,101, and the number of meters in operation was 6,844, necessitating the issue of about 10,400 accounts. The rates and accounts range from a few shillings up to many pounds, the smaller amounts, of course, largely preponderating, but the same process must be gone through with them as with the larger.

Taking, therefore, everything into consideration, your Commissioners think that a fair explanation has been given of what appears at first sight to be an unnecessarily large staff. In saying this, however, your Commissioners anticipate that, in the event of their recommendation being approved of as to the appointment of a President who shall give his whole time to the duties of his office, improved methods of working will be found to be practicable which will have the effect of reducing the expenses of management. [*Vide Appendices* C, D.]

Recommendations as to certain Officers.

Coming to the consideration of the Staff in detail, we are very favourably impressed with the way in which the Secretary conducts his duties, and are of opinion that his salary should be increased from £450 to £500 per annum. If the Department were to be continued on its present footing, an even larger salary would be justifiable; but if our recommendation is carried out as to the appointment of a permanent President who would naturally be able to exercise greater supervision over, and take a larger share in, the management and details of the administration, we think that the salary suggested will be sufficient.

We are of opinion that the position of the Examiner of Accounts and Auditor should be strengthened, and that his salary should be increased to £450. This officer, who is now paid at the rate of £350 per annum, audits the whole of the books and accounts and checks the work of the Accountant and Cashier, and should not be placed in an inferior position. It should be made clear that he has a complete and independent authority, subject only to the control of the Board.

The responsibilities and duties attaching to the position of Assessor are also heavy, and considering the special experience required for their proper discharge, we think that this officer is entitled to a salary of at least £450 per annum.

We do not feel called upon to make any further reference to individual officers: the Staff as a whole may be considered as a satisfactory one, while the individual salaries are certainly not fixed at an extravagant rate.

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Relations between the Engineering Staff and the Public Works Department.

From the evidence of Mr. Smail (*vide* pp. 27–28) it will be seen that our attention has been drawn to what may be termed a want of co-operation in some details between the Engineering Division of the Board and the Sewerage Construction Branch of the Works Department. In reference to this matter, which is one of importance, having regard to the question of economy in carrying out the sewerage schemes, the Engineer for Sewerage Construction in the Works Department has given certain explanations, which will be found on pp. 35–36 of the evidence. Your Commissioners learn that the matter has subsequently been prominently brought under the attention of the Honorable the Minister for Works, who has called for a report on the subject, and we have no doubt but that a satisfactory arrangement will be arrived at.

Financial Results of the Board's Operations.

The net result of the Board's operations during the year ended 30th June, 1897, after defraying all expenses of maintenance and management, and making allowance for depreciation of machinery, has been a credit balance of £188,799, available to meet interest on the capital cost of the works. The amount of interest payable on account of these works is set down by the Board at £215,378, so that, according to their statements, there was a deficiency on the year's transactions of £26,579. This sum included losses incurred in supplying water to the Municipalities of Liverpool and Campbelltown, to the amount of £251 and £91 respectively, but was exclusive of a deficiency of £231 on the administration of the water supply works at Richmond. This last-named town is not served from the Metropolitan system, and the supply is merely administered by the Board on behalf of the Secretary for Public Works. The loss in connection with Richmond will cease when the Board are put into the position of being able to assess all properties within the reticulated area; at present they can only assess those properties actually supplied with water.

According to the annual reports of the Board, there existed, on the 30th June, 1896, a net surplus of £53,536, which had accumulated from the commencement of operations in 1888, and deducting from this amount the deficiency of £26,579 on the transactions of the last working year, there would remain a net surplus of £26,957 at the end of June, 1897. It will be seen from the evidence of the President that he is of opinion that this method of presenting the Board's accounts, by which a surplus which may have accrued as a result of operations during previous years should be taken as a set-off against the present deficiency, is a proper one. We think, however, that this is not a sound way of presenting the finances, because all surpluses over the working expenditure and interest will, in time, be largely drawn upon for carrying out renewal works, a process which must extend as the years pass and the works and mains decay.

But in order to adequately show the financial results of the administration of the services by the Board, it is necessary to explain in what manner this surplus has been arrived at. The Board commenced operations in March, 1888, and at the end of that year it is shown, by their Revenue Account for the year 1889, that they had a surplus of £42,004, after defraying working expenses and meeting interest charges. This large surplus was chiefly the outcome of the City Corporation handing over to the Board arrears of rates to 30th June of no less than £55,547, of which £46,638 had been collected or accounted for on the 31st December; and it is necessary to point out that these arrears were not balanced by those existing at the end of 1888, because the rates then outstanding were also included in the revenue of the year—a practice which has been followed ever since. In commenting on the surplus resulting from their operations in 1888, the Board, in their first Annual Report (page 3), stated that "this happy state of things, it must be borne in mind, is brought about by the receipt of rates extending over a period of three or four years, and cannot be looked upon as revenue belonging to the year." This, then, was the origin of the surplus, and, according to the Board's system of presenting their accounts, the amount, at the end of 1894, had risen to £84,500, part of this increase being due to the unpaid sewerage rates, to the amount of £10,519, which were handed over by

the City Corporation, for collection by the Board, on the 1st January, 1890; but during the first six months of 1895 there was a deficiency of £9,983; during the twelve months ended 30th June, 1896, one of £20,981; and during the following working year, one of £26,579; leaving the net surplus at £26,957.

Even this surplus would not be in existence if the Board had debited their account with interest on the total capital cost as it was known to them. On a previous page your Commissioners have pointed out that the total capital cost, exclusive of the expenditure on the new offices of the Board to the amount of £64,793, on which the Board debit themselves with rent, is set down at £6,262,670. This sum is made up of £5,396,547, representing loan expenditure by the State, with accrued interest on the amount spent up to 25th May, 1888; £385,310, liabilities taken over from municipalities; £377,382, balance of the City Council Water Fund; and £103,431, expenditure on sewerage works from the Consolidated Revenue by the Department of Public Works. On the loan expenditure of the State the Board have debited their account with interest at an average rate which now stands at £3·789 per cent.; and on the municipal loans, with interest at rates ranging from 4 to 6 per cent.; but they have made no provision for interest on the two sums of £377,382 and £103,431 which make up the balance of the capital debt. It is contended by the Board that the sum of £377,382 which was debited to their capital should not form part of their debt, and that they should not be asked to provide interest upon it, seeing that it represents expenditure, from rates contributed by the City of Sydney, on works, buildings, machinery, stores, and lands, much of which no longer remains an asset of the Board. It must not be forgotten, however, that when certain remissions of debts were made to the City of Sydney by the State in the year 1879, it was then urged in Parliament, during the debates on the City Corporation Bill, that the Government would afterwards receive some equivalent for these remissions in the shape of the works and lands referred to, when they came to be handed over to a Water and Sewerage Board to be constituted. It would therefore appear that the Board cannot be relieved of the amount of the City Council Water Fund on the ground alone that the expenditure was made from rates paid by the citizens, and that it would, therefore, be unjust to tax the citizens to provide interest on works for which they had themselves paid. On this point your Commissioners express no opinion, but merely point out that when the capital debt of the Board is fixed by the Government, as recommended at the close of this Report, the question of the City Council Water Fund will require to be decided, as they feel that there is considerable uncertainty on the whole question. It is desirable to show, however, what would have been the result had the Board debited themselves with interest on the full capital debt as known to them; and it is necessary to bear in mind, as stated further on in this Report, that, putting the disputed item aside, the capital debt only represents out-of-pocket expenditure by the State. Had the Board debited their account with interest on the full capital cost of £6,262,670, their nominal surplus of £26,957 on the 30th June, 1897, would be converted into an accumulated deficit of about £140,000. In any case, your Commissioners think that it may fairly be contended that interest should be charged on the expenditure of £103,431 from Consolidated Revenue on sewerage works, and if this were done, and the City Council Water Fund ignored, the surplus would still vanish, and a deficit of between £2,000 and £3,000 take its place.

It is only fair to the Board to point out that they have in no way concealed the fact that they were not setting aside interest on the total debt, and that they have been endeavouring for years to induce the Government to accurately determine its amount. No doubt, had the Board felt it incumbent upon them to provide for interest other than that upon loan moneys, they would have taken steps to meet the deficiency by a higher rating; but your Commissioners deem it to be their duty to clearly set forth the actual financial results of the Board's operations since its inception in 1888, and to point out that, if the Board had provided interest on the total capital cost of the works as at present set down, the deficiency during the working year ended 30th June, 1897, would have been, not £26,579, but about £45,000, or, excluding the City Council Water Fund, a deficiency of about £30,500.

We are of opinion that no alarm need be felt on account of any deficiency on the water supply account, because there is good reason to believe that in the future the operations of the Board in this branch will become increasingly profitable. [*Vide Appendices* E^1, E^2, E^3.]

Remedial Measures to stop the Annual Deficiency on the Water Supply Account.

It will be seen by reference to Colonel Rowe's evidence (*vide* pp. 7–8) that he attributes the deficiency in the water revenue, shown in the Board's last report, in a great measure to the large proportions to which the "free" water services have attained. Colonel Rowe estimates the loss to the revenue occasioned by giving a free water supply to public hospitals and charitable institutions, churches and Sunday schools, and to municipalities for street-watering purposes, at £19,536. In justice to the Board, and as a matter of commercial practice, it is recommended that the cost of these services should be debited to a vote or votes taken for this purpose, and a corresponding credit given to the Board, as in the case of services rendered by the Railway Commissioners on behalf of other public departments. [*Vide Appendix* F.]

A further loss in revenue has arisen from allowing ratepayers a discount of five per cent. for the prompt payment of rates, which during the last year amounted to £5,764. The working of this concession has proved unsatisfactory, and your Commissioners recommend that it should not be continued.

The rates and charges levied by the Board in respect of water supply are the assessed rate of seven pence (7d.) in the £, of the annual valuation, and one shilling (1s.) per 1,000 gallons, when supplied by measure. The evidence submitted to us on this point shows that, as compared with those charged in other parts of the world, these rates are reasonable. [*Vide Appendix* G.]

Arrears of Rates and Method of Recovering same.

At the dates of the Board's assuming control of the water and sewerage systems, the outstanding rates taken over from the City Council amounted to the large sum of £66,000, namely, water rates, £55,547, and sewerage rates, £10,519. Under the Board's management considerable improvement has been made in this respect, the amount outstanding at 30th June, 1897, being £42,455, but this included meter accounts, just rendered, to the amount of £16,364, and rates on churches, chapels, and Sunday schools, to the amount of £7,990, which were left in abeyance pending a final decision being arrived at as to the assessment of such buildings.

Mr. Alderman Jeanneret draws special attention to the expenses to which ratepayers are subjected by reason of the Board adopting the practice of issuing summonses for the recovery of overdue rates, instead of proceeding by means of distress warrants under the hand of the President. This latter method, it is alleged, is less costly to the ratepayer concerned than process of summons; but the evidence given on this point by Mr. Williams, the Solicitor to the Board, should be read in connection with Alderman Jeanneret's remarks. We think that it is not necessary for us to do more than mention this matter, as we understand it will be dealt with in the Amending Bill which the Secretary for Public Works purposes bringing before Parliament at an early date.

Hiring out Water-meters.

The plan adopted by the Board of supplying large consumers of water with reliable meters at a fixed annual rental has worked satisfactorily, while it saves the consumer the first cost of the meter. The transaction returns a good profit to the Board, as will be seen from the statement relating thereto submitted by Mr. Smail, the Chief Engineer. [*Vide Appendix* H.]

Stormwater Drains, and their influence upon the Public Health.

Complaints have been made as to the burden which has been placed upon the community by reason of the alleged high rates levied by the Board on account of the storm-water drains. In reference to this matter, it may be of interest to recall the circumstances which led to the early construction of these drains, and which will be found detailed in a minute of Mr. Bruce Smith, dated 17th September, 1890, while he occupied the position of Secretary for Public Works, which reads as follows:—

As the Commissioner for Roads is aware, I have been considering the question of hastening on the sewerage works of the city and suburbs, the subject being one of the gravest concern, as so largely affecting the health of the citizens. After going fully into the matter, I am satisfied that Mr. Hickson is

is doing his utmost to press on with the work, but I cannot disguise from myself the serious consequence following the delay which must necessarily take place before these works are completed; and I have, therefore, been carefully considering whether something cannot be done quickly to (in a measure) mitigate the evils which are constantly resulting from the want of a proper sewerage system, more especially as regards the western suburbs. These districts are growing with great rapidity, and the evils I have referred to are becoming intensified in a corresponding degree, but the scheme now being undertaken cannot, I regret, reach them for some years to come. It has, however, occurred to me that some measure of relief might be obtained by carrying out quickly what will eventually form the "storm-water" portion of the general scheme. At present the watercourses which serve to carry off storm-waters are almost entirely in their natural state, and are the receptacles of the sewerage of the large populations which have settled in these suburbs, becoming in consequence a series of fœtid pools which menace the health of the whole population. If these storm-water sewers can be at once constructed they can be utilised for a time for the more rapid and satisfactory discharge of the sewerage matter, which must of necessity, under present circumstances, find its way into them, and thus, I feel sure, be the means of preventing a large amount of sickness.

We have now an abundant water supply, the capacity of the Nepean scheme being something like 50,000,000 gallons per diem. The normal consumption is about 10,000,000 gallons per diem, and the present pipe-line will deliver about 18,000,000 gallons per diem, which will be nearly doubled when the second pipe-line, about to be put down, is completed. Taking into account this large reserve of water, there can be no difficulty, I imagine, in utilising it in flushing down these proposed storm-water sewers; and, indeed, it cannot, I think, be put to a more profitable use. Of course, as soon as the sewerage system proper is complete, these drains will revert to their intended use, *i.e.*, channels for the conveyance of storm-waters only. One thing which must, however, be carefully avoided is, that under the term of storm-water sewers we are not led into carrying out what is practically municipal work, and not coming under the designation of storm-water sewers proper. It will, I apprehend, be easy for the municipalities to make temporary connections with the storm-water drains, and so render them effective for the purpose I have suggested.

I therefore wish Mr. Hickson to at once take this matter into his most serious consideration. The surveys necessary for the work I have already authorised to be carried out. What I desire him to do is to push on with these, and give an estimate of the cost; I will then do my utmost to obtain the necessary funds, so that tenders can be invited. Every possible endeavour should be made to carry these instructions into effect, delay, as I have already pointed out, meaning the sacrifice of health and life. I can see clearly that the municipalities in these matters are almost powerless; it is only the central authority which can effectually deal with them. The cost will, of course, form a part of the sewerage debt, and I feel convinced that both my colleagues and Parliament will bear me out in every effort I may make to ameliorate the serious condition of affairs which now exists in our midst for the want of a proper system of sewerage. I rely upon Mr. Hickson to give energetic effect to these instructions, so far as it lies within the scope of his branch; and I hope by next summer, at all events, a large portion of this system of storm-water drainage may be in operation.

The action of Mr. Bruce Smith, it is gratifying to note, has been amply justified by actual results, and in confirmation of the wisdom of the steps taken by him, we invite attention to the valuable evidence and report tendered to us by Dr. Kendall, the Medical Adviser to the Board. [*Vide Appendix* J.] We quote the following extracts from Dr. Kendall's report:—

The value of foul-water and storm-water sewers may be well estimated by the decrease which has become apparent in the death-rate in their various localities, and there can be no question at all but that storm-water sewers have improved the health of those localities in which they have been constructed.

Since the construction of these storm-water and foul-water sewers there has been a great variation in the earth temperatures of the various localities, and as these temperatures have an important relation with the disease Diarrhœa it is most satisfactory to note that the mortality from this disease has been reduced during the last eight years from 10·9 to 6·2 per 10,000 of the population. Although Diphtheria does not altogether arise from the faulty sanitary circumstances connected with defective drainage, still such defects tend to induce a state of health which indirectly assists in the propagation of this disease. The value, therefore, of these storm-water and foul-water sewers will be more fully appreciated through the remarkable decrease in the mortality from this disease, the death-rate falling from 5·2 in 1889 to 3·1 per 10,000 of the population in 1894, and since, then, assisted by the powerful aid of Antitoxin, to ·9 per 10,000 of the population.

The decrease of the mortality from these two diseases in those places where storm-water sewers only exist has been most marked, and should be emphasised. Phthisis is now considered to be a disease of a micro-parasitic nature, intimately connected with damp soils, and of such a character that its infection is capable of being transmitted by means of a specific microbe or virus. The construction of storm-water sewers has brought about an extension of the area thoroughly drained, thus abolishing stagnant pools, and indirectly improving the quality of the air. Since the installation of the present water supply and sewerage systems the mortality due to phthisis has greatly decreased, viz., from 16·8 to 9·5 per 10,000 of the population. The experience of other countries has been very similar to the above, as, after the insitution of sanitary work, the mortality from phthisis has very considerably decreased.

The principal disease with which the Board has had to deal in the extension of its several systems is Enteric or Typhoid Fever. This scourge for years past has been an annual visitor, and had greatly interfered with the national health, causing a mortality, the existence of which ought to have been avoided. During the operations which have been necessary for developing the sewerage system, it has been impossible to avoid stirring up into activity the germs of disease which lay latent in the soil. This, however, was a temporary evil, which must be in the end followed by good, and clearly demonstrates the criminality of polluting the soil in the careless manner which is very evident in every one of our suburbs. It is to remedy

remedy and prevent such pollution that the storm-water sewers prove of such value in those places which cannot yet be provided with a proper system of sewerage, more especially as they have turned foul creeks and ditches into clean concrete channels, with a proper fall, so that there is no stagnation of slop-waters.

Epidemics of disease will break out occasionally, notwithstanding all attempts made to abolish the evil, but the source of such epidemics will generally be traced to some locality where advantage has not been taken of the existing sewer, or where no sewer has been laid.

In Alexandria last year there was a terrible epidemic of Typhoid Fever, chiefly in a locality where a sewer existed and no advantage had been taken of it; now this sewer is fully used, and only two cases of this disease have been reported from that locality.

In the Borough of Macdonaldtown, where such diseases as Typhoid Fever and Diarrhœa were so rife that it might be called the hot-bed of disease, since the storm-water sewer has been constructed, the incidence of these diseases has been so reduced that this borough may now be called healthy. In Redfern also, which is a densely populated suburb, the construction of the foul-water and storm-water sewers has greatly decreased the death-rate. Rushcutter's Bay and the low-lying portions of Woollahra, known as Double Bay, have benefited very greatly since the opening of the storm-water sewers, as formerly the mortality in these districts was very high. In Erskineville (or Macdonaldtown) the mortality has fallen from 101 per 10,000 of the population to 48. In Redfern the mortality has fallen from 125 per 10,000 of the population to 44. In Waterloo the mortality has fallen from 140 per 10,000 of the population to 65 per 10,000. The whole of this change has taken place since the construction of the storm-water sewers, and, in Redfern and Waterloo, of the foul-water sewers.

It is not beyond the mark to state that, judging from the mortality table above, the saving to the national wealth through improved health has been about £110,000 per annum during the last seven years; and, if we were in a position to define the table of sickness, this saving would be found to be much greater.

Your Commissioners are of opinion that this emphatic testimony to the beneficent results accruing from the construction of storm-water drains furnishes a good answer to the complaints that have been made by some ratepayers on the score of alleged excessive drainage rates. It is easily seen that the expenses incident to diseases arising from defective drainage will outweigh the taxes which the citizens may be called upon to pay on account of these drains, which have been clearly shown to be chief factors in conducing to the improved health of the community.

Financial Results from Storm-water Drains.

The Metropolitan Water and Sewerage Act Extension Act of 1894 (57 Vic. No. 12) limits the maximum rate which the Board is permitted to levy in respect of storm-water drains to sevenpence (7d.) in the £, but, as will be seen from the evidence given by the President and Engineer of the Board (*See* pp. 19 *and* 29), this rate is in several instances much below what is necessary to render these drains financially profitable.

The following table shows, *inter alia*, the rates that are at present levied in respect of completed storm-water drains, and the gain or loss resulting therefrom after providing for interest and maintenance charges. It will be observed that at the present time these drains cause a net annual loss to the Board of £1,285.

Table Showing Financial Results from completed Storm-water Drains.

Name of Drain.	Capital Cost.	Interest (at 3½ per cent.) and Maintenance charges.	Rate in £ now levied.	Revenue Receivable.	Gain.	Loss.
	£	£		£	£	£
Wentworth Park	12,756	646	7d.	696	50	.....
Rushcutters Bay	3,748	371	7d.	30	.....	341
Beattie-street, Balmain	5,142	296	2d.	309	13	.....
Munni-street, Erskineville... ...	34,802	1,313	7d.	131	.....	1,182
Long Cove Creek	21,711	1,150	3d. class A. 1d. class B.	1,213	63	.....
Iron Cove Creek	34,068	1,341	6d. class A. 4d. class B.	1,384	43	.....
Do Extension ...	17,124	599	7d.	556	.....	43
Homebush Creek	15,273	684	7d.	833	149	.....
North Sydney	21,457	1,250	7d.	1,213	.....	37
Totals	166,081	7,650	.....	6,365	Net loss, £1,285	

On the completion of the sewerage system proper the cost of these drains will become merged in the General Sewerage Debt. For the present, therefore, it will be sufficient to consider them as a portion of the whole scheme, the financial results of which

which will be dealt with in a subsequent part of this Report. The amount of expenditure on storm-water drains in districts where a sewerage rate is levied, which has already been merged in the General Sewerage Debt, is £36,130. [*Vide Appendices* K[1], K[2].]

Western Suburbs Sewerage.

The scheme for sewering the Western Suburbs was projected in the year 1888, and the works then proposed by the Government and authorised by Parliament, after due inquiry made by the Public Works Committee, were estimated to cost the sum of £1,817,896. The Committee in their report to Parliament made it clearly understood that it would be necessary to levy a sewerage rate of 6½d. or 7d. in the £ on the assessed annual values of all properties throughout the entire district in order to raise a revenue adequate to meet interest and working expenses.

Taking as the basis of calculation the present assessed values of property in the Western Suburbs, as the scheme was recommended by the Public Works Committee, your Commissioners find that, in consequence of the decline in property values, the rate of 6½d. or 7d. quoted by the Committee would be wholly inadequate to meet the interest and working expenses, and that, for the area originally covered, the necessary rate would now be 1s. 2¼d. in the £.

This scheme, however, comprised large portions of suburbs draining into the northern and southern outfalls, and as your Commissioners think it might be desirable to look at the different areas draining to the northern, southern, and western outfalls, separately, they have obtained from the Engineer for Sewerage Construction (Mr. Davis) and the Board's secretary, conjointly, an estimate of the capital expenditure on the Western Suburbs system. The subjoined statement shows how the amount is arrived at :—

Western Suburbs Sewerage Scheme.

	£	£
Estimated cost of scheme as submitted to and approved by Public Works Committee in 1888–1889	....	1,817,896
Deduct :—		
(*a*) Cost of works belonging to Northern and Southern Systems ...	136,272	
(*b*) Proportional part of Northern and Southern Outfalls	274,000	
(*c*) Saving in construction of Northern and Southern Sewers	35,221	
(*d*) Saving in construction of Western Suburbs sewers	87,595	
(*e*) Cost of works belonging to Western Suburbs Scheme, which it is not proposed to carry out for some years, and which, when constructed, will produce a corresponding revenue	342,038	875,126
		942,770
Add :—.		
Cost of Storm-water Drains, the estimate for which was not put before the Public Works Committee, but which were acknowledged to be necessary	.....	135,000
Present estimated cost of Western Suburbs Scheme draining into Arncliffe Sewage Farm...	.....	£1,077,770

The scheme as at present determined upon will, it is stated, be completed in about four years hence, and your Commissioners have endeavoured to ascertain what the financial results will then show.

The Committee clearly intended that all property within the district should be subject to the sewerage rate. Upon this basis, after eliminating the areas draining into the northern and southern outfalls, the rate that will now be necessary to be levied in the Western Suburbs on the reduced cost of £1,077,770 will be 1s. 1½d. in the £. If the assessable area be restricted to such properties only as can be connected with the sewers, the rate required will be 1s. 10d. in the £.

At

At the time the scheme was under the consideration of the Public Works Committee it was assumed that the rapid development which had taken place in the Western Suburbs during the immediately preceding years would be kept up in the same degree for many years to come. The Committee anticipated that the annual valuation of assessable properties, which was £1,460,000 in 1887, would be, in 1889, £2,000,000; in 1894, £2,200,000, and on the completion of the scheme, £3,300,000.

As a matter of fact, however, owing to the shrinkage in property values that has taken place in recent years, the *actual* valuations, which totalled £1,656,842 in 1889, have fallen to £1,478,595 for the current year 1897-8. The depreciation is still going on, and although it may reasonably be hoped that there will be some upward movement in values during the next four years, experience shows how unsafe it is to count upon any large increase in the near future.

The ultimate financial success of the scheme is of course assured, but it will no doubt be found at present somewhat of a burden on the ratepayers. It must be remembered that the main sewers and outfall works, the cost of which forms a large proportion of the total expenditure, have been designed to meet the wants of a population twice the number of the present, and hence this generation will be taxed to an appreciable extent for the benefit of those who succeed them. This, however, is a liability which is incident to most new undertakings, and cannot well be avoided.

As illustrating the shrinkage in municipal valuations, we desire to draw attention to the evidence of the Secretary to the Board, and, in view of its great importance, quote his remarks on this point. In answer to questions put to him, Mr. Holmes gave the following reply:—

> In connection with the assessed values I might state that during the last year, although the Board laid 55½ miles of water-mains and about 30 miles of new sewers, bringing in new districts liable to be rated, the total year's assessed rates were £7,500 less than the previous year's; showing that the values of properties were still falling. . . . Our total revenue for last year is more, but that is due to a large meter consumption, and garden fees, and special rates; but the rates from assessed properties are about £7,500 less.

General Sewerage Debt.

The disappointing results shown in connection with the Western Suburbs Sewerage Scheme, considered as a distinct and separate system, have led your Commissioners to institute a careful scrutiny into the question of the general sewerage debt. The results of our investigations are of serious import as affecting the Board's future financial position, and, inferentially, the existing methods of levying sewerage rates.

Upon the operations of the year ended 30th June, 1897, the Board admit a loss of £14,000, while an allowance for interest on the State expenditure from the Consolidated Revenue, as explained on page x of this report, would increase the loss to £18,000. Looking forward to the completion of the sewerage system in about four years from the present time, a careful estimate gives the ultimate cost of the works in relation to the several drainage areas, and the revenue required to meet interest and working expenses thereon, as follows:—

Estimated Ultimate Cost of Sewerage System and Revenue required to meet Interest and Working Expenses.

District or Drainage Area.	Estimated Ultimate Cost of Works.	Estimated Revenue required to meet Interest and Working Expenses.
	£	£
Northern, draining into Bondi Outfall	1,646,055	83,005
Southern, draining into Botany Sewage Farm	463,332	23,342
Randwick, draining into Coogee Outfall	71,829	3,624
Western Suburbs, draining into Arncliffe Sewage Farm... ...	1,077,770	54,262
North Sydney, draining into Willoughby Outfall Works ...	204,500	10,305
All districts combined ... ... £	3,463,486	174,538

Before specifically discussing the question of the rating required to meet the liabilities pertaining to these works, it may be well to lay down the principles which may be applied in dealing with the distribution of the debt.

Firstly.

Firstly.—The debt may be divided amongst the several districts or drainage areas having separate outfalls, according to the amounts expended on the works in such areas. [*Vide Appendix—Plan.*]

Secondly.—The debt may be looked upon as a whole.

Under the first plan, the debt would be divided amongst five separate districts, as shown in the foregoing table. Dealing with the debt in this method, the following ratings would be necessary upon the present basis of assessment:—The Northern District, comprising the City of Sydney with its area wholly and closely built upon and its sewerage system completed, would require a rate of 7½d. in the £; the Southern, 1s. 2d.; Randwick, 4s. 3½d.; the Western Suburbs, 1s. 10d.; and North Sydney, 1s. 6¾d.

The adoption of this plan, it is easily seen, would be certain to lead to complications, as it would be a matter of great difficulty to accurately define the boundaries of the several districts in relation to the outfall works, and still more difficult to apportion the expenses of management. At the same time, however, it should be remembered that when the Western Suburbs Sewerage Scheme was approved by the Public Works Committee in 1889, it was clearly understood that the liabilities attaching to the scheme would have to be borne entirely by the Western Suburbs district. The Committee's report is emphatic on this point, as the following quotations will show:—

27. The money required for the proposed works will have to be obtained by loan, and to that extent the public indebtedness of the Colony will have to be increased; but the interest and, within a fixed period, the principal will be paid by the residents of the western suburbs. The general public will not be called upon to contribute in any degree.

29. The method proposed for paying the interest on the sum expended, and repaying the principal, is that of charging a certain sewerage rate, which will be paid by the residents of the western suburbs. The sewerage rate upon the cost of the works immediately befor the Committee, £830,304, would be, under the existing Act, 6·68d., and under the extended period for repayment of the loan, 5·12d., but as this deals with only a portion of the entire scheme, and the entire scheme must eventually be carried out, it is advisable that the people of the western suburbs should understand what they ultimately will be called upon to pay, and that, as already stated, will be 7d. or 6½d.

Under the second plan, namely, that of treating the debt as a whole, a general rate of 10¾d. in the £, it is estimated, would be sufficient. The arguments in favour of adopting this principle are stated in detail in the evidence given by Mr. Davis, Engineer for Sewerage Construction. [*See page* 49.]

Methods of Rating.

The estimates given above as to the amount of rate that will be required to meet interest and working expenses have been based upon the method of rating in force at present—that is, assessing only those properties which are or can be connected with the sewers. But if we take a practice prevailing in other places, it will be found that the whole of the sewerage area is rated, whether the properties situated therein can be sewered or not. In such cases it is, and with reason, contended that every portion of the area benefits from the construction of such works, whether actually connected therewith or not; that, in fact, inasmuch as the whole district participates in the general sanitary improvement resulting from the construction of sewers, it should contribute in fair proportion to meet the liabilities incurred.

In Melbourne we find that this principle is clearly recognised, and that, accordingly, the entire metropolitan area is required to contribute to the cost of the sewerage works. The following extracts from a letter received by us from the secretary of the Melbourne and Metropolitan Board of Works—which will be found *in extenso* in Appendix L—show the system of rating adopted by that body:—

The entire metropolitan area (which consists of twenty-four municipalities and parts of two other municipalities) is divided into two sections, an outer fringe, which has been defined by the Engineer-in-Chief of the Board as the area which will not be sewered until a very remote period, if ever, and an inner area which includes all the portions of the metropolis which are to be immediately or eventually sewered. The existing relative valuations of areas are at present:—

Inner area...	£3,975,699
Outer area...	243,035

Parliament has provided that upon all properties in the outer area a rate of 1d. in the £ is to be levied for a period of nine years. Upon all unsewered properties within the inner area a rate of 2d. in the £ is to be levied for a period of nine years. Upon all sewered properties within the inner area a rate of 1s. in the £ is compulsory so long as any rates are made upon the unsewered properties.

Acting

Acting on this, which appears to them a sound principle, your Commissioners have endeavoured to show a method of rating which will, in some measure, give effect thereto. From tables which have been, at our request, worked out by the Secretary to the Metropolitan Water Supply and Sewerage Board, the following results have been arrived at, the basis being the levying a Health Rate on all properties alike, sufficient to meet interest on capital cost and expenses of renewals; and a special additional rate on such properties as are connected with the sewers, sufficient to meet the expenses of maintenance and management. [*Vide Appendices* M 1–M 7.]

TABLE of Sewerage Rates required to be levied according as the Capital Debt is apportioned amongst the various Districts or is treated as a whole.

District.	General Health Rate on all Properties alike, to meet Interest on Permanent Works and annual Repayment Instalment on Renewable Works.	Special Additional Rate on Properties which can be sewered, to provide expenses of Maintenance and Management.	Total Rate on Properties which can be sewered.
Northern, draining into Bondi outfall	5d.	2¼d.	7¼d.
Southern, draining into Botany Sewage Farm ...	9d.	4d.	1s. 1d.
Randwick, draining into Coogee outfall	1s. 0¼d.	1s. 3½d.	2s. 3¾d.
Western Suburbs, draining into Arncliffe Sewage Farm	9½d.	6½d.	1s. 4d.
North Sydney, draining into Willoughby outfall works	8½d.	5½d.	1s. 2d.
Combined Metropolitan area	6½d.	3d.	9½d.

To adhere more closely to the Melbourne plan would give the following results:—Taking that portion of the Metropolitan District throughout which the sewerage system will be extended during the next four years as the inner area, and levying a rate of 2d. in the £ on the unsewered properties therein, it would be necessary to levy a rate of 10⅖d. in the £ on all sewered properties, in order to meet the financial obligations attaching to the system. [*Vide Appendix* N.]

We do not think it comes within the scope of our Commission to definitely pronounce an opinion as to the merits of the several methods referred to of apportioning the sewerage debt, or as to the various systems of rating, but we deem it desirable to state, for the information of your Excellency, the terms of the problem which has to be solved.

In thus drawing attention to the responsibilities connected with the Metropolitan Sewerage Scheme, we wish it to be understood that the case is presented in what may be considered its worst aspect, so far as revenue is concerned. Without indulging in over-sanguine anticipations as to great expansions in the near future, we cannot but think that the natural growth in wealth and population of a young and energetic community will, in course of time, cause the burden of taxation upon the individual taxpayer to be lightened. At the same time it must be borne in mind that the capital debt will most probably be increased to an appreciable extent by the proposed new legislation referred to in the two following paragraphs of this Report, and that such increase will necessitate a corresponding increase in the amount of the rate.

BOARD'S PROPOSED AMENDING BILL.

The Metropolitan Water Supply and Sewerage Board, in view of the necessity which exists for taking steps which will in some measure arrest the recurring deficiency in the sewerage revenue, has drafted an amending Bill for the consideration of the Secretary for Public Works, with a view to its submission to Parliament. This Bill contains, *inter alia*, provisions for definitely fixing the capital cost of all water supply, sewerage, and drainage works now or to be vested in the Board, and for levying such rates as will be necessary to raise a revenue sufficient to meet the interest on capital cost and all maintenance, renewal, and working expenses. As it has already been made clear that, while the existing maximum water rate of 1s. in the £ is amply sufficient to meet all obligations in respect of the water works debt, the sewerage rate will be inadequate for its purpose, the Board proposes to obtain Legislative authority to raise the maximum sewerage rate to be levied in the Western Suburbs and North Sydney Districts from 1s., as at present, to 1s. 7d. in the £.

Capital Debt of Board.

The capital debt for which the Board will become liable under the provisions of the Amending Bill, will comprise all amounts expended in the purchase or acquisition of land, and on the construction of all works in connection with water supply, sewerage, and drainage, together with interest at the rate of 3½ per cent. per annum, calculated from the dates of expenditure up to, say, 30th June, 1897. From these amounts will be deducted the excess of revenue over working expenses paid by the Board into the Treasury; but even when this is taken into account it is certain that, when the capital cost has been thus ascertained, it will be found to exceed the amount of £6,262,670, which the Board now adopts as the amount of its Capital Debt, and which, speaking generally, represents merely the out-of-pocket expenditure of the Government.

We think that the correct amount of the Board's capital debt, compiled on the basis provided in the Amending Bill, should be ascertained as quickly as possible, and that, in the meantime, the proposals of the Board as to obtaining increased rating powers should be acceded to.

Summary of Recommendations.

In conclusion, we beg to sum up the recommendations we make in this Report:—

1. That the number of members of the Board be reduced from seven to three, namely, a President, appointed by the Governor-in-Council, one member elected by the City Council, and one by the suburban Municipal Councils conjointly.
2. That the position of President be made a permanent one, subject to good behaviour, and that the salary attaching to the position should be £1,000 per annum.
3. That the fees payable to the other members of the Board be at the rate of £3 3s. per sitting, the total amount payable to any one member during the year being limited to £150.
4. That the annual salaries of the Secretary and Assessor be raised to £500 and £450 respectively.
5. That the position of the Examiner of Accounts and Auditor be made an independent one, subject only to the control of the Board, and that his salary be increased to £450 per annum.
6. That the practice of the Board in allowing a discount of £5 per centum on account of the prompt payment of rates be discontinued.
7. That the Board be reimbursed for the cost of those water services which are now rendered free.
8. That steps be taken as soon as possible to furnish the Board with a correct statement of its capital debt.

In closing our Report we desire to state that our colleague, Mr. T. A. Coghlan, left the Colony shortly after the work of the Commission began, and consequently had not an opportunity of acting except during the first sitting. We also desire to bear testimony to the efficient service rendered by Mr. J. Johnston, the Secretary of the Commission.

We have the honor to be,

Your Excellency's most obedient Servants,

J. BARLING,
President. (L.S.)
GEO. A. WILSON. (L.S.)
JAMES POWELL. (L.S.)

Jas. Johnston, Secretary.

Sydney, 14th October, 1897.

ROYAL COMMISSION ON METROPOLITAN WATER SUPPLY AND SEWERAGE BOARD.

MINUTES OF PROCEEDINGS.

MONDAY, 15 *MARCH*, 1897.

THE Royal Commission appointed to make a diligent and full inquiry into the management of the Board of Water Supply and Sewerage, incorporated under the provisions of the "Metropolitan Water and Sewerage Act of 1880," and to report whether, and if so by what means, that Department can be placed upon a more efficient and economical basis, met in the Board Room of the Public Service Board at 12 o'clock noon.

MEMBERS PRESENT:—

Joseph Barling, Esq., J.P., President.
George Alexander Wilson, Esq., J.P. | Timothy Augustine Coghlan, Esq., J.P.

Colonel Thomas Rowe, President of the Metropolitan Water Supply and Sewerage Board, attended.

The President announced the object of the inquiry, and that Mr. James Johnston would act as Secretary.

The Commission was read by the Secretary.

Colonel Thomas Rowe, President of the Metropolitan Water Supply and Sewerage Board, was sworn and examined.

The Commission, at 12·45 p.m., adjourned *sine die*.

FRIDAY, 14 *MAY*, 1897.

The Commission met in the Board Room of the Public Service Board at 10 o'clock a.m.

MEMBERS PRESENT:—

Joseph Barling, Esq., J.P., President.
George Alexander Wilson, Esq., J.P. | James Powell, Esq., J.P.

The minutes of the previous meeting were read and confirmed.

The President announced that since the Commission had been issued, James Powell, Esq., J.P., had been added to the Commission.

The Secretary read the following correspondence:—

Letter dated 6th May, 1897, from the Principal Under Secretary, transmitting an instrument under the hand of His Excellency the Governor, with the advice of the Executive Council, extending the term of the Commission for a period of three months, from the 4th instant.

Letter from the Secretary to the Metropolitan Water Supply and Sewerage Board, dated 23rd March, 1897, transmitting Returns asked for by the Commission.

Letter from Mr. Alderman Jeanneret, dated 29th January, 1897, expressing a desire to give evidence before the Commission.

The correspondence was received.

Colonel Thomas Rowe, President of the Metropolitan Water Supply and Sewerage Board, was further examined.

The Commission at 12·30 p.m. adjourned *sine die*.

THURSDAY, 20 *MAY*, 1897.

The Commission met in the Board Room of the Public Service Board at 12·30 p.m.

MEMBERS PRESENT:—

Joseph Barling, Esq., J.P., President.
George Alexander Wilson, Esq., J.P. | James Powell, Esq., J.P.

The minutes of the previous meeting were read and confirmed.

The Secretary read the following correspondence:—

Letter dated 15th May, 1897, from William S. Cortis, M.D., asking whether the condition of the water supplied by the Board was a subject which came within the scope of the Commission's inquiry.

Letter dated 19th May, 1897, from Mr. George Stone offering his services as a water analyst.

The correspondence was received.

Alderman Isaac Ellis Ives, Mayor of the City of Sydney, and Alderman Charles Edward Jeanneret were sworn and examined.

The Commission at 3·15 p.m. adjourned until 10 o'clock on Tuesday, 25th April.

TUESDAY,

TUESDAY, 15 *JUNE*, 1897.

The Commission met in the Board Room of the Public Service Board at 10 o'clock a.m.

MEMBERS PRESENT:—

Joseph Barling, Esq., J.P., President.
George Alexander Wilson, Esq., J.P. | James Powell, Esq., J.P.

The minutes of the previous meeting were read and confirmed.

Colonel Thomas Rowe, President of the Metropolitan Water Supply and Sewerage Board, was further examined.

Thomas Robert Steel, Accountant to the Public Works Department, was sworn and examined.

The Commission at 12 o'clock noon adjourned until 10 o'clock a.m. on Thursday, 17th June.

THURSDAY, 17 *JUNE*, 1897.

The Commission met in the Board Room of the Public Service Board at 10 o'clock a.m.

MEMBERS PRESENT:—

Joseph Barling, Esq., J.P., President.
George Alexander Wilson, Esq., J.P. | James Powell, Esq., J.P.

Alderman Isaac Ellis Ives, Mayor of Sydney, was further examined.

The Commission, at 10·30 a.m., adjourned *sine die*.

WEDNESDAY, 30 *JUNE*, 1897.

The Commission met in the Board Room of the Metropolitan Water Supply and Sewerage Board at 2·30 p.m.

MEMBERS PRESENT:—

Joseph Barling, Esq., J.P., President.
George Alexander Wilson, Esq., J.P. | James Powell, Esq., J.P.

William Holmes, Secretary to the Metropolitan Water Supply and Sewerage Board, was sworn and examined.

The Commission then proceeded to inspect the books and system of working of the Examiner and Auditor's Branch.

The Commission, at 4 o'clock p.m., adjourned *sine die*.

TUESDAY, 10 *AUGUST*, 1897.

The Commission met in the Board Room of the Metropolitan Water Supply and Sewerage Board at 10 o'clock a.m.

MEMBERS PRESENT:—

Joseph Barling, Esq., J.P., President.
George Alexander Wilson, Esq., J.P. | James Powell, Esq., J.P.

John Moore Smail, Chief Engineer to the Metropolitan Water Supply and Sewerage Board, was sworn and examined.

Melbourne Green, Accountant, and Thomas Kennedy, Examiner of Accounts and Auditor, to the Metropolitan Water Supply and Sewerage Board, were called and examined.

Herbert James Beaumont, Assessor to the Metropolitan Water Supply and Sewerage Board, was sworn and examined.

The Commission, at 12·15 p.m., adjourned until 10·30 a.m. on Wednesday, the following day.

WEDNESDAY, 11 *AUGUST*, 1897.

The Commission met in the Board Room of the Metropolitan Water Supply and Sewerage Board at 10·30 a.m.

MEMBERS PRESENT:—

Joseph Barling, Esq., J.P., President.
George Alexander Wilson, Esq., J.P. | James Powell, Esq., J.P.

The Commission, accompanied by Mr. J. M. Smail, Engineer to the Metropolitan Water Supply and Sewerage Board, proceeded to inspect the offices of the Engineering Branch, Mr. Smail explaining the system of working and the duties of the various officers.

The Commission, at 11·40 a.m., adjourned until 10 o'clock a.m. on Thursday, the following day.

THURSDAY, 12 *AUGUST*, 1897.

The Commission met in the Board Room of the Metropolitan Water Supply and Sewerage Board at 10 o'clock a.m.

MEMBERS PRESENT:—

Joseph Barling, Esq., J. P., President.
George Alexander Wilson, Esq., J.P. | James Powell, Esq., J.P.

Mr. J. M. Smail, Engineer to the Board, conducted the Commission on a visit of Inspection to the Crown-street Pumping Station and Stores, the Alexandria Ejector Station, and the Botany Sewage Farm.

The Commission, at 2·30 p.m., adjourned until 10 o'clock a.m. on Saturday, the 14th August.

SATURDAY,

SATURDAY, 14 *AUGUST*, 1897.

The Commission met at Rookwood Railway Station at 10 o'clock a.m.

MEMBERS PRESENT:—

George Alexander Wilson, Esq., J.P. | James Powell, Esq., J.P.

The Commission, conducted by Mr. J. M. Smail, Engineer to the Metropolitan Water Supply and Sewerage Board, proceeded on a visit of inspection to the Potts' Hill Reservoir, the Pipe-head Basin near Guildford, and the Works at Prospect.

The Commission, at 3·25 p.m., adjourned till 11 o'clock a.m. on Monday, 16th August.

MONDAY, 16 *AUGUST*, 1897.

The Commission met in the Board Room of the Public Service Board at 11 o'clock a.m.

MEMBERS PRESENT:—

Joseph Barling, Esq., J.P., President.
George Alexander Wilson, Esq., J.P. | James Powell, Esq., J.P.

William Holmes, Secretary to the Metropolitan Water Supply and Sewerage Board, was further examined.

The Commission, at 12·30 p.m., adjourned until 2 o'clock p.m. on Tuesday, the following day.

TUESDAY, 17 *AUGUST*, 1897.

The Commission met in the Board Room of the Public Service Board, at 2 o'clock p.m.

MEMBERS PRESENT:—

Joseph Barling, Esq., J.P., President.
George Alexander Wilson, Esq., J.P. | James Powell, Esq., J.P.

Joseph Davis, Engineer for Sewerage Construction, Department of Public Works, was sworn and examined.

The minutes of the previous meetings held on 17th, and 30th of June, and 10th, 11th, and 12th August, were read and confirmed.

The Secretary read the following correspondence:—

Letter dated 5th August, 1897, from the Principal Under Secretary, transmitting an instrument under the hand of His Excellency the Governor, with the advice of the Executive Council, extending the time within which the report of the Commission is to be furnished for a further period of three months from the 4th August.

The correspondence was received.

The Commission at 3·45 p.m. adjourned until 2·30 p.m. on Thursday, 19th August.

THURSDAY, 19 *AUGUST*, 1897.

The Commission met in the Board Room of the Public Service Board at 2·30 p.m.

MEMBERS PRESENT:—

Joseph Barling, Esq., J.P., President.
George Alexander Wilson, Esq., J.P. | James Powell, Esq., J.P.

Dr. Theodore Mailler Kendall, Medical Adviser, and Henry Sydney Williams, Solicitor, to the Metropolitan Water Supply and Sewerage Board, were sworn and examined.

Melbourne Green, Accountant, and Thomas Kennedy, Examiner of Accounts and Auditor, to the Metropolitan Water Supply and Sewerage Board, were recalled and sworn as to the correctness of the evidence given before the Commission on 10th August.

The Secretary read the following correspondence from the Secretary to the Metropolitan Water Supply and Sewerage Board:—

Letter dated 12th August, 1897, transmitting certain returns asked for by the Commission.

Letter dated 13th August, 1897, transmitting return showing arrears of rates owing by officers of the Board.

Letter dated 17th August, 1897, transmitting list of proposed increases to salaries of officers.

Letter dated 17th August, 1897, stating that the members of the Board did not desire to give any evidence before the Commission.

The correspondence was received.

The minutes of the previous meetings held on the 14th, 16th, and 17th August, were read and confirmed.

The Commission resolved, on the motion of Mr. Wilson, seconded by Mr. Powell, that they now proceed to consider the evidence given in their inquiry, with a view to the preparation of their report to His Excellency the Governor.

The Commission at 4 o'clock p.m. adjourned *sine die*.

FRIDAY, 3 *SEPTEMBER*, 1897.

The Commission met in the Board Room of the Public Service Board at 3 o'clock p.m.

MEMBERS PRESENT:—

Joseph Barling, Esq., J.P., President.
George Alexander Wilson, Esq., J.P. | James Powell, Esq., J.P.

The Commission considered their report to His Excellency the Governor.

The Commission at 4·15 p.m. adjourned until 2·15 p.m. on Monday, 6th September.

MONDAY,

MONDAY, 6 *SEPTEMBER*, 1897.

The Commission met in the Board Room of the Public Service Board at 2·15 p.m.

MEMBERS PRESENT:—

Joseph Barling, Esq., J.P., President.

George Alexander Wilson, Esq., J.P. | James Powell, Esq., J.P.

Mr. William Holmes, Secretary to the Metropolitan Water Supply and Sewerage Board was further examined.

The Commission at 3·15 p.m. adjourned *sine die*.

THURSDAY, 9 *SEPTEMBER*, 1897.

The Commission met in the Board Room of the Public Service Board at 12·50 p.m.

MEMBERS PRESENT:—

Joseph Barling. Esq., J.P., President.

George Alexander Wilson, Esq., J.P. | James Powell, Esq., J.P.

Mr. William Holmes, Secretary to the Metropolitan Water Supply and Sewerage Board was further examined.

The Commission at 1·15 p.m. adjourned *sine die*.

MONDAY, 13 *SEPTEMBER*, 1897.

The Commission met in the Board Room of the Public Service Board at 2·15 p.m.

MEMBERS PRESENT:—

Joseph Barling, Esq., J.P., President.

George Alexander Wilson, Esq., J.P. | James Powell, Esq., J.P.

Mr. Joseph Davis, Engineer for Sewerage Construction, Department of Public Works, was further examined.

The minutes of proceedings on 19th August, 3rd, 6th, and 9th September, were read and confirmed.

The Commission at 3·30 p.m. adjourned until 2·15 p.m. on Wednesday, 15th September.

WEDNESDAY, 15 *SEPTEMBER*, 1897.

The Commission met in the Board Room of the Public Service Board at 2·15 p.m.

MEMBERS PRESENT:—

Joseph Barling, Esq., J.P., President.

George Alexander Wilson, Esq., J.P. | James Powell, Esq., J.P.

Mr. Joseph Davis, Engineer for Sewerage Construction, Department of Public Works, was further examined.

The minutes of proceedings on 13th September were read and confirmed.

The secretary was instructed to communicate with the Melbourne and Metropolitan Board of Works respecting the system of sewerage rate adopted by that Board.

The Commission further considered their report to His Excellency the Governor.

The Commission at 3·30 p.m. adjourned until Monday, 20th September, at 2·15 p.m.

MONDAY, 20 *SEPTEMBER*, 1897.

The Commission met in the Board Room of the Public Service Board at 2·15 p.m.

MEMBERS PRESENT:—

Joseph Barling, Esq., J.P., President.

George Alexander Wilson, Esq., J.P. | James Powell, Esq., J.P.

Mr. Joseph Davis, Engineer for Sewerage Construction, Department of Public Works, and Mr. William Holmes, Secretary to the Metropolitan Water Supply and Sewerage Board, were further examined.

The Secretary read the following correspondence:—

Letter dated 17th September, 1897, from the Secretary of the Melbourne and Metropolitan Board of Works, respecting the system of levying sewerage rates adopted by that Board.

The correspondence was received.

The Commission further considered their report to His Excellency the Governor.

The Commission at 3·30 p.m. adjourned *sine die*.

THURSDAY,

THURSDAY, 7 *OCTOBER*, 1897.

The Commission met in the Board Room of the Public Service Board at 11 a.m.

MEMBERS PRESENT:—

Joseph Barling, Esq., J.P., President.
George Alexander Wilson, Esq., J.P. | James Powell, Esq., J.P.

Mr. William Holmes, Secretary to the Metropolitan Water Supply and Sewerage Board, was further examined.

The Commission at 11·45 a.m. adjourned *sine die*.

THURSDAY, 14 *OCTOBER*, 1897.

The Commission met in the Board Room of the Public Service Board at 3 o'clock p.m.

MEMBERS PRESENT:—

Joseph Barling, Esq., J.P., President.
George Alexander Wilson, Esq., J.P. | James Powell, Esq., J.P.

The minutes of proceedings on 20th September and 7th October were read and confirmed.

The Commission finally adopted and signed their report to His Excellency the Governor.

On the motion of Mr. Wilson, seconded by Mr. Powell, it was resolved:—

"That the Commission desire to place on record their high appreciation of the services and assistance rendered by Mr. Smail, Chief Engineer, and Mr. Holmes, Secretary, of the Board; by Mr. Davis, Engineer for Sewerage Construction, Department of Public Works; and by Mr. Martin, Assistant Statistician, in checking the statistical portion of the Commission's Report."

The minutes of proceedings were read and confirmed.

The Commission at 4 o'clock a.m. adjourned *sine die*.

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ROYAL COMMISSION ON METROPOLITAN WATER SUPPLY AND SEWERAGE BOARD.

MINUTES OF EVIDENCE.

MONDAY, 15 *MARCH*, 1897.

Present:—
JOSEPH BARLING, Esq., J.P. (President),
GEORGE ALEXANDER WILSON, Esq., J.P.
TIMOTHY AUGUSTINE COGHLAN, Esq., J.P.

Thomas Rowe, President of the Metropolitan Water Supply and Sewerage Board, sworn and examined:—

T. Rowe. 15 Mar., 1897.

1. *President.*] What is your name? Thomas Rowe.
2. You are President of the Board of Water Supply and Sewerage? Yes.
3. How long have you held that position? Four years, in the first instance, and then there was a break.
4. You at present hold that position? Yes.
5. When will your term of office run out? I think about this day twelve months, that is as to the Presidency, and not as a member of the Board.
6. We simply ask you to attend here to-day, because we want you to furnish us with certain information? I shall be glad to give the Commission all the information I can.
7. The information which we ask for is—

(*a*) Return showing Board's revenue and expenditure year by year from date of inception of Board up to 31st December, 1896, in respect of water supply, sewerage, stormwater drainage, and sewage farm:—

The revenue to be detailed under the following headings, namely;—Assessment rates, meters, special fees and agreements, railways, Government institutions: (a) by meter, (b) per head of inmates; miscellaneous.

The expenditure (loans and revenue to be shown separately) to be detailed under the following headings, namely:—Administration: (a) secretarial, accountant's, and assessor's divisions, and office expenses; (b) engineering division; maintenance (repairs and wages); renewals (goods and wages); new works (goods and wages); sewage farm (including inlet house).

(*b*) Percentage of working expenses to revenue, year by year.

(*c*) Outstanding rates and charges:—Amount taken over from City Council; amount of rates, &c., struck, year by year; amount of rates, &c., collected, year by year; amount of rates and charges outstanding at close of each year.

(*d*) Return showing names of present Members of Board, distinguishing those appointed by the Governor from those elected by Municipal Councils; dates when their respective tenures of office close; stated times of meetings; individual attendances of members during year ended 31st December, 1896; rates of remuneration granted to Members of Board—(a) by salary, (b) by fees; amount of salaries and (or) fees received by each member for year ended 31st December, 1896; total amount of (a) salaries and (b) fees paid to Board year by year, from date of inception of Board up to 31st December, 1896.

(*e*) Return of capital indebtedness:—(a) Amounts taken over at inception of Board, and (b) amounts added since then, year by year, for water supply, sewerage, storm-water drainage. (Loans and revenue to be shown separately.)

(*f*) Return of officers and employees, classified under the various branches, such as—

(1.) Engineering:—Draftsmen, field officers, inspectors and foremen, mechanics, turncocks, labourers.

(2.) Clerical:—Secretarial, assessor's, accountant's.

The particulars to be furnished respecting each officer and employée are:—Surname; Christian name (in full); age last birthday; date of appointment; manner of appointment—(a) by examination, (b) by nomination, (c) by whom recommended; length of service up to 28th February, 1897; break in service (from —, to —); position held; amount of annual salary received; amount of allowances, fees, or other emoluments; total amount of salary and emoluments; description, in detail, of duties performed.

You will have the kindness to prepare for us that information? Very well, sir.

8. Can you form any idea as to how long it will take for the information to be prepared;—we will then adjourn for that time? A week or ten days, I think.
9. *Mr. Wilson.*] I suggest that it be typewritten, and that there be six copies, so that there will be a copy for each member of the Commission, besides others? We have a printer who does our work.
10. *President.*] Well, as you find it more convenient. In this inquiry we invite your co-operation, Colonel Rowe, which I am sure you will give us; and, if there is any information outside of what we have asked you for, which you think might be of service to us, we would like you to produce it; and if there is any statement which you would like to make at any time we shall be glad to hear you? Well, it is a large establishment, and the public have various ideas about it. I shall be happy to assist in any way I possibly can.

11.

T. Rowe. 15 Mar., 1897.

11. Mr. Wilson is suggesting that perhaps you have some ideas now which you would like to put before the Commission? Well, sir, I can scarcely enter into the thing right off, but I had in my mind, when you were asking for that information, whether it will include all who are in the temporary employment of the Board. There are a good many temporary employees.
12. Yes, everybody; we want it to cover everything? I will make it as full as possible. In the course of the inquiry the Commission will, perhaps, visit the various stations.
13. We have come to no decision in the matter; we will see as the inquiry goes on. We shall, of course, visit your office, but we want to understand the whole thing first? A room can be set apart for the Commission. The Board room is available, if that would do. I will inform the Commission in a day or two of the exact time that these returns will be ready.

FRIDAY, 14 *MAY*, 1897.

Present:—

JOSEPH BARLING, Esq., J.P. (President).
GEORGE ALEXANDER WILSON, Esq., J.P.
JAMES POWELL, Esq., J.P.

Thomas Rowe, President of the Metropolitan Water Supply and Sewerage Board, further examined:—

T. Rowe. 14 May, 1897.

14. *President.*] How many meetings were held during the year ended 31st December, 1896? One every week, with some extra meetings. There were 61 altogether. You have a copy of this return, showing that I attended 60 meetings, Mr. Taylor attended 57, Mr. Mansfield 54, Mr. McPherson 44, Mr. Buckle 55, Mr. Davis, 57, and Mr. Ahearn 45. [*Vide Appendix.*]
15. At what rate are the members paid? £250 per annum. There are fifty-two weeks in the year, and that is distributed over the fifty-two weeks; about £4 16s. a week; but they are paid by fees at £5 per week for one or more meetings, not to exceed £250 per annum.
16. If you will look at the return you will see there is a discrepancy between the number of meetings run out at £5 a meeting and the actual amount paid. We would like that explained. You are paid at a fixed salary? Yes.
17. Mr. Taylor attended 57 meetings, which would run out at £285 at £5 a meeting, but he has been paid only £245. Your explanation is that he cannot be paid more than £250? Yes.
18. But he has only had £245. Then there is Mr. Mansfield, who has been paid £240 for 54 meetings, which at £5 would be £270; Mr. McPherson, £195 for 44 meetings, which at £5 would be £220; Mr. Buckle attended 55 meetings, which at £5 would be £275, but has only been paid £240; Mr. Davis was present at 57 meetings, coming to £285, but he has been paid £250, which is right, and Mr. Ahearn is paid £190 for 45 meetings, which at £5 would be £225. Is there any reason for that discrepancy? There may be two or three meetings held in one week, but they would only be paid £5 for that week, whether they attended one meeting or three.
19. The explanation apparently is this, that however many meetings may be held in one week, you only pay £5 for that week? Yes.
20. So that these figures, 57, 54, 44 do not necessarily mean 57 weekly meetings, 54 weekly meetings, and so on? No; there may be two in one week. We also visit various works, but they are included in the same pay. I have a return here of visits made since the 1st January, 1896. [*Vide Appendix.*]
21. These gentlemen are not paid anything for these visits other than the £5 per week? Nothing whatever; and they have other duties besides Committee meetings, receiving deputations, interviewing the public, visits of inspection to works, etc.
22. Are expenses allowed? Yes; actual expenses of visits.
23. What has been the cost of these expenses? I will have to get that for you.
24. What has been the total cost of the Board from the date of inception in 1888, to 31st December, 1896? £17,579 12s. 2d.
25. My colleagues are anxious to know the cost of each of the visits you have mentioned, and the items? We will furnish the information.
26. How often does the Board meet? Once a week; on Wednesday mornings.
27. How long do the meetings generally last? About two hours.
28. What is the nature of the business dealt with by the Board? I should like to hand in one of our business papers. This will explain the whole matter. This is a system introduced within the last six months. There are forty-one items on this paper. [*Vide Appendix.*]
29. What are the duties of the President, as distinct from the members? The general administration of the Department; the responsibility, of course, of the properties entrusted to the Board; to be present at all meetings, to receive deputations, attend on Minister and Under-Secretary when required, and receive the public generally throughout the day. Read, note, and approve of all important letters and documents from the Secretary, see various officers of Department in consultation, approve of all expenditure over £5 up to £20, which is afterwards approved by the Board. Examine all cash books, and check all tea books. Approve all requisitions for stores and goods of all kinds. Approve of all credits; attest all accounts. Credit for all lands divided where assessment is altered, lands cut up, houses pulled down or burned down. These things cause the assessments to be changed. Sign all vouchers for payment, and, of course, all cheques for wages, transfers, and for contracts, receipt vouchers, check cash ledger and cash books, and medical reports on officers. Deal with all officers who are brought before me charged with any wrong conduct; suspend them, &c., for the time-being. Periodical visits round the department itself; inspect books; attend all inquiries on improvements that might possibly be made in the books or the mode of conducting the business. Then I visit the catchment area, which I have been over twice, which no other member of the Board has done; and I have brought about some very good improvements there for the benefit of the purity of the water. That catchment area runs right away to the Bulli mountains. I visit also all the important works under the Board, and control all the workmen. I also visit works in course of construction with the Engineer. I jotted these down last evening as some of the duties.
30. How often do you attend? Every day.

T. Rowe. 14 May, 1897.

31. And how much of your time is devoted daily to the Business of the Board? It varies very much. I sometimes go there about 10, but my proper time is 11; and I frequently remain there until 1, and have been there till 2, and again in the afternoon. I am always in attendance when wanted, and if required a clerk can call upon me in my office if necessary. There has never been any delay in business, no errors whatever, and never a paper left unattended to when I leave the office. I remain until the business is done.
32. May that be said to occupy about half your time? I think it occupies very much more, if I take those visits into consideration. Of course I do not know the average, but I have the weight of responsibility for the institution on my mind, not only while I am there, but constantly on my mind.
33. I think you are allowed to carry on your private business as well? Yes.
34. Do you visit all the works in progress? Not all the works, for that would mean very small works. All the important works that it is necessary for me to see I visit; but I do not consider it a part of my business to visit every work during its progress.
35. Then the responsibility is left to the engineer, and is not shared by you at all? Not all the works, certainly.
36. You hold him responsible for the carrying out of the works? Certainly. We would very quickly come down on the engineer if anything were wrong, because the Board is composed of very competent men, and the engineer is constantly in consultation with me in regard to works in progress.
37. That is Mr. Smail? Yes.
38. And he is competent? I think he is an excellent officer.
39. You do not share the responsibility with him? Naturally the President of the Board looks to the officers of the Department, and these things are brought before the Board and discussed; and, if necessary, we have Mr. Smail before the Board. Of course I am not an engineer, but I know the whole of the works; and my long experience—getting on for thirty-five or forty years—naturally gives me a grip of the whole of the subject. I take a deep interest in the works, and consult with him in these matters.
40. You look upon yourself as the responsible administrative head, and you hold the engineers responsible just the same as the Minister of a public Department would hold his engineers responsible? Yes, and then, of course, my general experience would come in, in enabling me to discuss with the engineer all these points. I take it as a part of my duty that what I know of water and sewerage and sanitary matters in general shall be brought to bear, and I discuss and consult with the engineer, but do not profess to be an engineer.
41. For professional work you hold the engineers responsible? Yes.
42. What supervision do you exercise over the staff? The same kind, through the secretary, as the head of a Department.
43. Do you visit the various branches of the Department, and see the work of each officer? I have gone round the whole of the Department, and talked over the books and other matters with the secretary and principals of Department as to improvements, &c.
44. I presume all the principal officers are known to you? Yes.
45. You are personally cognisant of the work they carry out, and the way in which it is done? Yes, I have endeavoured to look into the whole of it, and have brought about improvements.
46. Do the other members of the Board exercise any supervision over the office staff? None whatever, with the exception of at the Board meetings. I cannot say that they have not gone into any of the departments. They may have done so much, but we have a staff committee composed of the Vice-President (Mr. Taylor), Mr. Davis, and myself. All staff appointments come before that committee, and they recommend to the Board as to who shall be employed, and the remuneration to be given.
47. They then take the position of an appointment committee, and deal with appointments only? Yes, and with promotions as well; the whole thing generally.
48. Do they exercise any supervision over the actual carrying out of the work of the staff? No, I think not.
49. Is that left to yourself and the secretary? Yes.
50. Or the engineers as the case may be? The heads of branches. I consult with them as well with reference to all these matters.
51. Now, coming to the staff itself, I understand that Mr. Trevor Jones is employed by the Board? Yes.
52. His name does not appear in the list? I believe that is so; that is an omission. He is not permanently employed, he is only engaged on a certain class of work which we want an expert to see to, but his duties will come to an end altogether soon, at the end of May.
53. What works was he employed on? Works at North Shore and the catchment area.
54. Do you mean defining the catchment area? Yes; it had never been properly defined. I found it was a very uncertain matter, and he was started on that.
55. Do you mean he has been engaged in making a map of the catchment area? He has done so, and employed some considerable time in reporting on the catchment area and defining its boundaries.
56. Has he been engaged in any other work? Yes, at the North Shore water works, taking levels and supervising works over there.
57. Taking levels in connection with the reticulation scheme;—you supply North Shore from Chatswood? Yes, Wahroonga, Chatswood, and Gordon.
58. You have a high service reservoir at Chatswood? Yes, two steel reservoirs.
59. Supplied from Ryde? Yes.
60. Pumped from Ryde to the high service reservoirs at Chatswood? Yes.
61. Do these two reservoirs supply the whole of North Shore? Yes.
62. Has Mr. Jones been engaged in running the levels, and so on? Not in connection with those two. It has been a later work than that. We have been extending the water to Hornsby and other places, pumping back again from Chatswood to Hornsby.
63. Have you any reservoir at Hornsby? At Wahroonga and at Ryde, on the Ryde Heights.
64. Then you have two steel reservoirs at Chatswood, one at Ryde Hill, and another at Wahroonga? Yes; but that is not a steel reservoir at Wahroonga. It is a buckled plate tank that was formerly at North Shore, and we have ordered a steel reservoir for Wahroonga.
65. The Wahroonga reservoir supplies Hornsby? Yes.
66. Has Mr. Jones been engaged in the engineering works in connection with these extensions? Yes; and Beecroft included. He has been the engineer assisting, and reporting to the engineer, Mr. Smail.

67.

T. Rowe. 67. You found it absolutely necessary to take him on for this work. Yes.
68. The staff was not large enough to admit of it being done? He was employed to make the surveys
14 May, 1897. for those works.
69. He had nothing to do with the engineering works? I think not.
70. What salary was he paid? He was paid £1 a day, but of late he has been getting 15s. You must remember that this man was getting £800 a year at one time as the engineer to the Board, and lost his position principally through defective eyesight, nothing more. The Board naturally sympathised with him, and as his eyesight had improved and he was disengaged and competent for the duty, he was employed temporarily. He served both the Corporation and the Board for a number of years, and now suffers from an affliction. He is a man of considerable ability and extensive knowledge of the whole of the engineering works, and it was advisable to hold on to him and obtain his assistance in many ways.
71. His eyesight was not sufficiently impaired to prevent him performing the works allotted to him? No; and I have known him to do works which have saved £75,000, the interest on which would amount to nearly £3,000 per annum.
72. He is now doing temporary works which will be completed at the end of this month? Yes.
73. Is his eyesight sufficiently good to enable him to do the surveying work now? Well, I presume he would perform the duty with difficulty to himself. I have never questioned him upon the matter, but he can see about and can take levels, there is no doubt about that, but his eyesight for office work is impaired.
74. As a matter of fact the engineer would know whether the work was right or wrong? Yes; as a surveyor in the field he always has his assistant and chain-men.
75. Analysing the return, it appears that you have 444 officers at an annual total cost of £68,622;—is this correct? There is a difference in the figures—£70,622.
76. If you look at the return [*Vide Appendix*] you will see that you have got 451 officers at a total of £70,622? Yes, including the Board.
77. In my question I took off the seven members of the Board at £2,000, and that brings it down to £68,622? Yes.
78. It would appear that the appointments of the existing staff were made up as follows:—

Division.	Transferred from Government or City Council.	Selected by Board after—		Appointed on personal recommendation.
		Public Advertisement.	Competitive Examination.	
Secretary	2	4	7	9
Accountant	1	....	14	9
Assessor	8	1	26	34
Engineer, Water Supply	82	3	7	35
Engineer, Sewerage	55	.....	18	129
Totals	148	8	72	216

Yes; but there is a little variation in the figures.
79. Would the totals be correct so far as the Secretary's, Accountant's, Assessor's, and the Engineer's for Water and Sewerage were concerned—216 appointed on personal recommendation? There are 444 in the Secretary's, Accountant's, Assessor's, and Engineer's.
80. Of the 216 officers appointed on personal recommendation I see that Alderman Graham recommended 13; Alderman Lander, 11; Alderman Palmer, 10; Alderman Young, 5; Alderman Buckle, 4; Alderman Taylor 4; Alderman Davis, 2; and Alderman Ahearn, 1. You recommended 17; the Engineer, 117; Mr. Bennett, 2; Mr. Darley, 2; Mr. Anderson, M.L.A., 2; Mr. Wakeford, 2; and various people, 24. Put together there are 444 officers and men? Yes.
81. Are you prepared to say, from your own personal knowledge or from inquiry, that they are required? I do not know of anyone who is not required of my own personal knowledge. We are very careful about taking on men, and we have kept down the charges as much as possible. There have been no men taken on of late, and the work is increasing constantly. Take the waste water inspectors—there are nine of them—and there were nine of them in the City Council years ago, doing perhaps less than half the work that these men are now doing. The work is increasing every month, and yet we are keeping down the number of hands as much as possible.
82. Then you think you could say that every one of these officers and men is required? I am constantly making inquiries upon that point. With reference to the appointment of these men, I think it is proper that I should remark that, in the early stages, especially in the first two years, when we were building up the Department, there was no competitive examination, and we had to take men as they appeared before us with personal recommendations, and it was natural that the Board would recommend men who had been recommended to them, and so men were taken on at every meeting of the Board, or almost every meeting, to build up the Department. But when we came later down, the third year, we commenced the competitive examinations, and there have been no personal recommendations since then. It was necessary to have the men, and somebody had to recommend them; but that ceased on the introduction of our system.
83. We wish you, Colonel Rowe, to feel at liberty to say what you like; anything that you think we should know, whether it is relevant to the questions or not, you should tell us? When the competitive examinations came, then we, of course, did away with the recommendations.
84. Do you wish us to understand that no officers or men are taken on now, except after competitive examination? I do not say workmen, but officers and engineers. We feed the institution from the juniors, who are taken on at £25, and get an annual increase of about £15. After the examination, they are on six months' trial, and if they are then not recommended by the head of their branch, they are dismissed, but if they are recommeded, they go on until they reach £100 a year.
85. At present it is all done by competitive examination, and the personal nomination has now ceased? Yes.
86. Has that been the case long? I think three or four years. But that does not apply to temporary men, such as Mr. Jones, for instance. I am now speaking of the staff. Of course, the labourers and men are taken on without competitive examination. I would like to show you the regulations.

87.

T. Rowe.
14 May, 1897.

87. Then so far as you are aware, your staff answers all requirements? Yes.
88. There is no one, as far as you are aware, in the service of the Board who is unsatisfactory? I know of no one. I do know where we could improve in certain branches of the staff by putting on more clerks. I know one instance where three could be put on and facilitate the business of the public very much.
89. What I want to know is, whether the men are all satisfactory? I think so. I know of nothing to the contrary.
90. So far as you are personally aware, the whole of the staff are satisfactory? I think so. I verily believe there are not two men doing one man's work any where that I know of, and I am constantly inquiring of each officer on that point.
91. You are satisfied with all your officers as to character? Yes. That is quite satisfactory on the whole; one or two have been brought before me lately and reprimanded, and we are keeping our eyes upon them. There are of course always a few who misbehave, and one or two have been cautioned lately, and they are watched very strictly, and if they are found tripping again they will be suspended by me, but generally speaking I am quite satisfied with the various branches of the Department.
92. How many officers are there who may be considered by you as unsatisfactory? I do not know more than two or three at the present moment. One important officer was suspended by me and dismissed by the Board a few months ago.
93. Generally the officers are satisfactory, but there are two or three whose names I will not ask you now who are unsatisfactory and have been reprimanded? Yes.
94. Are you prepared to say from your own personal knowledge that all the men now employed by the Board are actually required? I think so, as far as my knowledge goes.
95. Are you prepared to say that the rates paid to those officers and men are reasonable, taking into account the salaries and wages that they obtain outside? I think they are very reasonable, and some of the officers are under-paid for the abilities they show. The principal officers are under-paid, with the exception of the engineer.
96. But generally, as to the rank and file? I think they are reasonable, and low in some cases. I will say they are fair.
97. Do you know of any officer who is overpaid? No.
98. I think I noticed in your staff a Mr. Lander? No.
99. Is he not employed now? He was employed temporarily as an expert to do certain work at the Alexandria pumping station. A foreman of works was required and he being a contractor was employed temporarily, but is not on now.
100. We should like to know on what principle you have fixed the salaries? The office is principally fed from the juniors, who work their way up by their own abilities. When they get to a certain stage every case is dealt with according to the man's individual ability to fill the position.
101. You mean that the junior officers rise by increases to a fixed amount, and then have to wait for vacancies for promotion? Yes.
102. Take the salaries as a whole, what principle do you adopt in fixing the salary for any particular work? I do not know that there is anything laid down in principle more than I have told you. Each case is reviewed first by the Staff Committee, brought before the Board, and then the man is paid according to the ability he possesses and the position he holds.
103. Is there no principle of this kind—book-keepers so much, assessors so much, and so on? We have it with reference to inspectors and overseers. They are graded. I have here a sheet which I will give you. [*Vide Appendix.*]
104. Generally speaking then the Staff Committee come as near as they can at the value of the work without having any definite principle laid down beyond value for the work performed? Yes. There are those fixed salaries for inspectors and their assistants, and sewer maintenance men. These are certainly all regulated. Then there are the graded salaries for the junior clerks from £25 to £100. Senior clerks according to the value of the work performed and the ability.
105. Are you a member of the Staff Committee? Yes.
106. As far as you are aware are the salaries graded according to work in each case? Yes.
107. Do you know of any case where a special salary is paid to a particular man otherwise than for the work he does? No.
108. There is no employee who is paid a special rate for benevolent reasons? I know of none. There are two old men who came over from the corporation whom it would be a pity to send away, but they are necessary and make themselves useful about the Department—clean up and so on. They are reduced to the very lowest, 5s. per day.
109. In the event of any vacancy, what principle guides the Board in the matter of promotion? Generally the next man gets the place if he is suitable. If not, of course we go down the list. If the next man is suitable, and recommended by the head of the division, it is carefully considered and put before the Board.
110. It is on the principle of seniority combined with aptitude for the work? Yes.
111. Before any promotion is made, does the responsible head of the division report to the President as to which officer is to be promoted? We generally consult about it, but it is the practice for the head of a division, in case of a vacancy, to make a recommendation as to who is to fill the position. Frequently we consult, but not always, because sometimes it is very distinct who it should be.
112. Is the approval of the Board necessary before effect is given to the recommendation? Yes, it is subject to the Board's approval.
113. Have the Board ever overridden the President in such a case? No.
114. Any recommendation made to the Board has always been approved by the Board? I do not remember an instance in which that has not been done. The Secretary has just refreshed my memory. There was a difference of opinion with reference to the appointment of a resident engineer for the Prospect Reservoir, and it was decided by ballot.
115. Was that the appointment consequent on Mr. Wakeford's death? Yes; it was a question whether Mr. Wakeford, junior, should be the man, or Mr. Jacob, who had been on the works from the very commencement. It was advertised; there were several applicants; every name was discussed. We went to three or four ballots, and at the last, Mr. Jacob was appointed.
116. I am referring more to promotions;—in this particular case you called for public applications? Yes.
117. How many did you get? Seventy-eight. 118.

T. Rowe. 14 May, 1897.

118. Did you go over the list yourself, and then recommend to the Board who should be appointed? It came before the Staff Committee and a certain name was recommended, but the Board afterwards determined that it should be advertised, after which it was arranged that it should be decided by ballot, and therefore there was no further consultation, unless it was amongst the members individually.
119. Did you, as chairman of the Staff Committee, make any recommendation to the Board before the ballot was resorted to? I do not think so. Mr. Wakeford was taken on for a time during his father's illness, and on his death I recommended the son for the position until a permanent appointment was made. The ballot was afterwards carried by my vote for Mr. Jacob. I made searching inquiry as to his abilities from the Department for whom he had worked for many years. Things were gone into very thoroughly by the Board, and dealt with in the most careful manner, and it resulted in Mr. Jacob's appointment; and I have no hesitation in saying he was really the best man in the number.
120. I observe you have four officers engaged in the issue of rate notices, but I understand you require a large amount of extra assistance in the preparation of these notices;—what plan do you adopt? Of late, there has been a contract at so much per hundred.
121. Is that only recently? About twelve months.
122. Do you find a considerable economy result from that practice? Evidently it is the best plan we could adopt, but the Board are not in love with it, and think it must not continue, because there is a sort of sweating arising out of it. The contractor gets a lot of juniors to write them up. We considered it a very low tender, and accepted it with regret. He took it 40 per cent. under our schedule. He does very well out of it because he gets them to do the work very cheaply. The schedule fixed by the Board was:—Transcription of assessments into Board's books, per 100, 2s. 6d.; transfer of assessments to rate registers, 2s. 6d. per 100 assessments; writing rate notices, 2s. 9d. per 100 notices.
123. Would that include delivery? No; that would be writing up only.
124. How do you deliver them? There are district clerks, who have assistants. They live in their districts and distribute the notices in their own districts, and are bound to do a certain quantity of work. So many thousand notices are given to them, according to their districts, which vary. In Sydney where there are crowded streets they are allotted more work than where the districts are scattered.
125. How are they paid? £165 to £175 per annum.
126. "District clerks and collectors, 6 at £210, 4 at £175, 1 at £165, 5 at £156, 3 at £130, 1 at £117, 1 at £65." Is that correct? Yes; that includes the assistants, also forage allowance to six who keep horses.
127. I see there are twenty-one of these district clerks and collectors, costing the Department £3,477. Apparently that is the cost of delivering these notices? The rate notices, final notices, and summonses. They take money as well.
128. If persons choose to pay them, they are allowed to take the money? Yes.
129. What is the cost of the work that is done by contract? £359 11s. 1d. has been paid up to date.
130. So that the cost of preparing them and delivering them will be £3,744, plus £359 11s. 1d.? Yes, but these men have also other work in identifying properties and dealing with other matters, and are kept pretty constantly going.
131. I presume that £359 11s. 1d. is for the half-year only? From July, 1896, to date.
132. Can you tell what percentage on the revenue the cost of preparing the notices and collecting the rates shows? About 3·72. The cost of rate collecting, including the salaries of clerks, collectors, accountants, assessors, book-keepers, and summons staff, &c., during the year ending 30th June, 1896, was £9,677 which is 3·72 per cent. on the gross income of the Board, £259,843.
133. That is merely the proportion on the cost of the staff? Yes.
134. It does not include the Secretary's salary at all? No.
135. Have you compared that with the cost of doing similar work in the other cities of Australia? No.
136. You have the reports of other places? Yes, and I will furnish a comparative statement.
137. Before any new officers are appointed do you obtain from the responsible head a report as to the necessity for the appointment? No appointment can take place without necessity for it.
138. Is a new appointment initiated by the Board or by the responsible head of a division? The responsible head would bring forward any new appointment.
139. Have any appointments been made on the initiation of the Board itself? I do not know of any.
140. What is the capital debt standing in your books on account of the water-works? £4,205,790 13s. 8d.
141. And the same on account of the sewerage? £1,818,653 12s. 6d., also £162,724 3s. 5d. for Stormwater Channels.
142. And the total capital cost would be? £6,187,168 9s. 7d.
143. If you refer to your report you will see that the Board charges itself with interest on the capital cost exclusive of an amount of £377,382, "value of assets taken over from the City Council in 1888, derivable from rates." Is that correct? Yes.
144. I see that your return of interest on the capital cost for Sewerage since 1890 has been gradually decreasing; what is the reason of this? The depreciation in the value of property.
145. In 1890, interest on capital cost of Sewerage scheme was 5·06; in 1891, 4·16; in 1892, 4·03; 1893, 4·19; 1894, 3·97; 1895, 3·34 for half a year, and in 1895–6, 3·09. When you began in 1890, the interest on capital cost after paying expenses was 5·06, but in the last period it is only 3·09; what is the reason for this? There are three reasons I think. The Board did allow 10 per cent. off for payments in a certain time, which I have always been opposed to. That is a loss of somewhere about £8,000 or £10,000 a year, but this discount has now been reduced to 5 per cent. Then there is the general depreciation of property; rents are down and assessments are lower, and we are bound to take ours from the assessment books of the city and boroughs. And, thirdly, the capital cost is continually being increased by the handing over of works. There is the Centennial Park Reservoir.
146. I am speaking of sewerage—that does not apply to the Centennial Park reservoir? I will confine myself to sewerage. We are constantly having works handed over, and they increase the capital indebtedness.
147. The presumption is that if works are handed over they are revenue-producing? They are, of course, to a certain extent, but not to affect the revenue materially. Our outlay on reticulation is lying idle, waiting for the main outfall. That will be revenue-producing presently.
148. Does the Works Department hand you over works before they are revenue-producing? We watch those works, of course, and prepare our works to meet them when handed over; and in this way we try to prevent any loss and to give people the advantages of drainage.

149.

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149. Then it comes to this, that you have prepared your reticulation works in readiness for the Works Department main scheme, and until the main scheme is handed over to you these reticulation works are bearing no revenue, although they are costing you an annual charge on account of interest;—when the other works are handed over the whole thing will be revenue-producing? Yes.
150. Do you charge to wording expenses the interest on capital cost of works during their construction? I do not think so.
151. Do you add it on to the capital cost? Yes.
152. Until the works become productive the interest is added to the capital cost;—that cuts away from your other argument—you said that the reason the works did not pay was that they lay idle on your hands? It is not when under construction, but when completed, it is added.
153. Then they become revenue-producing; then the question comes in that the works you take over only produce a small revenue? They would not produce sufficient revenue to meet the interest upon the total expenditure until a length of time has elapsed.
154. Is that due to the fact that the main works are not completed, and if they were you would be able to reticulate a very much larger area? We are under the impression that the main works should have been completed long ago. I think they have been very lax in the completion of the western outfall, and there is an enormous outlay there. I think it has run into a quarter of a million there, lying idle. I cannot tell why it has been retarded. We pressed forward with our works in order to be ready when the outfall was completed; but it is not completed nor handed over yet.
155. You spent large sums of money in the anticipation that the main works would be finished, but they are not ready, and your own reticulation works are lying idle on your hands? Yes.
156. That does not affect the question which I asked you, for you said that the interest on that was not charged to the working expenses until the work became revenue-producing;—supposing £150,000 were handed over to-morrow, would not that affect the interest on the main capital? Take North Shore. The Board has very extensive reticulation works over there, but the inhabitants are not enjoying the use of them at present because the outfall to receive the sewerage is not completed, and the whole thing is idle.
157. You have told us before that the interest on that unproductive capital was not added to your working expenses;—how can that account for the decrease of the interest on capital cost? It will still affect it when handed over.
158. You mean that if a longer time than necessary is taken to carry out any work when it is handed over, it will be loaded by unnecessary interest? Yes; that is partly what I mean.
159. The point is so important, I will leave it;—we do not want to put you to any difficulty off-hand;—I will leave it, and you can look into it? I will find out about it.
160. Now, the same applies with regard to water supply, although not to the same extent;—in 1888 you commenced by paying interest on capital, 3·81; next year, 3·78; then 3·96; then, in 1891, 4·36; 1892, 3·68; 1893, 3·97; 1894, 4·05; 1895, 3·54; and now the last period, 3·62;—perhaps you will think over that question;—we want to get in the most accurate way what it means? I will find out.
161. When the Board took over the water works what were the rates and charges then levied? It was a different system altogether. It was so much per room, no matter how many rooms—3s. 6d. per room.
162. What was it per meter? I am not certain; I think 1s. per 1,000 gallons.
163. What was the sewerage rate? I am not aware.
164. What were the rates which you fixed when you took over? 6d. in the £ for water, and 7d. for sewerage; 1s. 6d. per 1,000 gallons by meter. It was lowered after that.
165. What is it now? 7d. in the £ for water, and 1s. per 1,000 gallons by meter; but then there are discounts allowed, and manufacturers and others consuming over 20,000,000 gallons per annum get a reduction. It was treated as on commercial principles that some reduction should be made where there was a large amount of water consumed. It only affected some of the richer people—the Sugar Company and the great breweries, and the railway authorities, and companies able to pay. They get the benefit, and the smaller manufacturers do not consume sufficient to benefit by it.
166. How long ago did that come into force? Four years ago; in 1892, I think. You see there it affected the interest on capital at once.
167. Can you tell me how much it has affected the revenue from year to year since 1892? I cannot go into that now. I think we must have lost £2,000 from the Sugar Company alone. I was always opposed to the minimum charge for assessment, 10s.
168. What is the minimum provided by the Act? Ten shillings.
169. Is there a maximum fixed by the Act? One shilling in the £.
170. Now with regard to sewerage, when you took this over what did you find as the rating? We made it 7d., and it is now 7d., with the exception of the allowance of 5 per cent. discount.
171. Did this 5 per cent. reduction make any very considerable reduction on account of the revenue for sewerage? Yes.
172. And you, as President, are entirely opposed to that? Yes, on principle.
173. *Mr. Wilson.*] I would like to see the scale of concessions to manufacturers? It is 1s. up to 20,000,000, and 9d. per 1,000 over that.
174. *President.*] We should like to know what firms have profited by this reduction, and to what extent? I will have to get that.
175. Can you tell me what is the average rate of interest paid by the Government for loans in respect of Water and Sewerage Works? I am not certain. I think it is 3·789.
176. And you will observe, looking at the return, it is only in 1895 that it begins with 3·48, and in 1896 with 3·46. According to your last report there was a deficiency on the year's transactions of £20,980 17s. 9d.? Yes.
177. That was the year ending 30th June, 1896? Yes; and the cause is given on the next page.
178. Are you aware what rates are levied for water in the other Australian capitals? Yes; I have it here. [*Vide Appendix.*]
179. There is another cause of deficiency which I might mention here—it is the free water that the Board are giving away? It runs into a very considerable amount—hospitals, churches, schools, street watering, and tramway watering. We have been led to go into it of late because of the drought and the dam having got down. It means £19,500 a year.
180. I think we will go into that later;—can you give us information as to the rates in the principal cities of Europe and America? I have handed it in in that list.

181.

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181. From the information you have supplied it would appear that the charges in Sydney are lower than in Melbourne? No; 6d. in Melbourne and 7d. in Sydney.
182. Can you give me percentages? I will work them out. We have to take into consideration that some of these cities are supplied by gravitation, while most of our water is pumped.
183. What has been the expenditure by the Board on new works, both for water and sewerage, since they took control? Water, £620,091 5s. 4d.; sewerage, £354,965 8s. 3d.; and storm-water channels, £669 19s.
184. Of this amount, how much represents revenue-producing and how much unproductive? We shall have to work them out.
185. How much of the money you have spent is revenue-producing? All the money.
186. While the works are going on you are spending money, but it is not producing revenue? During the construction only.
187. How much of that money (£620,091 5s. 4d.) is producing revenue? All those works were completed.
188. Then you have not answered the question exactly;—what has been the expenditure of the Board on new works, both for water and sewerage, since the Board took control? This return is only up to 1896. The amount is £975,726 12s. 7d.
189. What are the contracts in hand? This is all loan money, and the works are completed and are all revenue-producing.
190. How much money have you spent on works since you took charge, completed and uncompleted, and how much of that is revenue-producing;—there were certain works in progress on the 31st December which are not completed? I do not think there are any in regard to water, there may be in regard to sewerage.
191. You have not got the information? No.
192. In connection with sewerage you give in your return £354,965, does that include North Shore? We are getting revenue from that, because we are charging storm-water drainage rates.
193. What is the expenditure during the same period on works carried out by the Works Department and handed over to the Board? I will get that.
194. What has been the cost of storm-water drains constructed by the Works Department and handed over to the Board? £16,503 13s. 2d.
195. Surely it is more than that? £162,724 3s. 5d.
196. That is to the 31st of December? Yes, less what the Board has expended (£669 19s.), which I quoted before.
197. What percentage of the capital cost is the revenue yielding from these drains? That has not been worked out.
198. Are the full rates allowable by law levied? Not on all storm-water drains.
199. What are the full rates? 7d. in the £. They are not enforced in all cases.
200. Can you tell in what cases they are enforced and in which they are not? I will work it out. In some of the districts where there is sewerage, it will merge into the sewerage by-and-by.
201. What is the total amount of rates and charges paid by the Government in respect of rates on public buildings, everything the Government pays for, rates and meter accounts? £12,084 14s. 8d.
202. I think you will see that it is meter £10,938 4s. 9d., and rates £12,084 14s. 8d.? Yes; that is it.
203. What proportion does this Government contribution bear to the Board's total revenue? That has not been worked out.
204. What was the amount of outstanding rates both for water and sewerage when you took over from the City Council at the inception of the Board? Over £66,000.
205. What were the amounts for outstanding rates for water and sewerage at the close of your last financial period? I think it was £43,970 15s. 11d.—consisting of Government rates, £1,182 13s. 8d.; municipal, £285 19s. 6d.; domestic rates, houses, £8,925 8s.; vacant lands, £6,648 6s. 1d.; meters, £13,814 8s. 2d.; churches and charitable institutions, £6,681 16s. 1d.; compulsory drainage, £4,258 14s. 6d.; plumbers and drainers, £1,156 5s. 9d.; Richmond Water Supply, £99 15s. 11d. The charitable institutions outstanding is all in abeyance; we were asked by the Minister to leave that in consequence of the amended Bill. You will notice that the Board's affairs have increased during the last nine years to twice as much as before, and the outstanding rates are considerably less than when it was in the hands of the City Council.
206. How long do you allow accounts to be outstanding before taking the necessary legal measures for their recovery? Thirty days after the delivery of the notice.
207. Do you then strictly take legal action in every case to recover? Not when the people are so very poor that there is nothing to take.
208. Generally speaking after thirty days you take your legal remedy? Yes. There are thousands of cases where it is not worth while to take legal steps.
209. Where there is a chance you always do? Yes.
210. Can you indicate to the Commission where economies can be effected in the Department, without impairing its efficiency? I have thought very carefully about that, and have no suggestions to make.
211. Of course you have made a very important suggestion, that these rebates should not be allowed? I thought that was a question of management.
212. Is there any other suggestion you can make? Coming to the amending Bill, if this matter is to be treated on commercial principles, and there are to be monetary clauses introduced into the Bill, the Board are of opinion that every drop of water, no matter to whom it is supplied, should be paid for. We have been very liberal with the water, having a good supply; but it weighed very heavily on my mind the other day to see that magnificent dam down 11 feet, and no water coming through the channels. The catchment area was quite dry, and we were giving the city and suburbs 20 and 21 millions of gallons per day. It became a very serious matter how long the drought would continue, and how soon we would get down to the gravitation level. That led us to look into the causes of the waste of water. We are losing nearly £20,000 a year for water given away. The Board should charge everybody, and liquidate the debt within a certain period of time.
213. *Mr. Wilson.*] You think you should charge for everything you sell, the same as the Railway Commissioners do? Yes.
214. Can you give us a return of the amounts that have been taken from your supply without paying? I will hand it in.

THURSDAY,

THURSDAY, 20 *MAY*, 1897.

Present:—

JOSEPH BARLING, Esq., J.P., President.
GEORGE ALEXANDER WILSON, Esq., J.P.
JAMES POWELL, Esq., J.P.

Isaac Ellis Ives, Mayor of the City of Sydney, sworn and examined:—

I. E. Ives. 20 May, 1897.

215. *President.*] We understand that you desire to put the view of the City Council before us as to their relations with the Water and Sewerage Board. We also understand that you will be able to make some suggestions which will no doubt be very valuable to us in coming to proper conclusions in connection with this inquiry? I find there are a number of resolutions passed by the Council from time to time in connection with the working of the Water and Sewerage Board as affecting the citizens—matters of importance that it was deemed desirable to bring before the Minister of the day with reference to the working of the Department. I have a large number of papers to go through, and I would ask you to allow me twenty-four hours to look into it, and I would prefer to make a written report, and come here and read it and hand it to you.

216. We are only too pleased to accede to your request, and can give you plenty of time. If you will let me know when it will be convenient to you, we shall be glad.

Charles Edward Jeanneret, Alderman of the City of Sydney, sworn and examined:—

C. E. Jeanneret. 20 May, 1897.

217. *President.*] What is your name? Charles Edward Jeanneret.

218. What are you? Alderman of the City of Sydney.

219. We understand that you have a statement to make which you think, and we also, may be very useful to the Commission in coming to satisfactory conclusions on the subject? Perhaps if I communicate to you the resolutions that have been passed on the subject of water and sewerage by the City Council, it may make it clear what their opinions are.

220. The Mayor has been before the Commission, and he is going to make a statement on the subject for the Council? That is a very proper thing to do, but it will take a great amount of research to get to the bottom of it. His time is very much occupied, and these resolutions were passed before he became a member of the Council. [*Witness read resolutions dated 25th April*, 1893, *6th February*, 1894, *5th April*, 1894, *20th December*, 1894, *29th January*, 1895, *vide Appendix.*] These were all passed unanimously after considerable discussion and investigation. Having said that, I would like to say for myself, as an Alderman of the City of Sydney, that I have no complaint to make as to the manner in which the Water and Sewerage Board conduct their executive duties; from all, from the President down, I have always received the greatest courtesy, consideration, and attention, and especially from the Vice-President when acting as President. They have shown a very strong desire to do the most they can for the citizens. They, as our representatives, have tried to get all grievances remedied, and have succeeded in all except one great grievance, which is the persistent way in which they continue to issue summonses. From last year's report I see that they issued no less than 5,000 summonses against ratepayers. If you look at the return, you will find that officers had to go to considerable expense to get summonses for less than 10s. I see that the officers went to a place called Silverwater to recover four debts, amounting altogether to £2. As a matter of fact, these summonses are issued for the smallest amounts. Sometimes a matter of 10d., involves a summons being issued. I maintain it is utterly unnecessary. The City Council think that, notwithstanding the advice which appears to have been given to the Water and Sewerage Board by their legal adviser, they have full powers to distrain, which would be much more effectual than summonsing. We have a proof in the effectual way in which we collect the city rates. We are legally advised that it is utterly unnecessary for them (the Water and Sewerage Board) to summons for rates. If you refer to the Act you will see that the Board have full power to levy and distrain for water and sewerage rates. I dwell upon this because it is a much more effective and much less expensive method of collecting arrears. While the Board admit that they have power to distrain, they object that they have not power to fix a schedule of the bailiff's and levy fees, and that no schedule of such is fixed in the Act. We regard that as merely an excuse. They could put in a bailiff of their own for that matter, even if they did not charge anything, but we maintain that the Act gives them full power to fix a schedule, and all they have got to do is to put it in the by-laws for Executive sanction. There is reason why they do not like to do it, and that is, that they do not like to run the risk of distraining. But that is their fault. They should have their accounts so accurately made up that there would be nothing to be afraid of. We (the City Council) run the risk. I am quite willing to admit that they are in a difficulty, but it is not an insurmountable one. The difficulty is that they get their information second-hand, not like the City of Sydney and the boroughs, who get their information at first-hand, and whose officers are responsible for wrongful information. The Water and Sewerage Board may be led into a error through any mistake in the name of a person, or the amount stated to be due, and may distrain upon a person wrongfully, and become liable to an action for damages; but with proper care that would be avoided.

221. What about the difference in the expense of their procedure and the procedure you propose? It is incomparably in favour of distress, because there is about 3s. or 3s. 6d. to pay the Courts for every summons. It used to be 5s.; and there is mileage, which sometimes makes it come to a great deal more than that. It did not matter how small an amount you summoned for, there was this 5s. fee to be paid the Government. That included the service of the summons, but if it was a distance out there was mileage added, and it might come to nearly £1. The ratepayers have to pay all that, and are put to a large amount of unnecessary expense in addition, because they have to pay witnesses' expenses. These witnesses cost a great deal, and as they are officers of the Board, they may go to the Court and earn 10s. or 20s. a day, and I suppose the Government get the benefit of that, as the officer does not get it. This is a very heavy tax upon the ratepayers. The worst of it is that so many people are summoned who have no idea that they owe any rates.

C. E. Jeanneret. 20 May, 1897.

It is a terrible grievance and utterly unnecessary. Our civic Council experience is that, when you give a person notice that you are going to put a baliff in, he will come and pay up quickly, and whereas the Water and Sewerage Board has been issuing 5,000 summonses a year, the City Council recover their money without issuing a single summons. The Mayor signs a sheet annually with about 500 names of persons who are in default, and there is a fine of 2s. or so for defaulters. If they make trouble they have to pay the fine, but if they pay without any trouble and have proper excuse, the fine is often written off. The warrants are thus reduced from 500 signed to about fourteen or fifteen that are issued and put in operation. The cost of collecting our rates is £1·8 per cent. on our total income. We have a revenue nearly as large as that of the Water and Sewerage Board, yet we adopt none of the oppressive measures adopted by them.

222. *Mr. Wilson.*] Do you think that the revenue of the Water and Sewerage Board could be collected by the municipalities? I am quite sure of it, and that is what I advocate. The whole of that responsibility should be thrown on the municipalities. The whole of the responsibility for the interest for the debt should be thrown on the municipalities as provided by the Act. If you look at the debates that took place in the Legislative Assembly and Legislative Council on the passing of the the various Acts, you will see that it was never contemplated that the Water and Sewerage Board should continue to collect the rates. The provisions of the Act distinctly state that, on the completion of the works, they may be handed over to the Municipalities, who should pay the sinking fund together with the interest direct to the Government.

223. *President.*] There was an alternative provision in the Act? As far as the City of Sydney was concerned the provision was that it *should be* taken over, and *might be* by the others; but then it was amended afterwards. I may be pardoned for pointing out that somebody or other attempted to introduce a clause by which the transfer should not take place to the municipalities unless the whole of the members of the Board signed a requisition to the Government concurring in such transfer. That would practically have shut out the possibility of doing it. It was pointed out (by Sir Alfred Stephen, I think,) in the Upper House that that would altogether defeat the intentions of the Bill—for any one member of the Board could block the resolutions for transfer. As it now stands, the transfer resolutions may be carried by a majority of the Board. Then, in the Amending Act, unfortunately, although the principle is still maintained that the transfer shall take place, the amended Acts have taken away the basis of the calculations upon which the division is to be made. The original Act specified the basis upon which the apportionment of the debt between the City of Sydney and the different municipalities should be made.

224. It is not very clear how it is to be done. Have you tried to work it out? I have not; but I have no doubt it can be done, though I would not undertake it. That is what we in the City of Sydney would like to see done. We would like our apportionment of the debt, whatever it is, assigned to us, giving us full control of all reticulation in our boundaries, and we will pay the interest on the whole debt. In fact, we are quite in a position to pay the Government the money back if they like. The City of Sydney is in a very sound position indeed, and would have no trouble whatever in undertaking all its liabilities in connection with water and sewerage. There might be some hesitancy on the part of some of the suburban municipalities that do not understand the thing, and are sparsely populated; but they, too, will eventually see that their burdens will be lightened as the population increases. We are strongly of the opinion that the Government can relieve themselves of the responsibility of that £5,000,000 of debt, and we are confident we can collect the money and pay the interest, and administer the whole thing better than it can be done by the Board.

225. *Mr. Wilson.*] You have machinery, and the Water and Sewerage Board machinery comes on top of that? Yes.

226. *President.*] If you take it over, would you want to take over their large staff? We would not want many additional officers.

227. You could do it with your present staff? Not so. We must have our own repairers and water-inspectors, and such people, but we would need no more ticket-servers, collectors, treasurers, accountants, and so on. We have a competent health officer now, but his duties would be so much enlarged we might want another. We could do it with very little additional expense, because we have all our buildings and offices constructed with a view to this.

228. *Mr. Wilson.*] At present the secretary's department costs £3,758, the assessor's department costs £10,540, and the accountant's department costs £3,664. You could do it on much less than that? Yes.

229. *Mr. Powell.*] You could take it on the present ratepapers? Yes. Instead of having people calling four times a year to pay rates—twice for water and sewerage and twice for city rates—they would get it done in twice. It is a very great convenience to have properties in different suburbs belonging to the same owner registered as the Water and Sewerage Board do it, and the account rendered to the property-owner on one ratepaper, but the 10 per cent. reduction formerly allowed was completely thrown away. The people who avail themselves of the discount are the large ready-money people, the Government, the Railway Commissioners, the banks, and all the large consumers. They send down and get the saving under the discount arrangements, when their cheque would always be duly sent in any case.

230. *President.*] All others have to submit to the higher rate? And get no advantage from the discount, for to small people it is not worth noticing.

231. It really meant an additional penny to the small people who could not take advantage of the discount, and the larger ones went scot free? That is it. That discount business has worked very badly indeed. The sooner it is discontinued the better. Anyone might know well the bulk of the money comes from the large contributors, and the discount meant a big loss to the Board.

232. Have you thought of the difficulty of the head works being outside any of the municipalities when the different portions passing through them are handed over; who would have control of the head works? The Water and Sewerage Board. It is an admirable institution, and should by no means be abolished. I am strongly of opinion it would be far better to have a Board of that kind for the maintenance of the main arteries and reservoirs, and to have control over them as now, but the detail management of the reticulation in municipalities should go to the municipalities. I venture to think, also, that the power of the Board should be largely extended by making them the constructors throughout the whole of the Colony, and the mediators between the municipalities or people and the Government. They should construct the works, and hand them over to the local bodies when completed, and say, "That is your proportion of this, and you must pay it," and should see that it is paid to the Government.

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233. You say that the whole cost should be distributed now ratably among the whole of the municipalities served? Yes, and further, that the Water and Sewerage Board should become the Water and Sewerage Board for the whole Colony, for the construction of works of a water and sewerage nature, and for apportioning the cost to the local bodies.
234. Would you take it out of the hands of the Works Department? Yes. You have no end of complaints about the excessive cost of these works. The estimates are exceeded, and there is trouble between the people and the Government, and if they are constructed by a more directly representative body, the local bodies would know better about it at the start, and would have some representative people to call to account if the estimates were exceeded, or things went wrong.
235. *Mr. Wilson.*] You would like the Board elected by the municipalities, like the Melbourne and Metropolitan Board of Works? Not wholly; there should be some Government representative there. The Water and Sewerage Board is fairly representative now. If you give them control over the whole of the water and sewerage works of the Colony, you might have another country member or two, if you chose. The works should not be constructed wholly by or for the Government, but as for the ratepayers under Government control, the Government finding the money in the first instance, and then letting the people help themselves by paying for and controlling all the works in those municipal districts.
236. *President.*] Would you provide a sinking fund? Yes, at about 100 years, or perhaps less.
237. Just the same as the Hunter District Act? Yes. In the course of a few years, under good management, the water and sewerage systems would be a source of revenue to all the municipalities. The Government would never be able to make them revenue bearing or a profit to the State, because it would be unfair to ratepayers; but they would properly become most profitable works to the municipality. There is a return of nearly 4 per cent., as you see in the Water and Sewerage Board's report.
238. By the last report there is a deficit? Certainly. I do not know exactly how they arrive at it. They congratulate themselves on making a higher rate of interest, and then they say there is a loss.
239. *Mr. Wilson.*] They contend that they give free services, costing £20,000? I cannot see why they should give free services. Everything should be paid for. The churches should pay. Why should other people go free when the Government pay?
240. *President.*] Your Council come in for a good share of it for street-watering, which is £15,722. That is not all yours, but a good proportion of it is? There is no necessity for so much flushing and sanding on the wood-blocking. It is one of those things we are getting reduced every day. Of course if the City of Sydney took over their liability, they would have to pay for the water, and would be economical in the use of it.
241. *Mr. Wilson.*] Supposing the larger scheme could not be carried out through difficulties in the way, could this be done: the municipalities to take upon themselves the responsibility of collecting the rates at a certain discount? I do not think they would bother about it.
242. Would your Council do it? They would not undertake it in that way. When the sewerage is completed, if you will apportion the debt, they will be quite prepared to take the responsibility of it.
243. *President.*] The Commission will not save much by saying this man gets too much and that man is paid too much. We must deal with important principles to arrive at any great saving? Just so, we, the aldermen, are desirous of saving the citizens annoyance, trouble, and expense, and we are satisfied that we can save them that, and save the Government trouble, by taking our fair share of it. We know within half a million what our share of the debt is, and are quite prepared to face it.
244. If you took it over, your additional expenses would be infinitesimal, whereas now the machinery is duplicated? Yes, we have our own house-to-house inspection, &c.
245. Is it in any way possible to have officers common to both bodies? No, you cannot divide the control.
246. We have it so in the Government service. The same man may be police magistrate, liable to the Justice Department, and warden, liable to the Mines Department? You are all under one head, at any rate.
247. *Mr. Wilson.*] Would it do to have a municipality trust; each municipality to collect its own rates, and the whole thing to be centred in the City Treasurer? I do not think the municipalities would agree to the City of Sydney exercising any control over them at all. They would not let us be chief boss, as it were.
248. They would not join the trust? I think they would separate as soon as they could. They are afraid, in the scattered districts, that they would have to pay more, and are very jealous of the City of Sydney in that respect.
249. *President.*] You cannot avoid that? No. The municipalities would soon see that they would be improving their position every year by having their own control of water and sewerage reticulation. The cost of all the head works, viz., the Prospect Reservoir and all the main arteries, would be ascertained, and the municipalities would be told, "Your proportion is so and so," and as the population increased it would become a more valuable asset. They would be using more water, but that would be nothing in comparison to the cost of the main works. They would be in a splendid position, better than the city, because the City cannot grow much more; it is thickly populated now.
250. How would it be for the Board to remain in existence and to charge you for the water consumed? That is what I say.
251. Not debit the capital cost to you at all, but just simply charge you so much for water? That would be easier for us still at the present time.
252. Say the debt is £5,000,000, and the Government say they want 4 per cent. for interest on capital and wear and tear. They want so much, and the consumption is so much, and they charge you for your consumption? That is exactly in terms of the Act, the only thing is that you throw out the clauses requiring payment of the capital cost, and if the Government do not want us to take that over it is a very simple matter, though the city will not benefit in the future as much as the municipalities will, because it cannot grow much in population.
253. In one of the Bills which have been before the Legislature, it was proposed that the rates should be recovered by distress, and the Legislature would not hear of it? I suppose members knew very well the power was already in the Act, and it was no use duplicating it. Here is the section. (*Read Section 89 of Water and Sewerage Act.*) The Board, however, on the advice of their solicitor, do not act on that, but we think they have ample powers to do so. We have taken advice, and we are satisfied that there is no necessity to put in the schedule in the Act. The Water and Sewerage Board should make a by-law for it.

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254. We will have Mr. Williams, the Solicitor of the Board before us? Mr. Williams long ago advised that it was safer to issue summonses than to distrain, because then if anything is wrong, it lies with the Magistrate to decide, and no one is liable for damages.
255. You put two things before us. First you complain of the non-issue of distress warrants? That is my complaint against the Administration.
256. And, secondly, you complain that by reason of a separate body having the control and management of the works, it really imposes double collecting and notice-serving charges on city and suburbs, because of the double machinery? We will provide those charges without any expense to the Government. People do not pay twice over exactly, but they are put to more expense than they need be. We have a staff of rate notice-servers and of house to house inspectors, and the Water and Sewerage Board have inspectors and notice-servers who are constantly visiting the houses. It is unnecessary; this double machinery, I mean.
257. *Mr. Wilson.*] In the resolutions you handed in, reference is made to the extent to which the Police Force are used? They used to have to serve these 5,000 summonses, but they are served now by the Water and Sewerage Board's Officers. They have a small army of people all over the County of Cumberland who could be done away with or transferred to Municipalities.
258. And in the City your Inspectors might be at a house and might even meet the Water and Sewerage Board Inspector in the same property? Yes, and very often too.
259. *Mr. Powell.*] Is it your idea to continue the present Board as a Board of Construction and Maintenance? Yes, because they would have to supply the water to a number of places not at present incorporated, or unwilling to take over the reticulation.
260. The Board would supply, and the Municipalities and the City would sell the water and collect the money? Yes, and keep their reticulation in order, the Water and Sewerage Board having the control of main channels and the pumping stations.
261. Are you favourable to the maintenance of the elective principle for such a Board? Decidedly.
262. You would still stick to election for a body only dealing with construction and maintenance? Because the people have to pay for it, and if their representative sanctions expenditure that they do not like, they can bring him to account. You must have a highly competent skilled staff, and one thing must dovetail into another, and all should be done as part of one scheme.
263. But do you think you would get the most skilled men by the elective principle? I do not, and that is why I would like to see the Government control continue; but, inasmuch as the local people have to pay out of their own pockets eventually, they should have some voice in the appointment of non-skilled people chosen to represent them on the Board. I may say at once I am strongly in favor of a different system altogether. My travels have led me to the conclusion that there is no better managed city than the City of Washington, in the District of Columbia, in the U.S.A., and that is managed by a Commission of three men, who have the whole sole control of everything. They are paid a salary.
264. *President*] Who appoints them? The President, for seven years, responsible to Congress, and they report to Congress annually.
265. That is the Neutral Territory? Yes, and it is the most admirably managed city I have ever come across. It was originally managed by Aldermen, and there was so much log rolling that the Government had to step in, and Commissioners were appointed.
266. *Mr. Powell.*] That is rather an argument against the elective principle? I admit that both systems have their advantages.

TUESDAY, 15 JUNE, 1897.

Present:—

JOSEPH BARLING, Esq., President.
GEORGE ALEXANDER WILSON, Esq., J.P.
JAMES POWELL, Esq., J.P.

Thomas Rowe, President of the Metropolitan Water Supply and Sewerage Board, further examined:—

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267. *President.*] Last time you were here, Colonel Rowe, you promised to get certain information. I presume you have got it? Yes.
268. I did not quite finish the questions I wished to ask, but my colleagues' questions may overlap what I wished to ask you, so they will proceed first? Yes.
269. *Mr. Wilson.*] Do you adopt the Municipal valuations in your assessments? Yes.
270. I see you have a great number of Assessors and Collectors in your Assessor's Branch. Would it not be possible to have this collection done by the Municipal authorities? I think it would be utterly impossible.
271. Why? We should never be able to get our revenue in in anything like time. We have frequently to start with the distribution of our assessment and rate papers long before the Borough assessments are complete, we go upon the previous year then. If we were to wait for the Boroughs, I really do not know when we would get our revenue in. The City was behind considerably last half-year, and threw us back very much indeed in our revenue.
272. How did they throw you back? We have to take from their books, and if they are behind time with their assessments how can we copy them? It would throw us right to the end of the half-year, and we would have no time to collect our revenue at all.
273. I suppose you see that there is a duplication of expense to some extent? There necessarily must be so for us to have control. Well, I don't think there is any loss.
274. If two bodies collect where one would do, there must be a loss? Yes, but do you think the Boroughs would collect the revenue we have collected? Look at the arrears of revenue of the Boroughs compared with our arrears. And we would have to deal with fifty Boroughs. They are somewhat lax in collecting their rates. We know no one and favour no man. We issue our ratepapers, and if they are not paid within a given time, notice is given, and if that is not attended to there is no alternative then but to sue; but the Boroughs never take steps of that kind, they never press in that way.

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275. Your argument is that the Municipal authorities are remiss in the collection of their rates, and if they collected your revenue you would suffer hopelessly? Yes. And they are so frequently late with their re-assessments of property that they would throw us back, so much so that we could not overtake our work. It is nearly always the end of May before they get their assessments out. It would throw the whole thing out of gear to trust to fifty other Boroughs. There would be no regularity. It would throw the whole thing into confusion. We have not yet got the assessments on a large number of Municipalities.
276. You see no alternative but to retain the present system of collection? I see no alternative. That is a matter that has been discussed several times with our officers.
277. The duties of these clerks, assessors, and collectors are defined in the return, I believe? Yes. Of course we assess all new properties, and properties which are not assessed and come into existence after the assessment of the Boroughs, and the assessment is altered if necessary when the property is assessed by the Boroughs next year.
278. What is your method of collection? You have how many collectors? Nine District clerks with Assistants.
279. And how do they deliver the notices? Each District Clerk and his assistant also has his notice and ratepapers to distribute. The work is divided among a number of men and they have so many ratepapers to distribute in a day. There are 118,906 properties altogether to deal with each half-year.
280. How do you notify a man who has property in more than one municipal district? Each property is dealt with separately. If a person has a dozen, 20, or 30 properties, he may give in a property list, to the office, and he can pay on that property list irrespective of the ratepapers.
281. Supposing, for instance, I had property in two or three different districts, I could hand you a list of my properties, and you would notify me on one sheet of the rates for these properties? Yes.
282. But if I do not do that, there is a separate notice sent for each property? A ratepaper is distributed at each of the properties in any case, because we have to prove delivery of that ratepaper.
283. Will you hand in the details of the expenses of the Board's visits? Yes. (*Vide Appendix.*)
284. What is the object of these visits? It is necessary that the Board should have an intelligent idea of the works that they preside over as a Board, and we make annual visits, and other visits when necessary, in order that every man should have an idea of the works. If a new member came on the Board, how could he give an intelligent vote upon anything unless he was acquainted with the nature of these works?
285. I see that in a visit to Appin Falls Cataract River there were 11 persons. How many members are there on the Board? Seven.
286. So there were four there who were not members of the Board? The Secretary, the Engineer, Mr. Jacob (the Superintendent), and the local officer. One of those trips is more expensive than others because of returning to Campbelltown, late at night, and having to get refreshments. We did not get into town until half-past ten or eleven o'clock at night.
287. In an answer you gave to a question you said the Board's visit to Annandale took half a day? What did they do at Annandale in half a day? They started at two o'clock for Annandale, and visited the quarry there about which there is a dispute with reference to a sewer going through a man's land. That was examined thoroughly, and then we looked at the works along the line, the Monier arch work. We got back about five o'clock.
288. When you visit such a place as Prospect, do the Board inspect the whole of the works—everything that is to be seen there? Everything it is necessary to see. Sometimes they go down the tunnel.
289. Take the recent visit to Cataract. Did all the members inspect the tunnels? I think so. There might have been one or two exceptions who remained outside, but I think the general body went through the tunnel. We got into a car, and had electric lights and candles and things.
290. Have you any private business? Yes.
291. What is it? As an Architect.
292. Is there not some feeling in the profession, regarding the fact, that an Architect should be the President of the Sewerage Board? I do not know of any myself, unless it might be arising from jealousy.
293. But is not the position rather liable to create that feeling? Do you not think it gives you an advantage in the profession to be in a position like that? I do not think so. I think it is the other way about. It is a disadvantage sometimes to me.
294. You do not know of any such feeling? I do not. I have been on the Board now for six years or more.
295. It has never been brought under your notice at all? I do not know, but there might be one or two envious. There are always some to cry out of course, out of sheer jealousy possibly.
296. Is there any other member of the Board who has a private business? Every member of the Board has a private business.
297. What are their businesses? Take the official members first. Mr. Mansfield is an architect, Mr. Macpherson, of Holdsworth, Macpherson, & Co., and myself are the other two official members. The City member is Mr. Taylor, the Vice-President, and Alderman Buckle, elected; and then for the Boroughs there are Alderman David Davis, of Woollahra Council, and Alderman Ahearn, of Burwood Council.
298. Has the Board ever had any business transactions, as a Board, with any of these members for the supply of material, or any other form of business transaction? No. As an exception some items are got from Holdsworth, Macpherson, & Co., if it is suitable to go there, after getting prices quoted. We go round the whole of the ironmongers and obtain quotations, and if they are the lowest the order may be given. These are all items out of contract.
299. Can you give us a return of what is paid to Holdsworth, Macpherson, & Co., for 1896? We will furnish that.
300. With the exception of a few articles furnished by Holdsworth, Macpherson, & Co., you have no business transactions with the members? No, but I might say Aldermen Davis and Ahearn are contractors.
301. Have they had any contracts with the Board? No.
302. By what authority are the Board's fees fixed? By the Act.
303. There is rather a tendency to increase in the expenses of the Board as a Board. Will you explain that. I think I understand the explanation myself, but I would like you to explain? I think it is in consequence of the change taking place, because of the transfer of Mr. Darley. It was more at one time. In 1890 it was £2,485, then in 1894 it was down to £1,695, and in 1895 it rose to £1,920, and in 1896 to £2,045.

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304. You said that appointments on the recommendation of members of the Board or Aldermen were made at the time the Board was being organised? Yes.
305. When were the Board appointed? In March, 1888.
306. When was the system of recommendation for appointment stopped? About two or three years after.
307. I find that in 1891 there were four such appointments, in 1892 five, in 1894 (only three years ago) there were nine, in 1895 there were six, in 1896 there were six, and in 1897 one, a total of thirty-one appointments by recommendations since 1891, which is three years after the Board's formation? Yes, possibly there may have been some resignations and positions filled up.
308. Assuming there were resignations, there were appointments filled up by recommendation after three years from the formation of the Board. These are officers, not workmen? They might be draftsmen or surveyors in the Engineer's Department. I will have it looked into, and give you the particulars.
309. Who are your examiners? The accountant and the secretary.
310. So that the examination is really conducted by officers of the Board? Yes.
311. Not by independent officers at all? By officers of the Board.
312. You were asked to prepare a list of officers whom you considered unsatisfactory. Have you got that list? I do not think you asked for it.
313. Are there any officers still employed who have been guilty of any irregularities of any kind in regard to cash or of any other kind? I do not know of any. Anyone guilty of cash irregularity would not be there very long, I am quite certain of that.
314. Are there any other officers employed under somewhat similar circumstances to those of Mr. Jones, mentioned last time? No.
315. When an officer has committed an offence how is he dealt with? He is reported by the head of his division.
316. To whom? To me. It passes through the secretary. It comes up with the papers that morning, and the man is brought up before me to be dealt with. If it is a slight irregularity of any kind he is reprimanded and cautioned, and the second time more severely dealt with, and the third time dismissed.
317. Suppose the first offence is embezzlement? The man of course would be immediately suspended, and the matter brought before the full Board.
318. Has that been done in every case? Not in my career—not in my presidency. There was a case after my first presidency—a case of defalcation—and the man was arrested and dealt with by law. That is the only case.
319. It would not be possible for you to deal with an officer guilty of serious irregularity without the knowledge of the Board? No.
320. Do you keep a register of offences? I think the papers themselves are the record. There is no special register, but the papers are always looked up for previous offences.
321. You said, I think, that in your opinion there was no officer who was overpaid? Yes, I did say so.
322. There are some things here that no doubt can be explained. There is an examiner of accounts at £350, one at £225, one at £175, and one at £25. There seems a great difference in these salaries? The last is a junior—a boy in his first year—at £25.
323. Then they go up and down from £175 to £350. That seems to be a big difference? The examiner of accounts is the principal man. We always look to him. The others are the staff under him. There is only one examiner—Mr. Kennedy. He is the only man who attaches his name to any document as examiner.
324. There are nine waste-water inspectors at £156. Do you consider that is a fair thing? I think it is fair. Frequently in the summer time they work at night in house to house inspection, very late at night examining houses to catch people wasting water or watering gardens without a meter. They want a lot of looking after.
325. Then there is one at £104? That is a young man—Alexander. A very old servant of the Board died, and out of sympathy for the widow, the young fellow, who was a promising young man, was taken on at that salary, and will rise as he gains more experience. He took his father's position in fact at a lower salary. He is quite an able fellow, but has not the experience that his father had.
326. You have inspectors here, one at £402, one at £302, and one at £189. It that £402 a fair salary? Is that the Inspector of Pipelaying and Water Service?
327. I do not know what it is. It is £402? Yes, he is a valuable officer, his salary is £350 and forage allowance, £52.
328. The preparation of notices by contract you state that the Board does not favour, as it is likely to lead to sweating. What is your opinion? I think it does.
329. Why is it continued? Because there was a contract entered into for a certain time. It expires at the end of this month. Then I presume the Board will make some change.
330. You allow a discount? Yes.
331. Did you increase the water rate before allowing that discount? I was not on the Board at the time. It was increased before the 10 per cent. was allowed; the discount is now reduced to 5 per cent.
332. What class of citizens take advantage of this discount? Nearly every class if they can, but chiefly the large proprietors and agents for large owners of property. My personal opinion is opposed to making any allowance whatever.
333. It is quite clear that the very poor cannot take advantage of it all? Yes. It has not lessened the summons account in the least. It is the wealthy people who take advantage of it.
334. Have you many summonses for water rates? Yes.
335. Could you not cut the water off? We could, but then it would be considered very arbitrary; we are rather an unpopular Board now for enforcing the regulations under the Act. Then we had to look at it from the health point of view. We could not cut off the water from the closets connected with the sewers. We do cut off water in extreme cases, but are very cautious in doing so.
336. Your reason for summoning instead of cutting off is that it would increase the unpopularity of the Board? Yes, together with the health consideration. It would be expensive as well to the people, as we must charge for disconnection and reconnection, and there would be a lot of expense to collect a small amount.
337. On the other hand there is the labour and expense of summoning? True, but if the supply were cut off, the neighbours around would suffer also; through the stoppage of water for the closets, it would be very offensive.

338.

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338. What is the process of recovery of these rates? By summons in the Small Debts and District Courts. We prefer that we should have the power to levy and distrain, but that was cut out of the Bill.
339. You have not the power? We have the power, but no power to recover costs of distress. Therefore we never attempt that sort of thing, unless the proprietors guarantee to the Board that they will pay the costs.
340. Is that the only reason why you do not adopt distress instead of summons? Yes, we prefer to recover costs.
341. Would it be correct to state that one reason for summoning instead of distraining is the risk that would attach to distraining? It is a question of costs principally.
342. I mean the risk of mistake; was the Board at all influenced in adopting the system of summoning instead of distraining by the fact that there is a certain legal liability attached to wrongful distress? Yes, I think that did influence the Board. It would be very dangerous.
343. If your books are properly kept, there should be no more risk of wrongful distress than there would be in a bank which deals with thousands of transactions in dishonouring a cheque? It has been taken into consideration from time to time. As we take our information from the Council's books, if the latter were wrong, and we distrained, we would be liable.
344. Then the main reason is that the Act gives no power to recover costs; you can recover rates, but not costs? Yes, that is it.
345. What hours do your employees work in the office? They come at 9 and leave at half-past 4. They frequently remain behind until 8 or 9 o'clock to get up arrears of work.
346. And the out-door employees? Work the same time, 9 to 4.30. That does not apply to the rate-servers, nor to the waste water inspectors, nor the drainage inspectors.
347. What hours do the drainage and plumbing inspectors work? They do whatever they have to do no matter what time it takes them. They have no set hours at all.
348. You mentioned that the meter rate up to 20,000,000 gallons was 1s., and beyond that 9d.? Yes.
349. And the Sugar Company gains £2,000 a year by this? I think there is a mistake there. I should like to withdraw that, and I hand in this statement as a correct one. (*Vide Appendix.*)
350. So that for 3½ years, by this statement, it was £1,254, instead of £2,000 a year? Yes.
351. Of course it is self-evident that it was a mistake. You said you were opposed to this concession to large consumers? Yes.
352. Why are you opposed to it? I thought the large consumers had no right to a concession over the small ones. I thought it was giving them too great an advantage over the small manufacturers.
353. But the large consumer in every business has an advantage? I presume from a commercial point of view they are entitled to it. I stated that four or five years back, when this arrangement was first made by the Board, that I was averse to it.
354. I have asked you now why you are opposed to it, and you say because the large consumer has an advantage over the small manufacturer; it is the same in every business, the large consumer has an advantage over the small consumer. Anthony Hordern has an advantage over every man in the same line of business in Sydney? Yes. I advocated at the time that the large man should have no advantage over the small.
355. The supply I understand is a very plentiful one? Yes.
356. Therefore it would seem to be good business to encourage consumption so long as the general public do not suffer by scarcity of water? Yes.
357. It would help to pay the interest on the whole thing? I do not think it would make any difference to consumption. I cannot tell.
358. About the system of competitive examination again; you are really your own examiners? Yes, there is no one from outside the office.
359. *President.*] I think you said you lost something like £10,000 by this concession to consumers when I asked you how it was there was a deficit of £20,000? I cannot say what amount now, but it was something like that. There was a loss in consequence of that.
360. I see by this return that it is extended over 3½ years, so that the loss is something like £3,000 per annum? Yes.
361. As a matter of fact then the real loss by reason of this concession to consumers comes to £3,000 a year? Yes, at those prices. But the great reduction in the revenue was caused by the reduction from 1s. 6d. to 1s.
362. Judging from last year's returns it comes to something like £3,000? Yes. I think I must have been referring to the reduction from 1s. 6d. to 1s., which caused a very great reduction.
363. As a matter of fact the loss by the allowance comes to £3,000 a year? Yes.
364. *Mr. Wilson.*] Is the candidate who obtains the highest number of marks always appointed? Yes.
365. Do the examiners report to the Board? Yes, and in the event of the first man not accepting, the next is taken, and the next, and the next, and as men are required the others on the list are taken.
366. When a property is connected with the sewer the work is inspected by your officers? Yes.
367. How many officers go and inspect it? The plumber and drainer. A man may be an expert in plumbing and may know nothing of draining.
368. Are there two men to inspect it then? Not always. The plumber has generally a good knowledge of drainage but it might be drainage work only. Sometimes it is combined.
369. Suppose it is work involving both? We have men who are combined experts.
370. If it involves both; are there two men sent? There are two sorts, men who inspect drainage, and men who inspect plumbing.
371. Could not an intelligent plumber be trained to inspect drainage? Yes.
372. Is it necessary to have a drainage staff of inspectors as well as plumbers! I think it is. We have men who have been brought up all their lives to the work. Deep drainage requires more knowledge of drainage work than plumbing.
373. Is it a fact the plumbing inspector inspects the cisterns, baths, &c., and the drainage inspector inspects the other part? It appears that it is so, but I am quite certain that we have men who are competent to do both.
374. That is not the question. Suppose you connect a small cottage with the sewer, it appears you send two inspectors to inspect a small work like that which costs probably not more than £10? Yes.

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375. Is that really necessary; could not an intelligent plumber do all, do the work of both, with two days training; how many drainage inspectors are there? It is on the list, nine drainers and four plumbers, and we have two inspectors of water plumbing.
376. What are their wages? The two chief inspectors of drainage get £254 16s., with £52 for forage each, and the rest get £187 4s., that is 12s. a day.
377. What I want to be clear about is this, that in these jobs, many of them small, not exceeding £5 or £10, there are two men sent to inspect, one the inspector of plumbing proper, and another man who knows nothing about plumbing is sent to inspect the other part of the job; now is that justifiable in these small jobs? I should think so. It is justifiable. But as to the abilities of the men, the plumber may be competent to inspect the drain but a drainer would not be competent to inspect plumbing.
378. Would not any intelligent plumber in a few days be as competent to inspect drains as any drainer? Some do it no doubt, but plumbers never take levels and a drainer has to do that, to correct the levels of the drains; the plumbers are not brought up to that kind of work. I should think there would be danger in mixing up the work.
379. You uphold the present system by which two inspectors go round, sometimes together, to inspect the same place? I do not think they go together. The plumber has a number of places to inspect.
380. You still say you defend that system? I defend that system, but still I say that it is possible to have a man do both, but not as a rule.
381. Do you admit that some do it? I do not know, but I think so. I would not be positive that it is so, but I have met men who are competent to do it. As a rule it would be a very dangerous practice. There are many districts that have the water laid on but not sewerage, and the sewerage follows.
382. Is there not a sinking fund provided for this capital account? I think not.
383. There is no provision for it? No.
384. Have you a return of the summonses you issued in 1896? We will get that.
385. *Mr. Powell.*] About the bonus for prompt payment; can you tell us what amount has been allowed for any complete period, say for 1896? It is roughly about £9,000 a year from the 5 per cent. allowance.
386. How are the summonses served;—are they served by the Board? By the district clerks and their assistants.
387. Were they not issued by the police at one time? The secretary says that they were, but I do not know, until twelve months ago.
388. And what cost has been incurred by the issuing of summonses by the Board? Three shillings in each case. Formerly the 3s. was paid and an additional sum for mileage, running up to as much as 11s. at Hurstville.
389. I suppose some of the summonses are for very small amounts? Yes, as low as 5s.
390. Is it a fact that you have had summonses issued for less than 5s.? I daresay we have.
391. Is it a fact that you have issued a summons for so small an amount as 10d? If the public begin to know we are lax in serving summonses because it is for a few shillings, it will affect the revenue very much and therefore we have to treat everyone alike. The secretary says he thinks I may safely say "No" to that. I have no knowledge of that. I have never heard of such a thing.
392. You cannot say. They may have been issued? I cannot say personally. There would be a complaint made, and I should have heard of it before now.
393. I have heard that you have issued a summons for 10d.? I do not know of it.
394. Can you tell us how many cases of persons illegally using water have been reported by the water inspectors for 1896? They are very numerous indeed; I think they would average twenty a week.
395. How many inspectors are there? Nine.
396. I think you have the right under the Act to send any of your officers on to premises? Yes.
397. Mr. Wilson spoke of the advantage it would be to cut water off, and you urged that it would be dangerous upon sanitary grounds; well, would it not be quite possible to enter and lock all taps that are used for general consumption apart from those used for closets. You have the right to enter, and having that right could not your officers lock all taps in any house that they might think it necessary to enter? I do not think that could be done. There is generally a stopcock to the supply-pipe for ordinary premises, and if you turn off that you turn off the whole supply, closet as well. We have no power to cut off on the premises themselves. The stop-cock must be outside, on the pathway, for instance, but not on the premises. There are some instances where a supply-pipe might supply several houses, and a whole terrace might suffer.
398. I am presuming that you can lock each separate tap in each separate house if necessary to do so? We cannot do it.
399. What is your right of entry for? For examination only to see that the fittings are right, to see to waste, and for sanitary purposes.
400. Can you tell us what amount, if any, is written off annually for rates not recoverable? We only write off irrecoverable fees for stock, gardens, and various other things, but not for any rates.
401. But there must be a great number of people who fail to pay, I presume? For rates only?
402. Yes? None is written off.
403. Then you collect every penny that is due? We try to; if not paid it is carried on as arrears on that property.
404. What arrears were there at the end of 1896? £43,000 up to June, 1896, including everything—including £13,000 for meter accounts for the meter year only then just ended, and there were £6,000 in charities and churches, and some Government moneys.
405. So that a large portion of that £43,000 may yet be recoverable? Yes.
406. *President.*] Are you quite certain you could not recover any costs under distress warrants? That is the advice of our solicitor.
407. Suppose a bailiff is put into a house when arrears of rates are due, is it not a fact that costs are also added on to the overdue amount? Yes, but our solicitor advises us that the Act is defective in that respect, and that we could not possibly recover costs.
408. Can you say for a fact that it is not possible to collect the costs by distress warrants? That is the advice of our solicitor. We put them on the bill and we try to get them if we can, but if the tenant declines to pay we have no power to enforce it.

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409. I understand that not only is that your reason for not employing the method, but also because it is a more risky proceeding than issuing a summons? Yes I have said so.
410. Is it partly because it is a more risky proceeding, and partly because you cannot recover costs? It must be considered a rather risky proceeding.
411. The two objections against the method of collection would be, first, the want of legal authority to collect costs, and, secondly, that it is a more risky proceeding; can you tell me if it would be a cheaper method of collection to the consumer than the issue of summons? Levy and distress would be a little cheaper to the defaulter certainly. The City Council say it works very well.
412. If the legal difficulties could be removed would you be disposed to recommend that distress warrants should be resorted to? Yes. The Board are quite in favour of it, and had a new clause inserted in the Amending Bill which was thrown out.
413. Is it just the legal difficulty that stands in the way then? Yes.
414. Mr. Wilson asked you, could not the city and suburban collectors collect the rates for you, and I think your answer was that it would put you so far behind in the year in the collection of the rates. You said the assessments in the suburbs at any rate are made out rather late in the year and you would have to wait for them? That is one reason.
415. Would it not be possible to use these collectors still, but at different periods of the year; that is to say, you could use them in the early part of the year to collect water rates, even if at a later time they had to go over it for municipal rates? I do not think it possible at all. I think it would get all mixed up. It would be next to impossible to carry on in a proper manner to have to do with the boroughs in such a way.
416. I am not expressing an opinion in asking this question, although I may appear to be. I suppose you see that that would be one of the reasons that would be adduced as to the desirability of handing over the waterworks to the city and suburbs, that the expense could be reduced by that means, one set of officers doing the work that now requires to be done by two? I do not think it is practicable.
417. I suppose you see that that is one of the arguments? Yes.
418. The argument is that one set of officers would then do the work that now requires two sets. But you do not think it possible, from your point of view? I do not. Seeing the way that things are carried on in the municipalities, I do not think it would be an advantage to the Government.
419. Is it not a fact that the municipalities' assessments are not out until almost the middle of the year or, at any rate, until three months are over? Yes; very frequently.
420. And, therefore, if you waited for them, you could not issue your notices until late in the year? Yes.
421. At present you take the assessments for the previous year? Yes.
422. And, therefore, you are able to issue your notices (say) in the month of January? Yes.
423. The same difficulty does not exist in regard to the city? I think their assessments are every three years. It throws us back when their assessments come round.
424. But it would not with regard to the other years? I do not think it would. The appeal court might affect it. There is an appeal court every year.
425. Can you tell me when the city issue their rate notices? I do not know. I could not tell. I do not think they are out yet. If so, they are only just issued.
426. So there really is an objection in that respect? If you waited for them it would put you back for months in the year in getting your revenue? And you think the suggestion of getting the revenues collected at different times is not workable? Yes.
427. When you were here last you kindly promised to look a little more into the question of interest added to capital during the progress of works; have you done so? Yes; here is the return.
428. Perhaps you will kindly read that as an answer to the question? In the case of works constructed by the Government and vested in the Board, the rule now is to charge interest annually in Board's books on the cost of same from the end of the year during which they were handed over to the Board in a completed state. In the case of stormwater sewers, the revenue from which is a distinct fund, the interest is now only charged from the date of striking a rate in the district the expenditure refers to. With regard to the expenditure by the Board on works, interest is charged annually on the amount of expenditure to the end of the previous year.
429. Then according to that the interest which the State have to pay on the capital as it is being expended, is not charged to the capital account? No. When it is handed over to us, we then debit ourselves with interest on that work, but not until it is handed over in a complete state.
430. Who has to pay the interest on the cost of the work as it is being constructed? The country, I presume.
431. That is the case on works constructed by the Government, but on works constructed by yourselves, and on stormwater sewers? Yes.
432. That applies to all? Yes.
433. Then to put it shortly, as a matter of fact no interest is charged on the capital cost until it becomes reproductive? That does not apply to the reticulation portion carried out by the Board; on this, interest is charged annually as previously explained.
434. You say "with regard to the Board's expenditure, interest is charged annually to the end of the previous year." You only charge interest on works you yourselves have carried out to the end of the previous year? Yes. Our works do not take years.
435. But it may be so? Yes.
336. Considering that the works have cost some millions of money, would not the interest on the cost of the work during construction represent a very large sum of money? Yes, it certainly would.
437. Could you furnish the Commission with a return showing the amount of interest which the State had to pay on loan expenditure before it became reproductive, and that has not been added to the capital cost of the work? I do not think it is possible for us because we know nothing about payments that take place upon various Government contracts on hand.
438. You know for a fact that it is not charged? Yes.
439. And you cannot give us that statement? No. It was asked by the Board to be prepared and there was a big pile of papers sent down, but the return was not completed.

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440. Of course you see it is a very important thing to to get that information. I think I might say that, with regard to the country water supplies, interest has been charged on the unproductive capital previous to its becoming productive, and has been added on to the cost of the works. I know there have been large amounts written off, but still that principle has been adopted, and the advantage of that, is that the country sees the amount that has been written off exactly. In the case of your waterworks that has not been done, it appears, and the country does not know what has been written off on that account? No. In previous years there has been a credit balance of £80,000 upon which we could draw, and we have since 1888 paid interest on £423,000, which sum represents accrued interest on Nepean scheme up to that date.
441. It requires a very careful statement to show your exact financial condition? The Board is anxious for this, and has been trying to get it from the Government since 1890.
442. It would be quite enough for us if we get a near idea as to what it is. Speaking now about the deficit of £20,000 for last financial period, I think you said that in previous years there had been an excess of £80,000? Yes.
443. So you contend that, taking that into account, there has been no loss to the revenue? None whatever.
444. And that you have a credit balance of something like £60,000? Yes.
445. And this £60,000 would go, at any rate, against the loss of interest which the State is sustaining by reason of nothing being charged on the amount spent on works under construction? Yes.
446. Will you in conjunction with the Works Department endeavour to get out a true financial statement in regard to the water and sewerage debt? We shall be very glad to do so.
447. It is important that the people should understand exactly the true financial condition of these water and sewerage works? Yes.
448. I think you promised to get some information as to the water rates that are paid in the Australian and European cities? Yes. [*vide Appendix.*] And there is one you asked for as to the cost of collection. [*vide Appendix.*]
449. Will you kindly give us the conclusions to be drawn from that? This is a comparative return of the revenue and working expenses. It would appear that Sydney is charged a very low rate as compared with English towns, but it should be remembered that in England, for a rental of £25 per annum, a very much larger house can be obtained than in Sydney, and secondly a larger quantity of water would be used. The rentals there cannot be compared with the rentals here. The higher the assessment the lower the rate. The percentage of working expenses to revenue here is 23, Adelaide 25, Melbourne 20. In Melbourne the system is all gravitation, and ours is half-pumped. Ours is low as compared with others.
450. What I want to find out is this, taking every possible thing into consideration, is it a fact that Sydney is charged less for its water than most of the other towns that you give in your return? It appears so in this return, but in reality it is not so, as although the rate per £ is low the assessments are high.
451. Taking everything into account what is your general conclusion in regard to what Sydney is charged as compared with towns in that return? I think we compare very reasonably indeed. Our returns are reasonable and neither high nor low. It is a fair average.
452. Comparing the rates paid in Sydney for the use of water with the rates of most of the other towns, would you consider the Sydney rates less, taking everything into consideration? Taking the gravitation against the pumping?
453. That does not come into this question. That would be a reason for it to be higher than another perhaps; are we really charged less than most of the other towns referred to? I think it is a reasonably fair average compared with the charges made in other cities.
454. We are not unduly taxed? No. I think that the minimum charge is low, it is really too low. I think it should be 15s. instead of 10s. There is a loss of revenue in that respect on a cottage. A very large family may consume a lot of water for 10s.
455. Suppose the minimum were raised to 15s. what difference would it make in the revenue? Several thousands; I will find out exactly.
456. I understand that you recommend that the minimum charge be raised from 10s. to 15s? Yes.
457. I want to point out my object; supposing it turns out, when we look into the thing thoroughly, that there is a considerable debit balance every year, is it just to the whole Colony that Sydney should be charged so low as it is, when in every other city that you refer to they are paying considerably more? If we had a balance-sheet properly drawn up we would know how to rate to meet the cost, but as already explained the charges in Sydney compare well with others.
458. I suppose you admit that that is a very important view of the case? Yes.
451. And you will be prepared to deal with that question when the financial condition is brought out? It will be our duty to do so.
460. Now we can come to the question of percentage of working expenses to revenue? In Sydney it is 23, Adelaide 25, Melbourne with a gravitation scheme 20, London 40, Southwark and Vauxhall 43, Lambeth 37, Liverpool 31, Glasgow 26, Belfast 30, Manchester 23, Leeds 23, Birmingham 33, Edinburgh 31, Dublin 58. In Leeds, where about half the water is pumped, they have just the same percentage as in Sydney, where half is pumped also. In Adelaide, where about half is pumped it is 25; and in Melbourne where it is all gravitation it is 20. Boston is 37.
461. Will you kindly tell me the percentage of revenue to the cost of collection in the cities of Sydney, Melbourne, Brisbane, and Adelaide? Sydney revenue is £259,843; cost of collection £9,677; and the percentage, 3·72. In Melbourne the revenue is £164,204; the cost of collection, £6,832; and the percentage, 4·16. In Brisbane the revenue is £43,750; the cost of collection, £1,880; and the percentage is 4·29. In Adelaide the revenue is £89,447; the cost of collection is £4,838, and the percentage 5·40. So it is all in favour of Sydney.
462. When we were examining you last time, the question was asked:—"Are the full rates allowable by law charged for storm-water sewers?" And you said "No, not in all cases"; and then the question was asked: "Can you tell in what cases they are enforced, and in what they are not?" and you said you would work that out; have you got it? Here is a complete list of rates charged in all storm-water areas:—

City of Sydney—Rushcutter Creek drain 7d. in the £; Wentworth Park drain 7d. in the £.
Alexandria—Munni Street (Erskineville) drain 7d. in the £.
Ashfield—Long Cove Creek drain, Class A 3d. in the £; Class B 1d. in the £. Iron Cove Creek drain, Class A 6d. in the £; Class B 4d. in the £; Iron Cove Creek extension, 7d. in the £. Balmain

Balmain—Beattie Street, 2d. in the £.
Burwood—Iron Cove Creek Extension, Homebush Creek drain, 7d. in the £.
Canterbury—Iron Cove Creek drain, Class A, 6d. in the £; Class B 4d. in the £.
Enfield—Iron Cove Creek drain, Class A 6d. in the £; Class B 4d. in the £.
Erskineville—Munni Street, 7d. in the £.
Glebe—Wentworth Park, 7d. in the £.
Loichhardt—Long Cove Creek, Class A 3d. in the £; Class B 1d. in the £.
Newtown—Munni Street, (Erskineville) drain 7d. in the £.
North Sydney—Willoughby Falls drain, Careening Cove drain, Neutral Bay drain, 7d. in the £.
Paddington—Rushcutter's Creek drain, 7d. in the £.
Petersham—Long Cove Creek, Class A, 3d. in the £; Class B, 1d. in the £.
Strathfield—Homebush Creek drain, 7d. in the £.
Waterloo—Shea's Creek drain, 7d. in the £.

463. With regard to this return, is it a fact that when you have charged less than 7d. that rate is found sufficient to cover the interest on capital and working expenses? Yes.

464. Is it a fact that the stormwater drains, according to the rates you have levied, all pay interest on capital and working expenses? No. There is a large sum spent in the sewered districts which we get no return from. We cannot levy two rates.

465. What I mean is this: Where the stormwater is not merged in the sewerage scheme, is it a fact that in every case a rate sufficient to pay interest on capital and working expenses is levied? No.

466. Of course I am well aware that when the sewerage scheme is completed the stormwater sewer is an adjunct, can you tell me the cases where it does not pay? We go to 7d. in the £. In every instance where 7d. is charged it is insufficient.

467. Does it always cover the cost where the lower rate is charged? All those that are charged under 7d. pay interest, and on all those at 7d. there is a loss.

468. In every case where the full rate is charged there is a loss? Yes.

469. In every case where less than 7d. is charged it is sufficient? Yes.

470. Can you give us a return of the deficiency in each case where there is a deficiency? The gross revenue is 4·55, and the interest and maintenance without proportion of head office expenses is 5 per cent., so that there is a deficiency of ½ per cent. Irrespective of that there is interest and maintenance in connection with the amount of £37,000, which is the cost of stormwater drains in sewered areas on which we cannot levy a rate, and practically get nothing for.

471. You lose on stormwater drains when they merge into the sewerage proper? Yes.

472. Are you charging the highest amount allowed by law in connection with the sewerage rates in the city and suburbs? No; we are charging 7d., but we can go to 1s.

473. Notwithstanding that there is a loss in connection with them, do you not think that the capital spent on the stormwater drains should be added on to the capital of the sewerage debt? That is done.

474. And still there is a loss? There are £37,000 on which we cannot levy a drainage rate, and which are debited to the cost of the sewerage scheme.

475. Would not that be a necessary adjunct to the sewerage scheme? Each neighbourhood has been dealt with separately.

476. When the capital spent on the stormwater drains is taken into the general sewerage debt should not the city provide rates sufficient to cover the interest? That is a great question, because the stormwater drains out at Strathfield, Burwood, or Ashfield are for the individual advantage of the people in those particular neighbourhoods, and the cost of that would be added on to the whole.

477. Do you not think that the sewerage debt should be looked on as a whole, when the stormwater drains are merged in the general system? It will have to be, no doubt, because the great outfall is for the great body of the people.

478. You have said that wherever the stormwater drains are connected with the general system of drainage it practically pays interest. It is only these disconnected stormwater drains on which there is a loss? Yes. In sewerage districts it is tacked on to the general system of drainage on which we get a rate. It will be the case with all by-and-by, but in the meantime there is a loss.

479. Is an account taken of the loss year by year? I think so.

480. Is it the intention of the Board to debit that loss to the sewerage scheme when rates can be levied which cover that? I think so. That is the only way it can be done.

481. It is not the intention of the Board to allow that to go, and the Colony generally to bear that? No.

482. When the sewerage scheme is carried out in its entirety, that will be added on to the general scheme? Yes.

483. Will you kindly let us have a statement showing the loss the general taxpayers are paying now on account of these stormwater sewers, the loss in connection with each stormwater channel in each district? Yes.

484. There were some other questions which I asked;—what were the causes which contributed to the reduction of the percentage on interest and capital cost? Water. In 1888 the percentage of interest on capital cost after paying expenses was 3·81, in 1889 3·78, in 1890, 3.96, in 1891, 4·36. In 1892 there was a fall to 3·68; this was due to the following circumstances:—(*a*) Reduction of meter rate from 1s. 6d. to 1s. per thousand gallon. (*b*) Reduction of consumption of water by meter consequent upon heavy rainfall during the year. (*c*) Transfer of Prospect Works to Board, which increased the annual maintenance charges by nearly £6,000. (*d*) Breaking away of large brick aqueduct below Prospect, which cost £3,000 to repair. (*e*) Accident at Liverpool dam, caused by heavy rain, which cost a large sum to repair. In 1893 the percentage was raised again to 3·97, and in 1894 a further rise again took place to 4·05, but in 1895 there was a fall to 3·54, while for the year 1895-6 the return was 3·62 per cent. In January, 1895, the capital debt was increased by the sum of £713,647, being the cost of the Pott's Hill Reservoir duplicate pipe line from Pott's Hill to Crown-street; and the North Shore Water Supply, also increase of reticulation. The interest which the Board had to debit themselves in connection with these works was £28,000, and as no fresh revenue was collected on account of Pott's Hill Reservoir and duplicate pipe line, the result was to reduce the percentage. Another reason for the bad result was the all-round reduction in the assessments of the City and Suburban Councils. Sewerage: In 1890 the percentage of interest

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interest was 5·06, in 1891 4·16, in 1892 4·03, in 1893 4·19, in 1894 3·97, in 1895 3·34, and in 1895-6 3·09. There has, therefore, been a gradual reduction, which is accounted for as follows :—Transfer to control of Board of storm-water channels constructed by Government. Although the Board are empowered to strike a drainage-rate outside sewered districts they are limited by the Act to 7d. in the £; and as the amount to be collected at this rate is insufficient, in many cases, to meet interest charges and maintenance, the deficiency has to be charged against the sewerage scheme. There is a sum of about £37,000 returning absolutely no revenue, as it represents the cost of storm-water channels constructed by Government in sewered districts; and by the Act, where a sewerage-rate is charged, a drainage-rate cannot also be charged. Other reasons for the drop in 1895, are the general reductions in city and suburban assessments, and allowance of 10 per cent. for prompt payment of rates, which has since been reduced to 5 per cent. This discount did not affect the results of the water revenue, as the rate was raised to 7d. in the £, but with the sewerage there was no increase in the rate. Water and sewerage: Taking the results of the Water and Sewerage together, it will be seen that in every year down to 1894, the revenue, after paying expense, was more than sufficient to pay interest charges. Up to the end of 1894 the accumulated credit balance was £84,500 6s.; the financial result of the 18 months ending 30th June, 1896, was a loss of £30,963 18s. 6d.; deducting the latter sum from the former sum will leave a credit balance still at the beginning of the present year of £53,536 7s. 6d.

485. What did the City Council charge before the Board came into operation? Water-rate, 3s. 6d. per room per annum; meter charge, 1s. 3d. per 100 gallons; sewerage rate, 6d. in the £ on the assessed annual value.

486. What were the rates and charges first imposed by the Board? Water-rate, on premises of an annual value of £20 and under, 10s. per annum; 6d. in the £ on the assessed value from £20 to £300; 5d. from £300 to £700; 4d. from £700 to £1,000; 3d. from £1,000 to £4,000; 2d. in excess of £4,000. Vacant land of the assessed value of £60 and over, 2d. in the £. Meter charges, 1s. 6d. per 1,000 gallons. Sewerage-rate, on premises of an assessed value of £17 and under, 10s. per annum; over £17 a rate of 7d. in the £. Vacant lands of an assessed value of £40 and over, 3d. in the £.

487. What are the rates and charges now imposed by the Board? On premises of an assessed value of £17 and under, 10s. per annum. Water-rate, 7d. in the £ on the assessed annual value from £17 to £300; 5d. from £300 to £700; 4d. from £700 to £1,000; 3d. from £1,000 to £4,000; 2d. in excess of £4,000. Vacant land, 4d. in the £ on the assessed value. Meter charge, 1s. per 1,000 gallons up to 20,000,000 gallons per annum, and 9d. per 1,000 for all in excess of this quantity. Sewerage-rate, on premises of an assessed value of £17 and under, 10s. per annum; over £17, a rate of 7d. in the £. Vacant lands, 4d. in the £ on the assessed value. A discount of £5 per cent. is allowed if paid within 30 days, provided such allowance does not reduce the rate or charges below the sum of 10s. per annum. The water-rate charged at Liverpool, Campbelltown, Smithfield, and along the Milson's Point railway line from Chatswood to Hornsby is 1s. in the £. No discount is allowed. In addition to the rates and charges mentioned above, special fees are charged where it is desired to use water without meter for purposes other than domestic, viz., stock, gardens, building purposes, gas engines, steam boilers, ventilators, &c.

488. What is the proportion of the Government accounts and meter accounts, including railways, to the general revenue of the Board? 8·9 per cent.

Thomas Robert Steel, Accountant to the Public Works Department, sworn and examined :—

T. R. Steel. 15 June, 1897.

489. *President.*] What is your name? Thomas Robert Steel.

490. And you are accountant in the Works Department? Yes.

491. We find that no true financial statement has ever yet been got out in connection with the Water and Sewerage Board, no statement that shows exactly what the cost of the works has been to the country. We find that the interest that accrued on the moneys which had been spent from loan as the works were constructed,—some nine or ten years—that interest has not yet been debited to the capital sum, and we are anxious that you should get out a statement, in conjunction with the Water and Sewerage Board, as to what that amount really is, for unless we have that, we do not know what is the capital cost of the works to the country? The question involved there would be the rate of interest too.

492. Of course? That would be a matter for the Treasury.

493. I believe that is already got. We do not require it to the exact figure, but just a fairly accurate rough idea as to what that amount would be. We want to put before the Government, in answer to our Commission, an exact statement of the Water and Sewerage Debt, and against that should be put the interest on the moneys paid in by the Water and Sewerage Board. We want to find out what the country has really been paying for the capital during the time of the construction of these works, and during which time they brought in no revenue? Yes.

494. Up to the 30th of June, 1897? Yes.

THURSDAY, 17 *JUNE*, 1897.

Present:

JOSEPH BARLING, Esq., J.P., President.
GEORGE ALEXANDER WILSON, Esq., J.P.
JAMES POWELL, Esq., J.P.

Isaac Ellis Ives, Mayor of the City of Sydney, further examined :—

I. E. Ives. 17 June, 1897.

495. *President.*] When you were here before, you were so good as to say that you would be prepared to give us a statement showing what the views of the City Council were in regard to the Water and Sewerage Board in its relation to the City Council. We shall be glad to have you put before us anything that you would like us to consider in connection with the inquiry we are commissioned to make? Of course there is a great deal in connection with the Council and the Water and Sewerage Board that took place before I was a member of the Council at all, so that what I can say is not so much from personal observation as from

I. E. Ives. 17 June, 1897.

from the records of the office. I find that there were several resolutions carried, some as far back as April, 1893, and 1894, and one in 1895. I will hand them in. [*vide Appendix.*] The Council has no fault to find with the members of the Board or with the manner in which their employees carry out their duties. Objection by the Council, however, is taken—(1.) To the extravagant constitution of the Board. (2.) To their unnecessarily expensive premises, and system of conducting business, which causes a correspondingly excessive expense to the general body of ratepayers. (3.) To their management of a service which is purely Municipal assessment, but in regulating the rate for which the ratepayers have practically no voice. This is not in accordance with the principle of British Institutions, which always recognises that taxation and representation go together. When the Metropolitan Water and Sewerage Acts were passed it was so far recognised that local control would eventually ensue, that special provision was made to accomplish such. The Council maintains that, inasmuch as in the past it did successfully and more economically than is being done at present manage the entire reticulation of City and Suburbs immediately adjacent, and that without unnecessarily heavy taxation, it has proved its claim to so manage the city reticulation at the present time, more especially as it has every means within its power of economising service, of supplying the necessary office accommodation at the Town Hall, which was built to meet such requirements, and above all of being in direct touch with its constituents under the Municipal Act, which affords that direct representation so necessary to a satisfactory management of a civic work of great magnitude. The City Council is prepared at once to take over its legitmate share of the scheme as a whole, or the control of the reticulation only, leaving the main conduit and reservoirs in the hands of the Government, as is practically the case at present. A matter of great complaint, and, in fact, of as much grievance to the members of the Board as to taxpayers generally, is the right of veto of the Minister of Works, whereby the expensive deliberations of the Board's (paid) members are rendered nugatory and absurd. Such right of veto being exercised from the raising of an official's salary to the acceptance of a tender for supply of material, or services of the highest importance, after the due consideration of a body specially constituted by Act of Parliament to deal with the subject. The Supply of Water and Sewerage to the citizens must be admitted to be a work so closely connected with Municipal duty as to be inseparable therefrom, and a glance will show how unnecessarily mixed and expensive such services become when submitted to the control of any specially constituted Board apart from the Municipal Council. The streets and footpaths generally, and household sanitation, are among the principal items of Municipal management. But in these most important functions the City Council can only exercise a partial control, and the present Water and Sewerage Board a likewise partial authority. The Council issues its notices and summonses for filthy premises or other nuisances connected with household or other premises, but cannot immediately act in the matter of improvement, but in its notices has to inform those interested that amendments must be made to accord with regulations of the Water and Sewerage Board. The Council requires water for streets and gullies, and is dependent upon the goodwill and common sense of the Board for the same. The Council controls the streets formation, and yet is liable at any time to have its work interfered with by the laying of mains, which, if the work had been in the hands of the Council, would in all probability have been laid prior to the making of the streets. This causes a necessity for perpetual supervision and much correspondence in drawing attention to subsidences, improper reinstatements, and otherwise faulty work, which, though repaired without expense to the Council, still entails serious responsibility and watchfulness on the part of the Council's officers, and in nowise improves the thoroughfares in which it takes place. The difficulty in dealing with plumbers and others who open the streets and footways is also very great, much trouble being experienced by the paving branch of the City Council in ascertaining the names of those responsible for properly reinstating the footways, thus putting the Council and ratepayer to considerable unnecessary expense in doing the work and in the extra inspection of the thoroughfares and footways rendered necessary, whereas if permits were issued by the Council to open the thoroughfares a continual check upon the work would be available. Another matter of importance is that, whereas the Council has to incur the expense of assessment (in common with all the Boroughs), the Water and Sewerage Board obtains the whole of the information without sharing the cost. This, of course, necessitates a most expensive and elaborate system of book-keeping, virtually duplicating the whole of the municipal rate-books, besides affording an opportunity for error of a serious character in consequence of such a system of copying. This is actually instanced by the fact of the large issue of summonses for overdue water-rates, as against the simpler and less expensive system of distraint, lest litigation should ensue upon wrong action.

496. You have put it in brief, and I think we had better have copies of that before us to consider what questions we wish to put on it, and then, as you are very busy, you can let Mr. Palmer come and speak on your behalf? After this week I shall not be so busy, and will be able to come myself. There is one matter especially I wish to draw attention to, and that is that they have the Municipal books to strike the Water and Sewerage rates from, and it leads to a great deal of confusion, because in striking a rate for this year they take last year's assessment. It costs the Council a considerable sum of money to get those assessments, about £1,200 a year, and the Water and Sewerage Board gets them for nothing. We might just as well, when issuing our notices for the City Rate, put the Water and Sewerage rates on the same form, and let all be collected at the one expense. It would make a very small difference to the expenses of the Town Hall, sending out a ratepaper with three lines on it instead of one.

497. Do you think the Council would consider a proposition of this kind: That the Government sell you the water, keeping the main works themselves rather than handing you over any part of the main works? I do not think it would be proposed to take over any works except the reticulation; they would not take over the dam for instance.

498. Would you take your share of the reticulation and pay your proportion of the interest on the cost of the main works? Yes; that would be a fair basis to go upon.

499. That could be easily arranged for—a proportion of the cost or so much for the water? Yes. You would have to take into consideration that some of the works have been more costly than there was any necessity for, in working out a basis of payment of interest on the capital outlay.

500. You would expect a writing off, just the same as the country towns water debts have been written down? Yes.

501. We will consider this and write out the questions we should like to have answered, so that you may have time to consider them? I shall be glad to do so. I should like to add that the Town Hall was built with a view to accommodating all this work, and the southern side of the Hall is wasted. It is overrun with women for all sorts of committees, and we would be glad to get rid of them. There is ample accommodation or the work there.

WEDNESDAY,

WEDNESDAY, 30 *JUNE*, 1897.

Present:—

JOSEPH BARLING, Esq., J.P., President.
GEORGE ALEXANDER WILSON, Esq., J.P.
JAMES POWELL, Esq., J.P.

William Holmes, Secretary to Metropolitan Board of Water Supply and Sewerage, sworn and examined:—

W. Holmes. 30 June, 1897.

502. *President.*] What is your name? William Holmes.
503. And you are secretary to the Water and Sewerage Board? Yes, secretary and chief clerk.
504. You have given us a return, from which we have extracted information, showing that since 1891 there were thirty-one appointments by recommendation. We would like to know if the system of direct nomination is adopted now? It is in regard to some of the positions, but the clerical and engineering staffs, such as clerks, draftsmen, surveyors, and sanitary inspectors, are appointed after competitive examination. Applications are received for positions as labourers and mechanics, and some of them are recommended by the members of the Board. They are noted on a list in the office, and appointments made from that as required. All the higher ranks—the educated branches—are by competitive examination.
505. Is that without exception? Not altogether. Since the examination system came into force there have been five appointments in the clerical branch not by examination.
506. What were they? Three of them were men who were taken on as temporary clerks for special work for about six months in the assessor's branch. They gave satisfaction during that time and proved their fitness, and the Board endorsed their appointments.
507. Who recommended them? I cannot say now, it is in the list supplied. Two others were engaged for special audit work in connection with the store books. They were engaged on that eight months, and as the work of the Board was increasing, some four or five years ago, and vacancies having occurred, they were retained because they had proved that they were good men, and an examination was not necessary.
508. Then there are only five? Yes.
509. And that took place some five years ago? Yes.
510. Ever since that time they have all been appointed by competitive examination? Yes.
511. *Mr. Wilson.*] If that is so there is something wrong with this return? They are not all clerks that you refer to.
512. They are not all clerks, but they are superior officers? If you give me particulars I could tell you. The examination system is chiefly in connection with the clerical branch.
513. *President.*] Can you give us a sample of the kind of examination they undergo both in the clerical and professional branches? Yes, I can. [*Examination papers put in.*]
514. *Mr. Wilson.*] The examination is conducted entirely by the officers of the Board? I have always conducted the clerical examinations in conjunction with the late secretary, Mr. Bloxsome, and the accountant. There is no outside examination. We have not had an examination for eighteen months, not since I have been secretary.
515. Have you considered the various proposals that have been made, by which the Councils would undertake the collection of the rates and the administration of the Department? I have considered the question under three heads:—

First—The Municipal Councils to serve the ratepapers and collect the rates;

Secondly—The transfer of the works to the Councils; and,

Thirdly—Debiting the Councils each with a lump sum annually, as their proportion of the total expenses of the Board, including interest, sinking fund, maintenance, and management. I have made notes of the objections and difficulties I saw in carrying out each.

First—The serving of ratepapers and collection of rates by the Municipal Councils—

(1.) If the Board had to wait until the Councils' assessments were out and until appeal courts were held, notices could not be served and rates got in during the half-year; indeed, it is doubtful whether the notices could be served, in which case revenue could not be collected at all, as no demand would have been made during the half-year.
(2.) Then there is the question of dual control—the officers serving two masters—the Board and the Council.
(3.) If rates were not paid on first notices, who would serve final notices and summonses?
(4.) Then the Councils' ratepapers are served only once a year, and the Board's are served twice, as required by the Act.
(5.) If rates were not paid and the Board was compelled to sue, it would require an officer to attend Court and prove service of notice, but the server, being a Council's officer, may not be available for Board when required.
(6.) The Council's rate servers are frequently casual employees, not permanent staff, and might be in another part of Colony when required to attend Court and prove service of notices.
(7.) Board would still require district officers for identification of new properties, and properties becoming liable to new mains and sewers; also to report on probable revenue in connection with applications for new extensions.
(8.) If the Councils collected the money for the Board they would require to increase their staff and would each demand a Commission, the aggregate of which, it is believed, would far exceed the expense under the present system.
(9.) In the collection of water and sewerage rates, the Councils would not exercise the same vigilance as the Board, and consequently arrears outstanding would be large, unless some obligation were imposed on the Councils.
(10.) While under the City Council, the water and sewerage rates outstanding far exceeded the arrears uncollected at the present time, although the total revenue now is considerably larger.

Second—

W. Holmes. 30 June, 1897.

Second—The transfer of the works to the Council—

(1.) Who is to be responsible for the maintenance of the works, and the carrying out of new extensions and renewals from time to time?

(2.) Who will provide funds for such renewals and extensions?

(3.) The officers of the Councils are not competent to superintend and carry out such works, consequently each would have to appoint an inspector, which would mean fifty inspectors; whereas the Board has one inspector and assistant to do all.

(4.) Who would be responsible for the pumping mains, reservoirs, pumping stations, &c.? If the Board, they would still require a large staff; and how would the cost of such staff be divided among the various Councils?

(5.) How will the proportion of cost of interest and maintenance of main conduit, reservoirs, &c., be distributed among the various Councils, and how would payment be recovered?

(6.) The same remarks would apply to sewerage. Each Council would require plumbing and drainage inspectors, and how would proportion of cost of main ducts be distributed?

(7.) If Councils had to carry out drainage connections, they would require competent surveyors and draftsmen, &c.

(8.) To carry out this system would mean decentralisation, which is admittedly opposed to economy and efficiency, and contrary to the system now being perfected in London by the County Council.

(9.) If a break occured in a main in any municipality, and the Council neglected to repair promptly, the reservoir would be emptied and other districts deprived of water. Who would be responsible?

(10.) Many cases occur where it is necessary to lay a main through a district in order to supply another beyond. Who would be responsible for maintenance, &c.?

Third :—Debiting the Councils each with a lump sum annually as their proportion of the total expenses of the Board, including interest, sinking fund, maintenance, and management—

(1.) How would such proportion be arrived at?

(2.) Would the municipalities supplied with pumped water be charged more than those with gravitation supply?

(3.) Will districts nearer the source be charged less than those further away?

(4.) It might perhaps be arranged on a population basis.

(5.) Who would read meters? If each Council read its own, fifty readers would be required, instead of five, as at present.

(6.) If the Councils had to do this extra work, more clerks, and book-keepers, and accountants would be required, which would considerably increase expense, especially as the Board would still require a staff.

(7.) This would mean decentralisation, which would cause heavier expense.

516. *President.*] Would it not shorten your work if the notices were only served once a year, with the instruction that, if the ratepayer thinks fit, it could be paid half-yearly? Certainly, it would.

517. What would that save? There would be only one service instead of two. It would save the service of 119,000 notices.

518. Do you know whether there is any legal objection to it? That, I think, the solicitor should reply to. I think there is, because the Act says rates are due in advance on the first day of January and the first day of July in each year. But I could not say whether that would prevent the service of one notice instead of two.

519. Putting the possible legal objection to one side, do you see any practical objection to it? No. If there were a new Bill it could easily be altered. We have considered that before, and we have thought it would be a good thing if it could be arranged.

520. Is there anything you could suggest to us by which a more economical or better arrangement could be made, in regard to the management of the office? I have thought over that, too. I do not know of anything. As I have said, we are always studying how we can reduce work and increase the efficiency of the Department, and wherever it has occurred to me I have brought it into practice.

521. Do the members of the Board take any active part in the management of the Department? No.

522. They are simply a deliberative body who meet here in the Board-room? Yes. One or two are in the habit of coming on one morning a week, and the aldermen and others know they are here, and if there is anything they want to see about or get done they know where to find them.

523. Otherwise they do not take part in the administration? No.

524. It is left entirely to the President and secretary? Yes.

525. *Mr. Wilson.*] I know that there is a good deal of night work carried on here. Does that apply to all branches? No, chiefly to the accountant's and assessor's branches; but it has been curtailed very much of late. Some time ago a great deal of work was done at night in writing rate notices. On my suggestion, eighteen months ago, the Board decided to call for tenders for doing this work. I fixed a liberal scale for it, at which I knew a good wage could be earned. Rather unfortunately somebody tendered about 40 per cent. below it, and having complied with the conditions and paid his deposit, and all the rest of it, his tender was accepted. The Board has learned that his clerks are under paid, and they have decided to take on clerks to do the work at so much per 100—at the scale I fixed. We will take on three men, say, to-morrow, to do the work, and by and by two more, and there will be no contractor coming in to take the profits from them. Before that schedule came in there was nightwork, as we did not want to increase our permanent staff by putting on extra hands. The officers got no overtime for it, but 1s. 6d. tea money each night.

526. It is stated generally that the accountant's staff have excessive nightwork? Not so much as the assessor's.

527. It is in the accountant's and assessor's branches? That is it.

528. What other branches are there? The engineer's.

529. They could not assist? No.

530. What other clerical branches are there? There is the secretary's. As a matter of fact my men work at night. Nearly every second night in the week I take a bag of work home.

531. The general opinion is that the accountant's and the assessor's branches are worked excessively at night, and what I want to bring out is whether the other officers assist them? They would not know the work; a stranger to the books would not know the work. These officers up here in my office have night-work

W. Holmes. 30 June, 1897.

work themselves, but in some cases their work is not of the same duration as that in the assessor's branch, I must admit; but even in the assessor's branch the nightwork has been minimised considerably since this system of contract for writing the rate notices came into force. They have been working lately getting out returns for the Commission, and there will be additional returns just now, preparing for the balancing and the annual report. After that there should not be any need for excessive nightwork at all.

532. How much overtime do they work a week? It varies. It is a good deal just now, but not long ago there was no nightwork, and we had nobody burning the gas at all after hours, almost up to the time when you commenced this inquiry. Since that, for the reasons I have stated, they have been working late, and now it is the end of the year and they must stay behind getting information for the annual report.

533. In the normal state there is not much overtime? No; it used to be so before the system of contracting for the writing of the rate notices. I went into the matter and got out the amount paid in tea money, and recommended the contract system; but, unfortunately, the contractor took it at a very low rate. However, I think the present proposal will work very well.

534. *President.*] Are you satisfied with all the officers, with their conduct, and their capacity? Not altogether. There have been one or two exceptions, but, as the President mentioned, they have been before him and have improved since. There is no cause for complaint now. There have been lapses on the part of some officers, but after having been severely reprimanded and cautioned, they have mended their ways.

535. What is your opinion regarding the pay of the officers of the Department? I have always thought the heads of the branches are not sufficiently paid for the responsibilities placed on their shoulders. The junior officers are paid fairly. Until I became secretary the system was that juniors started at £52, and rose by yearly increasements of £13 to £3 a week. I saw that in a very little time we would have all our junior officers receiving £3 a week under that system, and I submitted a long report to the Board, and a set of new regulations, which they adopted, recommending that they should start at £25 and rise to £100, and beyond that be paid according to the value of the work performed. There would then be some incentive to the boys to work.

536. When they get to £100 they stop? Yes.

537. Then they have to wait for vacancies? Yes, or if they were found to be worth more they would probably get more important work and an increase of salary.

538. How many of these juniors are receiving higher salaries than they ought to receive? I have not gone into that. I do not say the evil has already happened because it was stopped in time. I saw that it would happen if left to go on. Some of the work they do is not worth £3 a week.

539. Do you think that at the present time the juniors get no more than the character of the work justifies? I do not think they do. Taking it all round at present they are only fairly paid. The assessor gets £400 a year. Until last year he received £300 a year. Compared with officials in similar positions in other departments of the State, his salary is not commensurate with his responsibility. I think Mr. Kennedy is worth more. He gets £350 now. He was selected from a great number of applicants as a man of exceptional ability, and having a long commercial training and experience. I do not know another man better suited for the position he occupies. He watches every item of the Board's revenue and expenditure. He has had only one increase of £50 since he joined the Board.

540. *Mr. Wilson.*] About your own salary? I do not think my salary is commensurate with my responsibilities compared with the salary Mr. Bloxsome received, £600. When Mr. Darley came here as permanent President, the positions of secretary and chief clerk were amalgamated and I was appointed. Then it went back to the old thing, the partial President, and I am practically doing the duties of the two offices, which were separate before. Then there is the natural increase in the business of the Department. My salary is £450.

541. What does the accountant get? £500.

542. *President.*] I suppose the accountant is under you? Yes, the Board looks to me for the conduct of the whole of the administrative or non-professional business of the office, the engineering, accounting, and assessing right through. Twelve months ago, when the estimates were being prepared, the President spoke to me about my salary, and I told him then that I did not think it commensurate with the duties, but I had not been long in the position, and I said I was quite satisfied if he was satisfied with me, and I would rather that he did not just then recommend anything further, as I was young, and felt that I was getting on, but if the Board were of the same opinion in twelve months time I would be glad for them to consider it.

543. *Mr. Wilson.*] You were on probation, in fact? Yes. I have been two years in the position to-day. The business is increasing every year, and we are working with one less than when Mr. Bloxsome was here.

544. *President.*] We drew Colonel Rowe's attention to the deficiency which took place in last year's operations—£20,000; and it was pointed out that that went against a very large surplus which had taken place on the transactions of previous years—£84,000. But if this deficiency goes on, and no steps are taken to check this deficiency, the accumulated surplus of previous years will soon be absorbed? Then, of course, we are at liberty to raise the rates. The collections for the year ending to-day are £10,000 more than last year.

545. To what do you attribute that,—to the dry season? That is one reason. There will be a larger meter revenue. There is also a natural increase through the extension of mains, but the capital will also be increased by that. I think the times are better, and the people have paid up better. I cannot yet tell what the arrears outstanding are, but I think they will be less than last year, showing there has been more money, and people have been able to pay up better.

546. What principle do you adopt in determining whether a certain reticulation should be extended? It must pay 6 per cent. The revenue must give us at least 6 per cent. on the outlay.

547. So that every extension means a decided profit to the Board? We used to put it this way, 4 per cent. interest on the moneys, and 2 per cent. maintenance and expenses, roughly.

548. If you had that it would not further increase the liabilities of the Board,—if that rule is adopted in every case, the tendency would be to keep the account balanced, to say the least? Yes, but then we are still expending money on the main works, and very soon we will have the Centennial Park reservoir thrown on our hands, which will be a large additional capital with no extension of revenue. We had a very large sum of money debited to the Board for the Potts Hill Reservoir and duplicate pipe line, on which there is £28,000 for interest. That accounts for the deficiency of £20,000, for without that charge of £28,000 there would be a credit.

549.

549. *Mr. Wilson.*] Do you ever take credit in your own books for gratuitous services performed by the Board? We want permission to do that. We sent a letter to the Minister last week. W. Holmes. 30 June, 1897.
550. You could do it with a mere book entry? It would have to be debited somewhere if we took credit for it. It would have to be voted.
551. *President.*] I gather from what you say, that you think the circumstances which operated to produce the deficiency are now considerably modified, so that the deficiency would be decreasing? That £28,000 will still have to be paid this year. It is carried on, and is not paid and done with. It is still a liability for this year, but if we could get credit for that £20,000 of revenue which we lose for that free water supply, there would be no deficiency. It is not like a rate on a building with a main running past it and the building not supplied, this is for water supplied to those institutions which we have had to pump and supply, and pay to supply it. We are just as entitled to be paid for it, as the Railway Commissioners are to be paid for passes. We cannot rate the railway premises. We cannot treat them the same as we do the Government buildings. We can put on a meter; and the only water they use in many offices is for washing clerks' hands and drinking, and that is a mere nothing. Those buildings are insured, and the water being laid near them would, I suppose, decrease the premium. In case of fire they would use the water, and yet they pay no rates. There is another matter. There was a special scheme of sewerage carried out from the Prince Alfred Hospital alone, and the cost of that is debited to the Sewerage scheme. We were some time ago about to proceed for the recovery of rates, and the Minister stayed our hand. They pay us nothing. There was a special sum expended for them. They have patients from all over the Colony, some of whom pay handsomely to the institution.
552. Do you know the amount debited to you for that? Some thousands. Then there is nothing paid for watering the tram tracks. The Act says water for streets is granted free. The trams flood the streets with water. They make them quite sloppy. Then the City Council wash down the wood blocks at night. I don't think they do it now every night, because we called their attention to it during the drought, but they used to flood the streets. You could sail a small boat down from kerb to kerb.
553. *Mr. Wilson.*] Do you supply the fleet? Yes.
554. Do you supply foreign men of war? Yes.
555. Why? It was considered a matter of good policy to do so. It is only a small thing. Her Majesty's ships only are supplied free, the Island pays £125 a year. The Navy takes all sorts of care to keep down the consumption as much as possible. The merchant ships, of course all water at private meters on the wharfs. We have cut off the old supply at the Man-o'-War steps, where the men of war used to get their supply free.
556. Is there any part of Colonel Rowe's evidence you did not quite agree with? I revised it and sent it back. One mistake he made was when speaking of the 3d. concession to large consumers. He said if a man used 19,000,000 he would run off another 1,000,000, so as to take advantage of the concession. That is wrong. I have cut that out. I think the large consumer should get a concession, and the manufacturers should be encouraged. Some of the asylums and charities have people from all parts of the Colony, and, as this work is to be debited pure and simple to the people of the city and suburbs, it is not right that we should supply water to these institutions unless they pay for it. The Railways will not carry us from here to Newtown unless we pay, and yet they expect us to give them services free.

TUESDAY, 10 *AUGUST*, 1897.

Present:—

JOSEPH BARLING, Esq., J.P., President.
GEORGE ALEXANDER WILSON, Esq., J.P.
JAMES POWELL, Esq., J.P.

John Moore Smail, Chief Engineer to the Metropolitan Board of Water Supply and Sewerage, sworn, and examined:—

557. *President.*] You have given us a statement of your officers and the work they perform; we should like now a statement from you as to how they perform their duties, and as to whether any improvement can be made? I might say generally that the whole of the officers we have got here are efficient. I cannot make any invidious distinctions. The inside staff of Water Branch consists of the assistant engineer, Mr. Cansdell, and the subordinate officers. I might say that the Secretary and I went through and found that instead of the engineer keeping a separate system of records we could amalgamate the records in the Administrative Branch. That took a lot of work off my clerks. J. M. Smail. 10 Aug., 1897.
558. That has been carried out since we began this investigation? Yes.
559. Is that the result of our investigation? No.
560. But it has been brought about since we first began? Yes. I suppose there is no doubt that this Commission gave rise to it. It released a clerk, Mr. Doyle. I had an officer in the Sewerage Branch—a relieving clerk named Long. He misconducted himself to such an extent that I could not recommend his continuing in the service any longer, and his services were dispensed with. Mr. Doyle, who is a junior clerk, took up the duties of relieving clerk, because there are times when the work becomes so great that I have to send a clerk to Crown-street, or downstairs to the Sewerage records, issuing plans. He goes to the different sub-branches, and it is a good training for him, as he will be in a position to take any little step above him that may become vacant.
561. I see that in this list the staff is divided;—do you divide the Sewerage Branch from the Water Branch? Yes; they are quite separate. They are charged to different votes.
562. You do not use the same officers to carry out the work of both departments? We keep the staffs completely distinct, as there is work enough for all of them. There is an assistant engineer for water supply, and there is also one for the Sewerage. It would be too much for one assistant engineer here. If I had only one assistant engineer I would have to give him two men to help him; so for the present, at any rate, until the water supply is nearing completion (and we are always finding out some improvements to make in the reticulation or the trunk mains), I could not certainly see my way to make any recommendation to the Board or to yourselves to amalgamate them. I have had it in my mind for some time, but I do not think I can fairly ask them to do it, because it would be asking them to do too much.
563. You think the disposition of your officers cannot be improved? Not for the present.

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564. Can the organisation be improved? I do not think it can be improved for the present. The only way would be as I say, by making one branch; but, as they are charged to different votes, it would cause a lot of confusion in the Account Branch in splitting up the vouchers. At present we have water vouchers and sewerage vouchers.
565. Putting aside the advantage to the Account Branch of having the branches separated, would there be a saving of expense if they could be treated as one branch? Not for the present. It might possibly be so in the future, because as you know we are pushing on the sewerage as fast as we can, and that takes the undivided attention of one officer, or else I could not attend to the work I do. Until the two approach partial completion I could not recommend any change, for I am sure it would not be efficient, and I am certain that in the long run it would not be economical.
566. Now, as to the officers themselves? There is only one exception, and I am investigating that now It is the Assistant Inspector of Water Supply, Mr. Playfair; he is not conducting himself to my liking, at any rate; but I am inquiring into that matter now.
567. Have you reported that to the Board? Not yet.
568. Still there are circumstances with which you are not satisfied? I am not satisfied. Take the whole of the inspectors; the whole of them have come here purely on their own merits—many have come in under examination. When I took charge here first—that is, when I came over from the Works Department, I had an idea that probably if we did not have an examination I might get some men with whom I would not be satisfied, so I recommended to the Board that all the technical men should come in under examination. I followed out, as near as possible, the system in the University in setting the papers and marking. I set the papers in the first instance and numbered them. The applications came to the Secretary, who conducted the examination right through and sent me the papers only, marked with numbers; the papers were marked and sent back again, and I did not know the men until the next day when I saw the names on the list.
569. That is, you set the papers, and the Secretary's Department conducted the examination? Yes; and when that was finished they sent me back the papers with only numbers on them, and I marked them and sent in a schedule; probably No. 20 might be first, and No. 15 next, and so on.
570. Did you set the whole thing;—were you assisted by anyone? I set the whole of the papers myself. I had no inspectors at all at the time. I had to start *de novo*, as it were.
571. Did you do that with all the employees? All the technical men. The only men who come in without examination are the pick-and-shovel men.
572. You applied it to inspectors, and so on? Yes.
573. Were they able to undergo an examination of that kind? Yes; and subsequently when the work became too great I got the Technical College Plumbing School to take up the examination, and the last two inspectors we have appointed have passed their examination at the Technical College. They report to us the men that have passed the examination, and, subject to an inquiry as to character, they are appointed.
574. Are there many men here who were in the employ when you took charge? Of course, there are some men who were taken over from the Town Hall.
575. Are they still here? Yes; there is one chief inspector and one assistant; that is all.
576. Only two men? Yes.
577. The others were all imported by yourself? Yes.
578. And everyone of them has come in as the result of this examination? Yes; and the same with the surveyors; we put them through a practical test.
579. Did you not get some from the Public Works Department? Yes.
580. They did not come in through the examination? No; but they were pretty well tried before they came over.
581. Can you tell me how many there are who have not come in through the gateway of an examination? Wood and Parkinson, the Water Branch Inspectors, were here when I came. Of course, they did not pass the examination. In the Sewerage Branch Mr. Rhodes and Mr. Sewell came from the Town Hall; Mr. McKenzie and Mr. Clark were transferred from the Works Department; the latter has been dispensed with lately. All the others have passed the examination.
582. With those few exceptions, everyone who has come into the Department has come in through your examination? Yes.
583. Do you find that it has been successful? It has been a great success; in fact, the same system was followed with the clerks afterwards, because it was found to be so successful; and I can say this—that the members of the Board are very thankful that it was introduced because it enabled them to get rid of a good many who were importuning to get into the Department.
584. Now, will you just give us your ideas with regard to the scale of pay? I think a good many of the professional men are underpaid, but the Board think otherwise. I have recommended some, and others I could not recommend because I knew the Board would not pass them, but still it did not alter my opinion. For instance, I think the salary of the assistant engineer for Sewerage compared with the salaries of similar officers in the Government, and with the salaries I hear are paid by the Melbourne Metropolitan Board of Works, should at least be £550. I know the work he has got to do in the extensions to the western suburbs—the general reticulation and the administrative work—he has a good many surveyors and engineers to supervise. I must leave the immediate supervision out in the field to him, and he has the getting out of all the contracts, and we have to push the works so as to throw open the districts directly the Government Construction Branch transfer their works to us so as to get the revenue in.
585. How did Mr. Griffiths come in? He was recommended. When I formed the staff he was assistant engineer in charge of Sewerage at the Town Hall.
586. Are you satisfied with him? Perfectly satisfied indeed; he is a very zealous officer.
587. *Mr. Wilson.*] Was not his salary increased last year? No.
588. *President.*] With whom would you compare him in the Works Department? I think their district Engineers get £550 and £575. I think Mr. Milner gets £575; he is the district engineer under Mr. Davis. Well, he has not the same amount of work to do. I know his work is not of the same detail character. We have to go more into detail than they have in the Works Department, and naturally it is more laborious while quite equal to it from a professional point of view.

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589. Now about the others? Mr. Riggs is the next one. His branch—the House Drainage Branch—is really a revenue-returning one. When people apply for permission to connect, the applications are made downstairs, and every day they go up to Mr. Riggs. Then the assistant inspectors, who have special plans, go out and visit the properties, survey them, and then design the drainage on the ground, in accordance with the bye-laws. That has to be checked by Mr. Riggs, and then, under his instructions, the draughtsmen prepare the sketches. Then Mr. Riggs has to pass those, to see that they are in accordance with the bye-laws, and that the sizes of the pipes are right, and then, in my absence, he signs them.
590. You charge a certain sum for that? We charge 5s. per house for that.
591. Then for 5s. any householder can get complete plans of the connections he must make? Yes, and then in addition to that the inspectors have to send in to me a certificate that the work has been carried out in accordance with the bye-laws and regulations of the Board. From that certificate an official one is prepared and given to anyone who has applied for the permit, and that is the guarantee that the work has been properly carried out. The plumber has to guarantee the work for twelve months, and if anything occurs during the twelve months which on inspection is found to be attributable to neglect on the part of the plumber he has to put it right, but if attributable to the householder's neglect, then, of course, the plumber is not asked.
592. I have heard many complaints that you impose an unnecessary expense on householders for connections and so on? We hear many complaints, but when inquired into, we find there is no ground for them.
593. They say that you impose upon householders an unnecessarily expensive system of connection? In the early days we advised the people to get the plan and call for tenders, but some people, instead of calling for tenders, sent for the family plumbers without any tendering against them, and, of course, these men charged what they liked, and when the people got the bill they blamed the Board for it. There was a gentleman who wanted a little alteration to his bath-room; in fact, he wanted one of those hot-water arrangements fitted. He called a certain plumber in, and then went away to the country to give the plumber the house; when he came back he found that the plumber had reorganised the whole of the system without any instruction from the Board or from this office (it was on the old system) and then sent in a bill for £120. We are not to blame for that. We have always advised, "You get your plan, call for tenders, and do not pay the final payment until the plumber produces a certificate from this office that the work has been properly carried out," We formerly advertised that in the paper every quarter, and it is only lately that the people have seemed to become alive to the necessity for the certificates.
594. Does that apply to both water and sewerage? Yes.
595. Now about the staff? There is no one that I can single out for any special mention; they are all a good, honest, hard-working set of officers.
596. And with the exception of Mr. Griffiths, there are none to whose salary or position you wish to draw special attention? Two of the district engineers get £350, and one £300. They generally have 10 or 12 miles of sewers to look after. The sewers are ramifying everywhere. These officers have a lot of ground to get over, levels to take, returns to make, and have really got to be professional men. I recommended that two of these officers should get £25 each, but the Board would not entertain it. I think if Mr. Riggs and the others referred to get £25 each it will be only justice to them.
597. Are there any others? No.
598. Now, with regard to your relationship to the Works Department, are there any observations you would like to make? I think that should come from the Board.
599. Is the interworking between the two Departments economically carried on? Of course while the present system exists we try to work economically. We cannot work more economically than we are doing, because the Works Department before they carry out any work generally get from us the openings and any other information necessary, so that we do not have to open any of our work, and they do not have to open any of theirs.
600. Is it so arranged that there is no overlapping of work between the Works Department and yours? There is bound to be overlapping. When you have two departments carrying on practically the same work you cannot avoid overlapping. We try to avoid it as much as possible, but there are times when we cannot possibly avoid it—as a general thing we do not overlap.
601. There is not overlapping to any serious extent? Oh, no; I look after that.
602. There is no ground for any reasonable complaint as to the interworking between your Department and the Works Department? No, but there is one thing that I think I mentioned to you before. Plans of a certain work were sent to us by the Works Office, and after going over the ground with my officers I suggested that the work might be carried out in a more economical manner. My officers have to go further into the details, and have to go over the district more thoroughly than a man simply running a main line sewer through that district.
603. You go into all the back yards and little streets and so on? Yes, the other officers would never get their work out if they covered so much ground. We suggested that a certain deviation should be made and that it would result in the saving of so much money. We had an object in that because we represent the taxpayer and have to study economy. I got a snubbing from the Works Department over it. It is on record that we are "asked for information and not for suggestions." I simply gave it as a suggestion; not that the Minister ought to or should carry it out, but merely that the lines might be altered in order to effect a saving.
604. In what particular part was that? As near as I can recollect it was on the Waverley or Randwick slope, but the papers will show.
605. Did it involve any large sum of money? There was a saving of about £3,000.
606. You recommended a deviation in their main lines? I suggested. I do not know how the letters were written from the administrative branch, but my minute suggested that such and such a thing should be done. Of course I knew that the Minister was the constructing authority, and that any recommendations would be considered, and so I put it as a suggestion.
607. And you got a snub? I took it as a snub.
608. Was any reason given for your suggestion not being carried out? Not that I know of.
609. Your suggestion was not given effect to? I could not say.
610. Is that work carried out? That particular work is not being carried out yet.
611. Was it a work affecting Waverley or Randwick? Well, it affected Waverley more particularly.
612. Where was the discharge? Bondi sewer.

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613. I thought all the main sewerage there had been carried out? So the main sewers had been, but there is a little dispute as to the line of demarcation between main sewers and the reticulation sewers. I understood that when a sewer like the Bondi sewer was constructed through, then any trunks or subsidiary branches from that would be considered Board's work, coming under the section settled between Mr. Hickson and myself.
614. Then do the Works Department contend that this particular part of the work which you call a branch is part of their work? Yes.
615. Has that been settled yet? Yes; it has been settled by the Minister carrying out the main branch for Randwick and Kensington, which we had surveyed in this office. I am just waiting for them now in order to go on with the reticulation. I contend that that is a branch.
616. Has that been carried out by the Works Department? It is being carried on now.
617. Is this the particular part that you object to? No; that is another portion.
618. We want to know the portion to which there was an objection? Between Randwick and the Bondi sewer. It takes the eastern slope of Waverley.
619. Is it your contention that that particular work should come under you? Yes; I think so. Once the main branches have been constructed by the constructing authority then I think that the reticulation sewers, the subsidiary branches, can be more economically carried out by this Board.
620. I understand that there is one particular part of the work which you recommend should be carried out in a different way? Yes.
621. You do not know whether it has been done? No.
622. Can you identify it so that when we come to examine Mr. Davis we can find out? Well, if you say the drainage for the eastern slopes of Waverley they will know the papers.
623. Are there any other circumstances which you should bring to our knowledge as to the rather unsuccessful interworking between you and the Works Department? There is no unsuccessful working.
624. It is unsuccessful if work is carried out which might have been done cheaper? I do not claim any special merit for this at all. It is merely that we have, by force of circumstances in carrying out reticulation work, to go more into detail, and consequently we must get a better grasp of the whole subject.
625. To your knowledge are there any other circumstances of a like kind? I believe there are, but I cannot tax my memory with them now. I can get them for you.
626. It would be just as well if you would get them, because it is just these little circumstances of want of harmony that it is desirable to remove the causes of? There is no inharmonious working at all. This was adopted. We showed that the thing could be done and it was adopted, but I wanted to show you that in carrying out the detail work we are in a position to grasp the whole thing, far more so than gentlemen connected with the Works Department, and consequently we are in a position to suggest certain deviations which would be more economical than tunnelling through a ridge. That was given effect to.
627. Has it been given effect to in the first case you mentioned? I cannot say in that case.
628. But you have no reason to suppose that it may not be given effect to, notwithstanding the snub you received? It may.
629. Are there any other recommendations of a like kind which have not been given effect to? No; I would rather mention those that have been given effect to, because I only want to show that the Board's surveyors and the Board's officers must have a more intimate knowledge of the work to be done, so that if the constructing authority under the present system would construct only the main branches and leave us the other, there could be consultations between the two branches as to where we want the openings.
630. Your contention is that the Works Department have taken up some of the works that you contend should be done by you? Yes.
631. Can you give us a statement of what those works are? Yes. Of course, it is only a matter of opinion. The Minister decided that this should be done, and so I dropped the matter.
632. Still, the Minister decides on the evidence given to him in his Department; he has not the evidence of your Department, and if it is shown to him that the evidence of his Department was not correct, no doubt he will be glad to be made aware of it, so you might give us a statement of those works which you think could be more properly carried out by you than by the Works Department? Yes. I am only giving my opinion from the experience that we have had.
633. Can you tell us whether you have been delayed at all in carrying out the reticulation by reason of delay in the Works Department? Oh, yes; there are 12 miles of sewers in the western suburbs which have been finished for over six months.
634. There are 12 miles finished and lying useless by reason of the non-completion of the trunk works? The non-completion of the outfall works at Arncliffe.
635. Are those works proceeding now? Yes; they are pushing them on. You see, what we do is, we get from the Works Department as near as possible about the time they will complete (of course, we do not expect to a day or a week), and then we let our contracts so as to fit in, as it were, with them. I have arranged in my contracts so that I can take any section out of the contractor's hands and throw it open to the public; then we advertise that and give the public a month to connect, after which we charge the rates.
636. What we want to find out is this: What delay there has been in carrying out the main works in connection with your subsidiary works;—are there any others? Yes; we have got very nearly the whole of North Shore reticulated waiting for the outfall works.
637. Is the reticulation quite useless there? I cannot say it is quite useless, because we have brought them under a drainage rate. We do get some revenue from it, but not within 50 per cent. of what we would charge if connected.
638. These drains are made available, to a certain extent, for running water into an open creek? Temporarily.
639. But only a portion of the reticulation is being used in that way? Yes.
640. Are you aware what is delaying the carrying out of the outfall works there? Yes; I think there is some difficulty as to the system of disposal. Of course, since that was settled the works have been going on.
641. How long will it take before those works are finished? I think it will be about twelve months.
642. And the delay is due to the alteration of the design? I do not say that. That is all done in the Works Office. I would not like to give any opinion about the delay. 643.

643. How long will it be before the outfall works at Arncliffe are finished? I think it will be three months. I was down there some time ago. I do not think it will be sooner. J. M. Smail. 10 Aug., 1897.
644. And then the reticulation works will be brought into use? Yes. I might say that the Minister sent down asking if the Board were of opinion that the subsidiary carriers should be constructed. Well, if we carry out any more work there it will simply mean delaying the outfall works. We are increasing our reticulating works that are inoperative every day, and things are getting worse. I suggested that the Minister should be asked not to construct any more permanent works there, but to hand the works over to the Board, so that we can give the people the benefit of the sewerage and use the farm; because we are closer to the residential area there than we are with the Botany farm, and there might be such a rumpus that we might have to change the system, and any subsidiary carriers might be thrown away. I thought we had better not add to the capital account until we saw whether the people took to it. We can dispose of the sewerage by just simply plough-draining for a time, because, if they will object to the plough-draining, they will object to the sewerage passing along a concrete carrier.
645. Are you referring to the operation of that syphon drain? No. That is on Cook's River; this is what we call Muddy Creek.
646. If these carriers had been constructed it would have delayed the utilisation of the works? It would, in my mind.
647. So you are resorting to plough-draining instead of treating it as you would have done with the carriers? Yes; we want to get hold of it, and really to put the sewerage on the sand, to prevent it blowing away.
648. What do you do with the sludge? Dig it into the ground too.
649. You say the Works Department will have finished their work in three months? Yes.
650. Then they will bring 12 miles of reticulation into use? More than that.
651. How long has it been lying idle? Getting on to twelve months.
652. Are there any other parts? No; that is the crux of the whole question.
653. Are there any other cases in which the Works Department has lagged behind your works except this? No; these are the only ones.
654. Are you aware that efforts are being made now to keep up with you? I can say this, that I think the Government Construction Branch are doing their best.
655. So that nothing could be done to hurry on the works now? No; they are going as fast as we are. If you put on too many men they are all crossing each other.
656. So far as you are concerned now, everything is going on harmoniously between your Department and the Works Department? Yes. Of course the Minister now, as I say, sends down to the Board, asking their opinion before any works are constructed. I think that is only right, as we have to take them over and find the revenue for them.
657. Are there not difficulties in regard to the storm-water sewers;—is the Works Department not carrying out works which would not be approved by the Board? No; now they never carry out anything that is not approved by the Board.
658. I think there is a considerable loss on those storm-water sewers? Yes.
659. You cannot levy more than 7d. in the £? That is the maximum. At some of the places it would take 15d. to make it pay.
660. Are you in every case where it is necessary striking the maximum rate? Yes.
661. But you find the maximum rate is short by 9d. or 6d.? Take Rushcutters' Bay—it is fully 15d. in the £, but we can only charge 7d.
662. But when the works proper are carried out the capital cost will be merged in the general capital cost? Yes; that is the intention.
663. Then you will levy a rate such as will pay the interest? We will add the capital debt of the storm-water sewers to that of the foul-water sewers, and then strike a rate to carry out the whole.
664. But these storm-water sewers are a necessary adjunct to the other sewers? Yes; of course we must have them in some places, but the Works Department has carried them beyond being an adjunct. If the storm-water sewers are above the foul-water sewers, they are of no use as adjuncts. These were constructed to carry away the stinking slops until such time as the Western Suburbs scheme was carried out.
665. Still, it has been a benefit to health? From Burwood and Strathfield we are getting complaints every day of the smell. Take a piece of land with a tortuous stinking ditch through it. The Department come along and run a straight channel through it, and improve the man's land; and this channel being like a barrel, any accumulation of gases in it come out at the top end. It is just like a gun-barrel. We have had to put in gas-interceptors here and there to prevent that. I think it would have been far better to have left it as an open concrete channel. We have now got to put up ventilating shafts.
666. You have charge of the meter-readers? Yes. The Meter Branch is under the engineer. There is one matter I think Mr. Holmes has mentioned to you—about two inspectors going into the same house. The only inspectors we have are the sanitary plumbing inspectors and the drainage inspectors. They are different men altogether. The sanitary plumbing inspector goes there, perhaps, a good time after the drainage inspector has done his work and cleared out. If the work were to be done with the one man, the staff would simply have to be doubled, so the men are kept separate. The plumbing inspector looks after the sanitary plumbing and the water fittings as well. We only keep two inspectors of water-fittings; they have to look after the whole of this city and the whole of the suburbs. Of course, they are assisted by the turncocks, but the sanitary plumbing inspectors have to take as many as ten boroughs as well as the city. You know what sanitary plumbing is. They have got to go there probably ten times before they pass a job. I think there are four of those inspectors.
667. The meter-readers are under your control; have you anything to say with regard to them;—can you suggest any improvement? No. I might say we are improving that every year. I have got a most excellent officer in Mr. Absell. He has always got the Board's interests at heart, as well as the *esprit de corps* of his own branch. This branch only reads the meters; the accounts go straight to the accountant. None of my officers handle money in any shape or form. Everything in the shape of money goes straight to the Account Branch. The charges are made in my office, and go to the accountant for collection. It is just the same with the Administrative Branch; all letters are initialled by me, and go to the Administrative Branch to be sent to the public.

668.

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668. We should like to know how this meter-reading is carried on;—what checks are there? Each meter-reader has a weekly book. He comes in every Saturday and compares his book with the meter-clerk, who has his ledger and can see whether there is any marked difference between the meter-reading for one quarter and the reading for another quarter. If there is any marked difference he sends a man to inquire, so that is a check.

669. It is the same as the Gas Company's. Say the winter quarter of this year is very much less than the winter quarter of last year, then someone is sent to see that the meter is in order? Yes. We make sure first that the meter is correct. It may register too fast or too slow. After that the inquiry goes further, and we see if the readings are correct.

670. The meter-clerk is under you? Yes. The accounts are sent down to the accountant for collection.

671. Does the accountant keep any account of the meter accounts;—you keep the ledger accounts? Yes.

672. Is it duplicated? They do not go into the detail, for instance a property owner may have a lot of properties, and the meter account is entered up against him in his account. We only show the assessments and the difference between the assessment and the meter accounts. It is necessary for us to make the accounts out.

673. *Mr. Wilson.*] Have you anything to do with the recommendation of the turncocks' salaries? Yes. There is no man gets a rise of a shilling unless I recommend it.

674. Do you think that is a fair thing, £140? Yes, it is fair for the work they have to do.

675. Do you not consider it too high? No, I do not. You see they have to be at the beck and call of fire brigades at any time a fire occurs. The outlying turncocks are all connected by telephone, and we have arranged with the Inspector-General of Police that if a policeman sees a main burst he goes to the watch-house and informs the man, and he goes out, no matter what time it is, and repairs the leak there and then.

676. It is not very hard work? But see the districts they have to walk over.

677. I see six of them get £39 a year for forage? Take Alexander—he has, I suppose, 200 to 300 miles of mains under him. He has the whole of your district—Petersham, Burwood, and I think part of Ashfield. This £39 is to allow them to keep a horse and trap. They have to go round flushing their mains, and the stand-pipe and hose they have to carry weigh about 30 or 40 lb. The men could not possibly do this. They had to do it, and I pointed it out to the Board that they should have a horse and trap, and now they get £39.

678. There is a great deal of difference in the wages of the maintenance men? There are different classes of men. Freeland is a plumber—that is the man who goes round and does the plumbing in connection with our mains. When we are putting down a new main we have to disconnect from the old and connect with the new. Then this man Whittaker has charge of the Ryde Hill Tank, and has to look after the pumping main between Ryde and Ryde Pumping Station. He has a residence, but has to pay for it. The other 7s. men are just ordinary maintenance men. The best of these men are taken off sometimes when we are short of foremen and gangers, and temporarily promoted, and when the work slackens they go back again to their old places.

679. What about the men at £102 a year? These men are on the canal, they get £8 10s. a month and a residence. They are a little less paid, but then they have not got so much work as the men about the city.

680. They are just ordinary labourers, I suppose? Just ordinary labourers.

Melbourne Green, Accountant to the Metropolitan Water Supply and Sewerage Board, called, and examined:—

M. Green. 10 Aug., 1897.

681. *Mr. Wilson.*] What were the arrears at the last report? £43,000.

682. Are they increasing or decreasing? They are increasing a little this year.

683. How are they compared with three or four years ago? They have considerably increased the last two years, because of the land rates. The land rates on vacant land are very difficult to get in.

684. Are they more difficult to get in now than before? The vacant land was not rated.

685. According to the statement furnished us, in December, 1894, they amounted to £27,000, and on 30th June, 1896, they had increased to £38,000;—that is serious, is it not? Well, there is a good deal of it land and a good deal of it charities.

686. I thought the churches and charities got it free? No; the churches do not get it free. They are charged, but it is not collected, on account of a decision by the Board. The Government rates were £1,100; meter accounts, £13,000; churches and charitable institutions, £6,600.

687. Is there any discrimation exercised in pushing for these arrears? Five thousand summonses have been issued every year.

688. Is there any possibility of favouritism being shown in these summonses? Not that I know of.

689. Are there any officers or members of the Board in arrear? I do not know.

690. Who does know? Mr. Beaumont, the assessor. Every year I send a statement up to the secretary of all the arrears outstanding, and he is supposed to send that to the assessor for a report. In going through the books if we see a large amount of arrears outstanding on any premises we send the secretary up a minute to that effect, and it is reported upon by the assessor.

691. The examiner is supposed to carry on a continuous audit, is he not? Yes.

692. What relation has he to your branch;—has he a right to call for any information? Yes, any books.

693. He has free access to the books? Yes, except those that are actually in use. If he wants to look at those he sends a clerk down or looks after that himself.

694. Has he occasion to call upon your officers to extract information for him at times? No; he does that himself.

695. He has the right to free access to your books and to call for any information? Yes.

696. And he gets it? Yes. The clerk that he has used to be with me as a checking clerk—as a protection to me—for of course I cannot check everything myself.

697. Of course, you look upon Mr. Kennedy as a protection to you against the other officers? Yes, I think so; and if I see that there is any work which has not been checked I call attention to it. With reference to the checking of course if I am to be held partly responsible for any defalcations that occur is it not necessary that I should have someone to check the details, or that I should have some little control over the examiner to see that his work is kept up?

M. Green. 10 Aug., 1897.

698. That is to say, the examiner's work might get into arrears, and that would facilitate fraud? Yes.
699. Of course the accountant is supposed to exercise the necessary checks in his own department? Yes; but of course I cannot do it without a staff.
700. *President.*] Your idea is that the examiner's staff is practically your staff to check the accounts? Yes.
701. But you do not contend that the examiner should be under your control? No. I think the Examiner ought to report direct to the President or secretary, but at the same time I think I should have a little guidance over him to see that the work is kept up. Supposing a defalcation were to occur, who would be responsible?
702. *Mr. Wilson.*] You would be primarily responsible, and the examiner would be responsible if he allowed his work to fall into arrear, and should have discovered it but did not? Then where is my staff protect me?
703. That is for the Water and Sewerage Board to say;—you must make representations to them;—when you talk about the examiner's work falling into arrears, how long would it be in arrear? Well, suppose it was in arrear three months?
704. Has it ever been in arrears three months? Some time ago it was in arrears twelve months, but not lately. That was three years ago.
705. What was the reason? He had not sufficient staff, and he had to do a lot of back work. He was going right through from the start.
706. Has he a stronger staff now? Yes.
707. And is he often in arrear now? No; he is not in arrear at all.
708. So that the question you raise is entirely a hypothetical one? Oh, no. I say that supposing anything occurred I consider that I would be responsible to a certain extent.
709. You are certainly primarily responsible? It is only by watching that the examiner and his staff are keeping up this check from day to day that I am protected.
710. However, you do watch that? Yes.
711. That is all right? Do you think that is sufficient?
712. He is there primarily to protect the public purse, but incidentally he protects the accountant? Yes.
713. But he does not relieve you of responsibility? No; but at the same time for my protection I point out when his work is not done as it ought to be done.
714. I think you should point that out to the President or secretary, but I do not think you have any control over the examiner. If the thing were serious you should draw attention to it? As a matter of fact most of the checks in this Department I have instituted myself. I had that checking clerk under my control and then he was transferred to the examiner to do exactly the same work that he had done with me. That was done because I went through this checking work day after day, and the examiner came round afterwards in, say, a month, and did it over again with his staff; and so as not to duplicate the work the clerk was transferred to him.

Sworn before me, this nineteenth day of August, 1897,—
G. A. Wilson, J.P.

T. Kennedy. 10 Aug., 1897.

Thomas Kennedy, Examiner of Accounts and Auditor to the Metropolitan Water Supply and Sewerage Board, called, and examined:—

715. *Mr. Wilson.*] As examiner, you know all about the arrears of rates, I suppose? No; I do not know all about them.
716. Does not that come within your work? No; that would be the accountant's work. I might explain that the assessor makes all the charges, and those are debited to the accountant. He charges himself with that revenue to be collected, and as the money is collected so he credits himself with it, and the difference is the amount owing in the aggregate, but the rate ledgers should agree with the aggregate in the accountant's lists. I never had the staff to go into that.
717. Do you consider that that should be within your jurisdiction? I should think that that would be one of the most important things for me to take up.
718. *President.*] Has that never been done? No. I might say that the collection of the revenue is done now under the system recommended by the Treasury Inspector that was last here—that is, so as to prevent double payments, the ledgers are posted at once simultaneously with the receipt of the cash. The calling back and checking of it is done after the day's work is over, and compared with the cash-books. All the particulars are entered in the cash-books.
719. *Mr. Wilson.*] That system has materially reduced the double payments? Yes.
720. It was a great source of trouble? Yes. Of course, in connection with the refunding of payments, it has always been my aim to see that we had received it twice over before we refunded the money. In a great many instances people have made mistakes, and paid money on the wrong property. When they have come for the money, I have put my foot down, and Mr. Bloxsome and I have had a great deal of unpleasantness over that. I said, "If we refund these rates now, what guarantee have we that the proper people will pay them?" I did that to ensure the proper collection.
721. Is your position a quite independent one here? It is, and it is not. It is unpleasant at times.
722. Is there any attempt to obstruct or intimidate you in any way? No.
723. How is it unpleasant? It is unpleasant with the obstructions I have received from the officials, principally in the Account Branch. It has been very unpleasant at times down there, but we have managed to get over that trouble.
724. What was the nature of the obstruction? They have been manifold. In not giving enough information, more particularly in connection with the refunds.
725. Is all information you call for not available for you? Not at the time. I have had to get it afterwards. They do not give me enough information on the claims.
726. So that you feel that you have not got sufficient help from the Account Branch? No.
727. *Mr. Powell.*] You mean there is a passive resistance? Yes; a sort of passive resistance. We have always obtained it, but it has always been the means of wasting a lot of time.
728. *Mr. Wilson.* In the end you get what you want, but it has always required an expenditure of time and energy? Yes.

729.

T. Kennedy. 10 Aug., 1897.

729. What is the precise limit of your duty and power? I deal with all vouchers that are passed for payment of claims of every description. They have to pass through my hands, and they are not paid until I sign them. I deal with contracts of every description, and advances in the same way.
730. You frequently call for information which you do not get? It is sometimes very difficult to get. Of course I get it in the end; there is a great improvement latterly to what it used to be.
731. How do you mean? They see the necessity for facilitating the work and giving the necessary data on the papers before they reach me.
732. When did they commence to see that? It has been going on slowly.
733. You think it ought to be within your jurisdiction to look into the question of arrears? Yes, in fact I have made a start and am sending in a report to-day in connection with over-payments. The rate-ledger keeper should take out his aggregation of balances standing at the debit of all the rate numbers, and it does not agree.
734. Have the Treasury Inspectors ever gone into that question? They have only gone into the question last time, and it was so confused that the Treasury Inspector left it in my hands to straighten, and I sent him a report showing where the differences existed, but I do not think they have gone into the question since. I do not know.
735. It would be the accountant's business to go into that? Yes.
736. *President.*] I think you said that it would take such a great deal of time that it has never been undertaken? I do not think I said that.
737. *Mr. Powell.*] It has been reduced? Yes.
738. *Mr. Wilson.*] It is hardly worth the trouble? It would be a great expense.
739. The proper thing would be to reconcile that by an entry and to see that it was kept balanced in future? If next year's difference is the same it will prove that the work during the year has been done correctly.
740. *President.*] The mistakes will be gradually found probably? They might.
741. *Mr. Wilson.*] It may or may not come out? There is a doubt about it. Of course there are over a hundred thousand entries. The system is very simple in connection with the rate-ledgers downstairs.
742. The aim now will be to keep things correct and carry the balance forward and see that there is the same discrepancy next year? Yes, that will be proof enough that the work has been done correctly during the year.
743. *Mr. Powell.*] I suppose the difference between you and the others is that you look to the property to pay the money; persons come and say that they have paid it in mistake, but you say that it is the property that pays? Yes. I say "it is not a part of our business to find out whether the right person has paid." If they come and present the paper we take the money from them. That is reduced to the minimum now. In connection with the over-payments there is a difference between the books that are kept and the amount standing to the credit of what we call the "Overpayment Account."
744. Is it much? Over £200. Some of it is refunded and others transferred and the amounts removed.

Sworn before me, August 18th, 1897,—
J. BARLING, J.P.

Herbert James Beaumont, Assessor to the Metropolitan Water Supply and Sewerage Board, sworn, and examined:—

H. J. Beaumont. 10 Aug., 1897.

745. *Mr. Wilson.*] The arrears on 31st December, 1894, amounted to £27,000, and eighteen months afterwards had increased to £38,000? Yes.
746. Can you account for that? Yes. I think you will find that in the half-year ending June, 1896, we had a dry season, and the consumption by meter was about £7,000 or £8,000 over and above the corresponding period in the previous year; and of course the meter accounts do not become due until the 30th June, and I had no opportunity of collecting these arrears until after the year had expired.
747. Therefore some of this would come in the next year? Yes. And then there is another thing—the churches and charities, which the Board are not pressing for rates. That is accumulating. Although the actual rates due upon house property and land, which are the properties which we have some opportunity of recovering rates upon, are getting less and less every year, the arrears upon churches and charities are increasing every year.
748. And it is at the express wish of the Government that you do not press those charities, I believe? That is so.
749. What steps do you take;—is there any discrimination exercised in pressing those claims on private people? None whatever. As they appear on the books so the summonses go out; only in the case of property lists, before we take proceedings against the tenants, we give them seven days' time.
750. You do not exercise any discrimination in favour of anybody? No.
751. Not as regards the people connected with this Board—the officers and members of the Board;—are any of them in arrears for rates? Not one, to my knowledge; not one single one, that I know of.
752. You do not know one? Not one, that I know of—neither a member of the Board nor an officer of the Board.
753. There is no favouritism at all? No.
754. It has been stated, and is pretty commonly accepted outside, that officers are in arrears, and it is only fair, if you are correct, that it should be stated in evidence;—it is only fair to the officers? There is not one, that I am aware of. I know that in past years one or two have been in arrears, and I have sent the accounts up to the paymaster and they have been knocked off their salaries.
755. You do not know any single officer who is in arrears? Not that I know of at the present time, but I will certainly look it up and see.
756. Statements are made very freely outside, and it is only fair that they should be corrected? Certainly. I have no recollection of them.

MONDAY, 16 *AUGUST* 1897.

Present:—

JOSEPH BARLING, Esq., J.P. (President).
GEORGE ALEXANDER WILSON, Esq., J.P.
JAMES POWELL, Esq., J.P.

William Holmes, Secretary to the Metropolitan Water Supply and Sewerage Board, further examined:—

W. Holmes
16 Aug., 1897.

757. *President.*] Have you given us all the returns that we asked you for? I think so.
758. Is there anything else you have to tell us which you think we ought to know? No, I cannot think of anything; the range of questions has been so exhaustive that I do not know of any fresh matter. Of course, on discovering that certain officers were in arrears I wrote that second letter to you, stating that there were officers in arrears for rates at the time the question was asked, but had since paid up; as I thought that half the truth was worse than a lie, I wrote to you right off.
759. *Mr. Wilson.*] Are these all the officers in arrear? We deal with numbers, not names. In many cases we do not know who the owners of property are, but as far as we know, as far as we can tell, those are the only officers in arrears.
760. Of course this is a small thing. Can you tell us why officers should be allowed to have two and a half years of arrears? Of course it was quite unknown to me and to the assessor.
761. The assessor himself is in arrears? No; that is his brother, not himself. I told him he should have informed me of the fact that these officers were in arrears when the question was asked. He did not know of that when under examination. I have called for a report as to why these arrears were allowed to accumulate and what steps have been taken to recover. In the case of Mr. Kennedy, of course it is explained that they were arrears owing by a lessee, a Dr. Paterson, who took the house from him. Dr Paterson was in a considerable time, and his arrangement was that he should pay the rates and taxes, which he failed to do. The Board served a notice, and took proceedings against him and got a verdict, but before they could put in execution he went to West Australia. Now, Mr. Kennedy has to pay these arrears, and we will not accept payment of the current rates until he pays the arrears also, and he has been trying to get the money from the doctor. He has now paid the rates, but I told him he ought not after his explanation, which was quite sufficient. As to the others I do not know the reason; but an explanation has been called for.
762. *President.*] Do you think there are other persons who are in arrears and who ought to be reported to you? I do not think so. The only way to find it out would be to question each officer.
763. *Mr. Wilson.*] Could not you tell from his account? We do not know who the householders are among the officers, whether they are tenants or owners, or whether they pay rates or not. We do not know sufficient about their private affairs. The only way is by questioning each one, but I do not think there are any others. I cannot say for certain, but I do not think there are.
764. *President.*] Seeing that this escaped your attention, might there not be others, not officers, who would try to get influence to get their accounts passed over? I have come across instances of that.
765. *Mr. Wilson.*] Suppose, for instance, some influential householder is friendly with your district assessor, would it not be possible for the assessor to let that man pass? There would have to be collusion between two or three officers. There would have to be collusion between Mr. Fraser of the accountant's branch, the man who supplies the list, the summons clerk, and the district clerk—three officers—before that could happen; but in these cases the three officers were district clerks themselves.
766. *President.*] These are the men concerned in the collecting of the money? Yes. I look upon it as very reprehensible indeed in their cases, as I consider that they should be the first to pay, seeing that they have to collect from the outside public.
767. Do you not think it would be well to look through all the others outstanding to see if there were persons using their influence to evade payment of rates? The assessor assures me there are none who are using influence to evade payment. I had the summons clerk up, and I asked him particularly whether there were any others, and he said "No," he knew of no others.
768. So far as you know you believe that this shows the true state of the case? Yes.
769. So far as you know, too, there are no persons who have been shielded from pressure as to the payment of their rates? No; I know of none.
770. I think Colonel Rowe explained that some of the poorer people whom it was not worth while to sue were allowed time? Yes, heaps of those; in fact, every day I have people come up to me, and I make the best arrangement I can with them, and most of them pay by instalments as low as a shilling or two a week—just whatever they can pay. Some of them come and say, "I cannot pay, will you give me time," and if I find, after making inquiry, that it is a genuine case, I make some arrangement for them to pay so much a week or so much a fortnight, and they generally keep to their payments.
771. *Mr. Wilson.*] Have any appointments been made since this Commission came into existence? I do not remember any just now. We have had an examination for two engineering draftsmen last week, and I have sent you along copies of the examination papers; but they are not reported upon yet. They are going to Professor Warren at the University. I cannot think of any appointment, except it might be in the lower ranks.
772. If any appointment has been made it has been by examination? Yes. I think there were two junior clerks put on in place of one or two who resigned since you commenced your work, but they of course have passed the examination.
773. *President.*] I think that you said that the members of the Board took no active part in the management of the Department? Practically none of the members take any active part in the working of the office.
774. Simply the President? Yes.
775. He gives about half an hour a day? The arrangement with him according to his appointment is, I think, from 10 to 1.
776. And he gives that every day? Yes. He was there when I came away this morning. Those are the terms of his appointment. He is frequently there till 2. He never goes away leaving anything undone on his table.
777. I think you have a Board meeting once a week? Always once a week. We have a special meeting to-morrow to consider the new Bill.

W. Holmes. 16 Aug., 1897.

778. *Mr. Wilson.*] Colonel Rowe says—"It varies very much. I frequently go there at 10; my proper time is 11"? He has not any fixed hours. He stays until his work is finished.
779. What is the status of the examiner as regards the accountant? He is an auditor over the accountant. He audits the accountant's books, and, in fact, all books right through the Department, whether expenditure or revenue, and also examines all accounts.
780. Does he deal with arrears in any way? No.
781. But is not that portion of an auditor's business? It is not his. He sees that the amount shown there as arrears is all right, but he does not have anything to do with getting them in.
782. Having a continuous audit in the office, there is great liability to friction between the auditor and the accountant? There is; there is no doubt about that.
783. There is friction? Yes. Of course when a man is always pulling another up saying, "Here, you will have to get authority for this. You have exceeded," and is continually finding mistakes, there must be a little friction; but this feeling is not carried outside the office. I must say the examiner does his work in a very fearless way. If we have exceeded the limits allowed by the Board he pulls us up even if it is only a 1d. or 2d. The engineer and he are frequently at loggerheads. The engineer says, "Oh you are not a professional man, and you cannot interpret the specification properly." There is continual friction that way. He certainly has saved the Board hundreds of pounds. I can say that without any hesitation.
784. *President.*] Do you think his position requires strengthening at all? I think it might be strengthened if he had a better salary. I always look upon him as underpaid.
785. That is to say tacitly it would give him a better position? It would improve his position.
786. But, so far as office control is concerned, he has got all the control and authority he needs? We give him full authority. The other day I had an instance of where he was delayed. He could not get at some books that he wanted. I think they were overpayment books from the accountant's department. He reported it to me, and I sent for the officer concerned, and told him forthwith to give every information, and let the books be given up at once, and pointed out that the great virtue of the audit is in the books being available at any time they are wanted. If he has any difficulty at all he comes to me. The books were in use at the time.
787. He has given every satisfaction? Every possible satisfaction. There is no doubt about it, he is an excellent officer.
788. What was the dispute between the Board and the Councils about the bonds? I sent you a copy of the minute. We do not lay water mains anywhere unless we get 6 per cent. Well, in some cases the residents are very anxious to get the water, and are continually importuning the Board to extend the mains; and the Board instituted a system of guarantee bonds. It is not a Council's bond; it is an individual bond by a ratepayer and two sureties. If a man wants a main extended along his street, he must guarantee the deficiency. If we want £5, and the revenue along the street is £2, we ask the man to guarantee the £3. The main is laid, and at the end of the year we credit them with all the revenue from that street, and then charge them with the deficiency. At Hurstville, they have been trying to get the Board not to enforce the guarantees. I have made inquiries, and find that two or three of the guarantors, or sureties, are aldermen, and it would appear that they are trying to get the Council to pass resolutions to induce the Board not to enforce the guarantees. They have got the idea that the surplus in some streets would balance the deficiency in others. I went into that matter, and I have charged up each borough with a proportion of the cost of the main works on a population basis, and I think there are only two or three that pay more than 3½ per cent. I showed that if the City were taken out, and each borough taken separately, some of them would not pay more than 1 per cent. Hurstville is ·99 per cent.
789. Are there any other boroughs that object to it? Yes. We had a petition about three months ago from the Mayor of Leichhardt, on behalf of sixteen or seventeen other municipalities, stating that their boroughs, as a whole, would pay more than the amount required. I have shown now, in this return, that they do not do anything of the kind.
790. *Mr. Wilson.*] How do you enforce these guarantees? We proceed in the same way as for recovery of rates. There are one guarantor and two sureties, who are jointly and severally liable. Very often there are a dozen people concerned, and they divide the difference between them, when it becomes only a small thing. If the City and two other boroughs were taken out, the rate for the remainder would have to be 1s. in the £, instead of 7d.

TUESDAY, 17 AUGUST, 1897.

Present:—

JOSEPH BARLING, Esq., J.P. (President).
GEORGE ALEXANDER WILSON, Esq., J.P.

Joseph Davis, Engineer for Sewerage Construction, Public Works Department, sworn and examined:—

J. Davis. 17 Aug., 1897.

791. *President.*] We have had Mr. Smail before us in connection with the Sewerage Construction Works, which are under the Board, and one or two points have arisen in his examination which touch on the relationship of the Board with your Department. But, first, there is one point on which I would like a little information. I think you know pretty well what rate of pay their engineers get? Yes, I think I know.
792. Can you tell me how their salaries compare with the salaries paid in your branch? The Assistant Engineer gets £500, and he occupies the same position as Mr. Milner does with me, and, I think, Mr. Milner gets £525.*
793. Mr. Smail said he believed your district engineers got £550 and £575? I think my district engineers would be rather under his. One of my district engineers gets £400—only one; the rest get £350

* Note (*on revision*):—Since giving this evidence, I have had an opportunity of refreshing my memory by reference to the Estimates, and I find that Mr. Milner is in receipt of £450 per annum, not £525. My opinion, nevertheless, is not changed as to the relative value of the duties performed by Mr. Milner and Mr. Griffiths.

£350 and £300, and down as low as £250. I do not think his go down lower that £300. I am not sure on that point.
794. Mr. Griffiths gets £500? He would correspond with Mr. Milner, and he gets £525, but Milner's responsibilities would be very much greater than Griffiths'.
795. So there is good reason for the difference? Yes. With regard to the district men, I think my men are paid much less than his.
796. Your idea is that your men are actually paid less than his, comparing work for work? The work done by my men is very much more responsible than that done by his.
797. His assistant engineer gets £500, yours gets £525, but you say his work is much more responsible than that of Mr. Smail's assistant? Certainly.
798. In what way? At the present time he has got under his supervision £250,000 worth of work—that is, he is responsible to me for £250,000 worth of work. At the present time that is being carried out in the city and suburbs; and for that he gets £525. I do not wish to underrate Mr. Griffiths at all, I merely state the fact. Mr. Griffiths, on the other hand, is carrying out the reticulation, which you might say at so much per yard, in the same way as you buy cloth. What you do in one chain you have to do in the next, from one end to the other.
799. Now the district engineers;—they have two at £350, one at £300, one at £156, and one at £136. How would those salaries compare with yours? One gets £400, I think, one £350, and they range from that and £300 down to £250. These men all have charge of large contracts—three or four large contracts.
800. Mr. Smail's surveyors run—one at £300, six at £234, one at £187, and one at £52;—how would they compare with yours? They get precisely the same pay as far as the £235 is concerned. That is what we give to surveyors that are engaged in preparing works for contracts. The salaries that are above that are paid to the detail survey men, so that the same rate of pay rules in both branches.
801. In fact it is pretty well the same? For the same kind of work the same pay is given—£235 a year.
802. Now, Mr. Smail has got two draftsmen at £300, two at £200, four at £156, one at £151, one at £136, and two at £130;—would that be about the same pay as yours get? Yes.
803. So that where the difference is is in connection with your assistant engineer? Yes.
804. Your assistant engineer would get more than his assistant engineer? Yes.
805. And you contend that the work he has to do is very much more responsible than that which Mr. Smail's assistant does? Yes; inasmuch as he has to supervise, at the present time, contracts estimated to cost a quarter of a million of money. For that £525 a year is not too much.
806. In our examination of Mr. Smail the question was asked—"Is it so arranged that there is no overlapping of work between the Works Department and yours?" He said, "There is bound to be overlapping. When you have two departments carrying on practically the same work, you cannot avoid overlapping. We try to avoid it as much as possible, but there are times when we cannot possibly avoid it; as a general thing we do not overlap." Then the question was asked—"There is not overlapping to any serious extent?" and he said, "Oh no. I look after that." Do you admit that there is any overlapping; you see it is not to any serious extent? No; I do not see how any overlapping can occur. Take the levels; we collate any work we do and that is available for the Board, so that they need not go over any ground after we do. We establish the bench-marks and they are put at the disposal of the Board, and when they make their surveys, which are quite independent of ours, they use these bench-marks. With regard to the detail survey work, that is done principally for them, as you are aware. Where we come into close contact is in regard to the junctions. We have to provide openings in the main sewers for the reticulating pipes, and when we make a survey, immediately the survey is finished we send on to the Board a rough plan indicating what junctions we think will be required in any particular length of main sewer. They then either approve, or if they wish to carry out the reticulation in a different way to that which we think it should be, they say, "We want another junction here, and we do not want that junction there." Then when we get that plan back we incorporate the junctions they decide upon in the contract. There can, therefore, be no clashing.
807. That is to say, the Engineer for the Water and Sewerage Board has an opportunity of examining the plans before the contract is let? Yes; he has an opportunity of saying precisely what he requires.
808. There is another thing Mr. Smail said here. When we were asking about this overlapping he said, "We suggested that a certain deviation should be made, and that it would result in the saving of so much money. We had an object in that, because we represent the taxpayer, and have to study economy. I got a snubbing from the Works Department over it. It is on record that we are 'asked for information and not for suggestions.' I simply gave it as a suggestion, not that the Minister ought to or should carry it out, but merely that the lines might be altered in order to effect a saving." Then he was asked, "In what particular part was that?" and said, "As near as I can recollect it was on the Waverley or Randwick slope, but the papers will show." "Did it involve any large sum of money?" "There was a saving of about £3,000." Then the next question was, "You recommended a deviation in their main lines?" and the answer was, "I suggested. I do not know how the letters were written from the Administrative Branch, but my minute suggested that such and such a thing should be done. Of course I knew that the Minister was the constructing authority, and that any recommendations would be considered, and so I put it as a suggestion." "And you got a snub?" "I took it as a snub." "Was any reason given for your suggestion not being carried out?" "Not that I know of." "Your suggestion was not given effect to?" "I could not say." "Is that work carried out?" "That particular work is not being carried out yet." "Was it a work affecting Waverley or Randwick?" "Well, it affected Waverley more particularly." "Where was the discharge?" "Bondi sewer." "I thought all the main sewerage there had been carried out?" "So the main sewers had been, but there is a little dispute as to the line of demarcation between main sewers and reticulation sewers. I understood that when a sewer like the Bondi sewer was constructed through, then any trunks or subsidiary branches from that would be considered Board's work, coming under the section settled between Mr. Hickson and myself." "Then do the Works Department contend that this particular part of the work you call a branch is part of their work?" "Yes." "Has that been settled yet?" "Yes; it has been settled by the Minister carrying out the main branch which we had surveyed in this office. I am just waiting for them now in order to go on with the reticulation. I contend that that is a branch." "Has that been carried out by the Works Department?" "It is being carried out now." "Is this

J. Davis. 17 Aug., 1897.

this the particular part that you object to?" "No, that is another portion." "We want to know the portion to which there was an objection?" "Between Randwick and the Bondi sewer. It takes the eastern slope of Waverley." "Is it your contention that that particular work should come under you?" "Yes, I think so. Once the main branches have been constructed by the constructing authority, then I think that the reticulation sewers, the subsidiary branches, can be more economically carried out by this Board." "I understand that there is one particular part of the work which you recommend should be carried out in a different way?" "Yes." "You do not know whether it has been done?" "No." "Can you identify it so that when we come to examine Mr. Davis we can find out?" "Well, if you say the drainage for the eastern slopes of Waverley they will know the papers." We want to hear what you have to say about that, Mr. Davis? The portion referred to lies between the outlet of the Bondi sewer and Coogee Bay. The question arose during the time that Mr. Smail was Engineer-in-Chief for Sewerage Construction whether the Coogee Bay outlet should be used for draining these slopes extending from the sea up to the ridge at Waverley, or whether the Bondi outlet should be used. He decided then, and the survey was made, that the major portion of it should be taken to the Bondi outlet. When the work came over to me, I put these decisions on paper, and forwarded on to Mr. Smail, in the way I have already indicated, a plan for any junctions he might require. When the plan went on to the Board they went into the matter and concluded that it would be done cheaper by taking the drainage wholly, with the exception of a very small portion near the Bondi sewer, to the Coogee outlet. The papers then came back to me and I had to investigate the thing very thoroughly, and the conclusion I came to was that the major portion should go to Bondi, as Mr. Smail originally proposed, for two reasons. First of all the Board's officers said it would be cheaper to take it to Coogee, and, secondly, they said the Bondi sewer would be overcharged, supposing it was taken to Bondi. To begin with I proved from actual figures that they were wrong in the conclusion they arrived at in regard to cost, and, secondly, I proved by a physical fact that this particular drainage had been provided for in the size of the Bondi sewer, so that it was impossible for the sewer at the Bondi outlet to be overcharged from the drainage of these slopes into the sewer. At the outlet the sewer is 7 ft. 6 in. by 8 ft. 6 in. for a mile extending from Ben Buckler to the South Head Road, and beyond that it is 7 ft. 2 in. by 8 ft. 2 in., and the extra size was provided to allow for the drainage from the districts under consideration; and from that I concluded that the best plan would be to take the major portion of the drainage to the Bondi outlet, and that is being carried out,—that is to say, tenders were received on Monday last for the construction of the sewer. With regard to Mr. Smail's contention that this sewer was reticulation, when I tell you that a matter of between 1,500 and 2,000 acres is involved, and that this intercepting sewer running along the coast-line of Bondi has to take the whole of this drainage, it can scarcely be contended that is reticulation. We have been in the habit of carrying out the main sewers and the branch sewers—that is to say, the sewers that are necessary to tap any particular drainage area,—leaving Mr. Smail to develop the drainage area itself. I know that that is quite understood by the Minister. We have had money voted for this particular work which will involve, I suppose, an expenditure of £16,000.

809. Has Mr. Smail become aware of the result of your inquiries? Yes; he has since sent on the junctions that are required.

810. So that he has seen the plans? I believe so. He has seen so many things it might not be impressed on his memory as it is on mine.

811. Your answer to his statement is this, that in the first place it was cheaper to carry that sewerage to the Bondi outfall rather than to Coogee; and secondly as to the objection that the Bondi outfall was not of sufficient area to discharge that additional drainage, you found it amply sufficient, and that in fact it was constructed with that end in view? Yes.

812. Then Mr. Smail was asked this question, "Can you tell us whether you have been delayed at all in carrying out the reticulation by reason of delay in the Works Department?" "Oh, yes; there are twelve miles of sewers in the Western Suburbs which have been finished for over six months." Then he was asked, "There are twelve miles finished and lying useless by reason of the non-completion of the trunk works?" and replied "The non-completion of the outfall works at Arncliffe." What are the reasons for that? In order to explain that I would have to go back to 1895, when the sewerage works as a whole were taken over by Mr. Darley at the time that he devoted the whole of his time to the Water and Sewerage Board. At that time the works were fairly under way; and through some misconception (I put it in that way for want of a better word), the officers that were taken over with the works were not sufficient to carry them on at the rate that they were being constructed at that time. First of all Mr. Darley was away on leave, and when he came back he found that he had not the officers, and he had to reorganize and to get together virtually another staff to be capable of carrying out the works. That took some months, and I found in 1896, when the Branch was rearranged again and Mr. Darley was made Engineer-in-Chief for Public Works and I took over the sewerage works, that only £83,609 worth of works were in progress, and that during the twelve months, through nobody's fault, but through the set of circumstances that I have already explained briefly, scarcely any contracts had been got out. The designs had been virtually at a standstill. Work had been let during the twelve months, but the designs were prepared for this work prior to April 1895. Work had been let to the extent of £68,543 between April, 1895, and April, 1896, but these designs were prepared before Mr. Darley took over the works. Then the Minister decided in 1896 that they must go on at a quicker rate. You might say that as far as the designs were concerned the work was suspended for twelve months, and through that I have no doubt the Water and Sewerage Board got ahead of us. Indeed I have no doubt myself that they calculated that the works would be pressed forward at the same rate of progress that they had been, instead of which they were not.

813. I think I understand that the reason there was delay in carrying out the main works was because of the want of money? That was earlier still. The whole branch was disarranged. Some twelve or eighteen months before Mr. Darley took everything over there was really no money to go on with the works. It was quite as a matter of grace that Mr. Lyne allowed us to go on with the £40,000 contract across the Sewage Farm.

814. So it was due to the fact that the shortness of the finances disarranged the orderly carrying on of these works? That is so.

815. And secondly, at a later period when Mr. Darley took it up, it was due to the fact of the continual changes? Yes; it was thought that the works would be amalgamated with the Board's works, and then the Minister altered his mind.

816.

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816. Those two circumstances account for the delay? Most certainly.
817. Of course in the Water and Sewerage Board they had one continuous management right through, and therefore there was no cause for delay, so far as they were concerned? No. At present we send them on from time to time a list of our contracts that we have in hand, and an approximate date when they will be finished, and they arrange for their reticulation to finish about the same time as our contracts are finished.
818. Was not that the same at the time the delay took place? I do not know whether the lists were sent the same as now, but they knew perfectly, as well as we did, when the contract time would expire.
819. Still they went ahead? Yes.
820. Then Mr. Smail says there is a considerable delay in carrying out the works at North Shore. We asked, "Are you aware what is delaying the carrying out of the outfall works there?" and he said, "Yes, I think there is some difficulty as to the system of disposal. Of course since that was disposed of the works have been going on." Then the next question was, "How long will it take before those works are finished?" and his answer was, "I think it will be about twelve months";—we would like to hear what you have to say about that, Mr. Davis? Primarily the question of finance came in there. The first contract that was let at North Shore was the main sewer, which was to take two years. There were very deep shafts and tunnel, and consequently it took a very long time. It was thought that the outfall works would take about twelve months, as they will now that they are in hand, and it was intended to start the outfall works and branch sewers, so that when the main sewer was finished at the expiration of the two years, the other work would be finished on or about the same time. When the main sewer got fairly advanced the financial crisis came and the work stopped.
821. The financial difficulty was wholly responsible? I think we may say wholly.
822. Then, with regard to North Shore, I think there was a justification for carrying out the reticulation works, in that they were made to discharge into the creeks there, and so, to a certain extent, relieve the borough of the slops nuisances? Yes, the reticulation works, at the request of the borough, were carried out, in order to carry away the slops in the meantime. There was no proper drainage in any part of the borough, and in some cases these pipes could be discharged into existing creeks, and were discharged in that way *pro tem.*
823. Is there anything delaying the works now? At North Shore the outfall works are in hand. There are 7 or 8 acres of reclamation to be done. Mr. Darley has his sand dredges there doing that, and the contract is let for the precipitation and filtration works, so that nothing more can be done just now than what is being done. The whole of the work is in hand.
824. I am not asking this with regard to your work, but wish to ascertain whether the water and sewerage works are not carried out in advance of your works, thus causing a loss of interest? Not so far as we are concerned. The alteration in management and the financial crisis caused a derangement; but, so far as I see now, there is nothing to interfere with the proper arrangement of the work.
825. Might it not be said, "But the same financial difficulty must have overtaken the Water and Sewerage Board, and therefore there would be the same reason for delay in both cases"? Yes; but there is this to be said: the Board had contracts ready to let—indeed, tenders in for certain reticulation—at the time we all got orders to go on with the works; and so had we, but the Board could carry out their reticulation so much quicker than we could do our work, and they started simultaneously with us, so that they would get done sooner than we could.
826. The explanation was that their works were so much smaller than yours? Yes.
827. Is there anything you can tell us that will assist us in our inquiry—anything by which better economy and efficiency could be obtained in the water and sewerage work? I am not sufficiently familiar with their work to express any opinion. I wish the Commission to understand that what I have said in regard to delay in the main sewers is not either a reflection on Mr. Darley or Mr. Smail. It was simply the result of accident. The office got disorganised through a misapprehension.

THURSDAY, 19 *AUGUST*, 1897.

Present:—
JOSEPH BARLING, Esq., J.P. (President).
GEORGE ALEXANDER WILSON, Esq., J.P.
JAMES POWELL, Esq, J.P.

Theodore Mailler Kendall, Medical Adviser to the Metropolitan Water Supply and Sewerage Board, sworn, and examined:—

T. M. Kendall. 19 Aug., 1897.

828. *President.*] In the course of our investigation it has been stated that the stormwater sewers rates have become a very great burden on the revenues of the Board, and a matter of considerable hardship to some of the ratepayers, and we want you, as Medical Adviser to the Board, to give us some idea of the value, from a sanitary point of view, of these stormwater sewers;—a high rate is being paid, but are there not compensating advantages on sanitary grounds; we want you to give us the result of your observations? There is one particular district, Erskineville, which used to be very unhealthy at one time, but it is a curious district. The soil is low-lying and very much water-logged. It is composed of made soils in many places. In Erskineville, as lately as 1893, the average of reported cases of typhoid fever per 10,000 of the population was as high as 60. Since the construction of the sewers, and the consequent drying of the soil and admission of a purer state of air, the incidence of disease has been reduced from that high average to as low as 17.
829. Has that ranged over a sufficient time to show that it is due to that cause, or may it have been some other local cause, drier or wetter weather? No; it has ranged over now a period of nine years, so that it gives a fair time. It has ranged over a time when we have had a very little rainfall, which means that typhoid fever would increase more rapidly.
830. In a period of drought the typhoid fever is more likely to be rampant than in a period of wet, because in the wet weather the flushing of the channels takes place naturally? And the infections are carried away. Of course, we have had a very exceptional year this year. Typhoid fever is very low. The mortality from typhoid is lower than it has been for fifteen years, and the reduction is noticed more in those places

which

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which have been provided with sewers. The highest rate of typhoid fever occurs at the present time in the districts of Annandale and some portions of Marrickville and Leichhardt, which are not yet provided with any proper sewerage scheme. There is no doubt at all that the stormwater sewers have had the effect of drying the soil and decreasing the mortality, not only from typhoid fever, but they have decreased the mortality from diseases in the form of diarrhœa and such like, which used to carry off many children and young adults. The mortality from such diseases has been greatly decreased during the last few years.

831. And that you attribute largely to the construction of these stormwater sewers? And the general sewerage system.

832. You know, I suppose, what brought about the construction of the stormwater sewers earlier than would otherwise have been the case? I understood it was because where it was not possible to provide the people with the permanent system of sewerage, it provided them with what was the quickest form of sewerage to help them along.

833. We want from you some indication to show whether that policy has been justified by results; there are other places besides Erskineville which have storm-water sewers, such as Burwood? In Burwood the mortality has also decreased.

834. Are you aware of any other parts of which that can be said? If you can tell me where the storm-water sewers are, I can tell you.

835. We should like you to think over that question, see where the storm-water sewers are constructed, and give us an idea of their value to the public health; your answer may be a complete one to the complaints that have been made? I will do that.

836. Deaths of typhoid patients removed to the hospital are not shown by the Registrar-General attached to the locality from which the patient comes, but in your reports they are attached to their localities? Yes; in Balmain the average of reported cases is 11·6 per 10,000; Leichhardt, 48·3; Glebe, 11·5; and Annandale, 64·07. Then the west central is considerably less. The east central is much higher; for instance, Alexandria shows as much as 114 per 10,000, and the reason for that is that the power given to the Board for dealing with the old existing sewerage was not sufficient. In Alexandria, where this high death-rate was, it nearly all occurred in one portion, called the Beaconsfield Estate. It is a very water-logged place, near the woollen mills, where they are drying wool. The streets had the sewers through them, but the Board had not the power of compelling the people to connect with them; they could not interfere with the existing sewerage, and the consequence was that we had all this bad state of affairs, just as we had in Ridge-street, Surry Hills, where nearly every house contained a patient stricken with typhoid fever. I personally inspected all these places, which were in an insanitary condition; and when this epidemic became so dangerous I reported it to the Board, and suggested to them that it was necessary, in the interests of public health, that something should be done. They showed the public the benefits to be derived, and persuaded them to connect the houses with the sewers. Since that time we have had no trouble in that neighbourhood at all. I do not think this year there have been more than two cases of typhoid in that locality. These reports that I write show the exact locality, and that would not be obtainable from the Registrar-General at all, because he has not the opportunity of getting it. I get the returns from all sources, and get the address and work out the localities.

837. You will be able to do it under the new Medical Bill? Yes; we will have the notification of disease. When that is proclaimed, then we will have a better state of affairs.

838. Is there anything else you think might be of assistance to us in our inquiry? In 1892, in Balmain, the average of death from typhoid ran at about 23 per 10,000, and it is now only 11. Of course there are many other things which have tended to improve the general health; for instance, in diphtheria we have the improved method of diagnosis, and the improvement in this new and very useful remedy called anti-toxin. Although we have had a very serious outbreak of diphtheria this year, the mortality is greatly less than it has been for seventeen years; but the mortality was decreasing considerably before the anti-toxin treatment was thought of in all those districts where the Board had extended their operations.

839. It is very easy to see that a householder may, if he has a case of typhoid in his house, have to pay as much as ten years' rates in one year? Yes. The householder does not look forward to the future; he only looks to the present. He wants to get as much as he can out of his rent. Here is a copy of my annual report for 1896, and also a comparison of Sydney, Melbourne, Brisbane, Adelaide, Perth, and Hobart, which will show that, although we had a very serious typhoid fever epidemic last year, Sydney till stands out as the most sanitary city of the whole lot. [*Vide Appendix.*]

Henry Sydney Williams, Solicitor to the Metropolitan Water Supply and Sewerage Board, sworn, and examined:—

H. S. Williams. 19 Aug., 1897.

840. *President.*] We wish to get from you any suggestions you may be able to supply as to any measures which may be necessary to the more economical administration of the Department to which you are solicitor. A good deal of evidence has been given to us with regard to issuing distress warrants rather than summonses, and there are one or two other matters upon which we want you to give us some information? Well, I might say that in the administration of the Act up to the present time various defects have come to light, and wants felt with reference to the matters you hint at, as in the matter of proper power to distrain for rates, and so on, and all those defects and wants have been incorporated in a Bill, which has been in draft for a considerable time past, and which has lately been revised and brought right up to date. That Bill is to be presented during the present Session of Parliament. You mentioned the matter of distress; that has been fully provided for in the Bill. The Act as it stands at present is defective in that respect, and the Board have not proper powers to distrain for rates. There is a power in the Act to distrain for rates, but the power is too bald to be made use of generally. It has been put in force in certain cases—for instance in the case of a tenant leaving the premises hurriedly the Board have distrained at the request of the landlord, but they have not made a practice of distraining, because the provisions in the present Act are not considered sufficient to be acted upon generally. The only provision is in the 89th section of the Municipal Act, and that merely provides that the President may issue a warrant under his hand, in the form contained in the Schedule, to levy the rate by distress, and sell all the goods and chattels of the person occupying the premises. There is no provision, as there should be, that the distress is to be carried out under the provisions of the "Distress for Rent and Replevins Act,—" that

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that is to say, the Act does not provide how long the bailiff is to remain there to begin with. The "Distress for Rent and Replevins Act" only relates to the distraint for rent, and it does not in any way touch distraint for rates. The City Corporation, in the "Sydney Corporation Act," have full power to distrain, and the distress is brought under the "Distress for Rent and Replevins Act," and they have power further to charge the bailiff's fees for distraining. The various municipalities have also distress powers under the Municipalities Acts, although somewhat defective. Where the Board have exercised the power of distress they have followed, so far as possible, the provisions of the "Distress for Rent and Replevins Act"; that is to say, the bailiff has remained in possession for five days before selling. It was not considered safe to sell before that time. We thought at all events that no fault could be found if we stayed there for the full time that a landlord's bailiff stays in possession under the "Distress for Rent and Replevins Act"; but then, although no question has arisen (we have not had many distresses), the question is open as to how long we are to remain there—whether we ought to sell immediately or remain there for five days; there is no provision made in the case. Then we have no power to levy for our bailiff's fees, and if we stay there for five days and the bailiff has to be paid 6s. or 7s. a day, it does not pay, especially if the rate is only a few shillings. In the new Bill which has been drafted, full provision has been made for the recovery of moneys by distress proceedings, with power to distrain in all respects as a landlord distrains under the "Distress for Rent and Replevins Act," and with power also to levy for the bailiff's fees, under a schedule of fees similar to that which has been already passed by both Houses for the Hunter District Bill. I think the Assembly took the whole of the distress clauses out of the Hunter District Bill, but I understand that they are still under consideration, reasons for their inclusion in the Bill having been supplied. We have copied the provisions of the Hunter District Bill which passed the Legislative Council in that respect. Such provisions were originally prepared by myself on behalf of the Metropolitan Board. I think that is all I can say about distress.

841. We have had the Mayor of Sydney before us, and also Mr. Jeanneret, one of the aldermen, and they have drawn special attention to this power of levying by distress which they possess, and which they say, and I suppose it is a fact, is more economical to the ratepayer, and they thought that the Board had the same power, and said they could not understand why you should resort to the more expensive and more cumbrous system of summonses. Your answer is, that the Councils have the power to put the "Distress for Rent and Replevins Act" into force. The "Distress for Rent and Replevins Act" deals simply with rents, and does not apply to rates; but the Municipal Acts have adopted the machinery of the "Distress for Rent and Replevins Act," and made it applicable to rates, and that you cannot do? I think, in the case of the Municipalities Act, they have somewhat similar powers enacted; but in the "Sydney Corporation Act" the provision is that the distress is to be in accordance with the terms of the "Distress for Rent and Replevins Act. Speaking from memory, I think, that is the case.

842. The Act adopts the machinery of the Rent and Replevins Act? Yes.

843. But you do not possess that? We do not possess it, and it would not be safe to resort to distraining as a system under our present Act as it stands.

844. As a fact, you have got the principle laid down, but the machinery is not there? Yes.

845. Is it a fact that it will be much more economical to levy rates under that Act than under summons? In some cases it may, and in other cases it may not. Take the case of summonses in the Small Debts Court—all summonses for amounts ranging from 5s. to £10. Under the present Act the Board issue a small debts summons, and that is the only expense the ratepayer is put to. If he pays the money into court he pays the summons fee of from 2s. to 5s. to the court with it, and there is an end of it; but if a bailiff is put into that man's house there is a levy fee to start with, and then if the bailiff is any time in possession, if he follows the usual custom of bailiffs, he will charge the usual days' possession fee, which would be 6s. or 7s. more, making, say, about 9s. for expenses. In small debts cases, I think, the ratepayer will not benefit in any way by the change; but in larger cases, in cases where the amount sued for is over £10, and where the Board at present issue a summons in the District Court on which the fees are heavier some 17s. 2d. or something like that—of course the ratepayer would be benefited.

846. Is levying by distress a more speedy process than by summons? Possibly it may be more speedy. In the majority of cases, I suppose, when the bailiff comes the money would be paid. Of course, where a summons is issued it is generally two or three days before the bailiff serves it. As a rule he has so many that though some may be served the same day it may be two or three days before the whole are served.

847. Then the adoption of this distress system would rather benefit the richer than the poorer class of people—that is to say, it would reduce the expenses of those who have to pay the larger amounts rather than the expenses of those who have to pay the smaller amounts? Yes. I think it is a very desirable power to have, because often it is necessary to put a bailiff into the place at once; for instance, in hotels, when the transfer of the license is about to take place, or where a tenant is about to remove his goods, the landlord comes in and asks us to protect him against the rates that are owing. In cases of that kind the Board should have full power to make distress as a matter of convenience, but it remains to be seen how it will work if adopted as a practice.

848. The evidence of the City Council is that it works very well; they have that power, and the threat to use it is generally sufficient;—the Mayor said there were surprisingly few cases where they had to carry it out? I think if a return were asked for from the City Council it would be found that very few distress warrants are issued, because the people pay up, as a rule. The same thing is coming about with the Water and Sewerage Board. Nothing like so many summonses are issued now as were issued years ago. The people pay up very well. So far as I am concerned, in dealing with the District Court summonses I have comparatively little to do in the way of recovering rates. Of course there are other moneys that are not paid up so well, but then that is through stress of circumstances as a rule; I mean moneys for compulsory drainage works, and such like. The necessity for proceedings for the recovery of rates seems to be gradually dying out.

849. Are there any other legislative powers which you think it desirable to take with a view to working with economy and efficiently? Of course there are many powers it is desirable to have to enable the Board to work with more efficiency, and those powers are incorporated in the Bill. Whenever any defect or requirement is brought to light it is brought before the Board and thoroughly thrashed out, and then consideration is given to the best means of remedying it. It is then put into form, and a note kept of it. All those amendments and requirements have now been incorporated in this Bill, which we hope will

make

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make the Act thoroughly workable. There has been a great difficulty in connection with the old city sewerage. The Amending Act of 1889 enabled the Board to compel connections with sewers laid down by the Government, but did not cover connections with sewers laid down by the old City Council, and that difficulty has been very much felt by the Water and Sewerage Board. I believe there are a great many places in the city which should be properly connected with the sewer, and the owners have refused and neglected to connect. Complaints have been made to the Water and Sewerage Board by neighbours and residents in the district, and they have been helpless, powerless in the matter. But in the new Bill full power has been taken to compel persons to properly connect—to make proper sanitary connections with the sewers, although they may be the old city sewers.

850. That is a defect which evidently very much needs to be remedied? Yes, very much indeed.

851. Is there anything else? No.

852. And all these improvements will be found in the new Bill, which has not yet been tabled? Yes. It has been finally approved of by the Board, and I think it is now in the hands of the Minister.

Melbourne Green, Accountant to the Metropolitan Water Supply and Sewerage Board, was sworn, and examined:—

M. Green. 19 Aug., 1897.

853. *Mr. Wilson.*] Is this copy of the evidence which you now hand in a correct transcript of the evidence given by you on the 10th instant? Yes.

Thomas Kennedy, Examiner of Accounts and Auditor to the Metropolitan Water Supply and Sewerage Board, was sworn, and examined:—

T. Kennedy. 19 Aug., 1897.

854. *President.*] [*Handing transcript of evidence given by witness on 10th August.*] That is the evidence you gave? Yes.

855. You swear to that as true and correct? Yes.

856. Have you anything more to say? There are many things that have cropped up during my term of office that have had to be put right, but they are gradually settling down, and we are getting into a good groove.

MONDAY, 6 SEPTEMBER, 1897.

Present:—

JOSEPH BARLING, Esq., J.P. (President).
GEORGE ALEXANDER WILSON, Esq., J.P.
JAMES POWELL, Esq. J.P.

William Holmes, Secretary to the Metropolitan Water Supply and Sewerage Board, further examined:—

W. Holmes. 6 Sept., 1897.

857. *President.*] I think you are prepared to give us certain further statistics with regard to the Water and Sewerage Board? Yes.

858. We shall be glad to have, first, the gross revenue for the year ended 30th June, 1897, both for water and for sewerage? Water, £175,984; sewerage, £87,652.

859. What were the gross working expenses and maintenance expenses for water and for sewerage to the 30th June, 1897? For water, £40,821; for sewerage, £29,680; and depreciation in value of plant and machinery, £4,336.

860. What is the interest payable on the capital? 3·789 per cent. The interest at 3·789 per cent. is £215,378 1s. 7d.

861. The rate of interest is that which you have ascertained to be actually payable on the debt? That is the average rate paid by the Government.

862. We want to know also the net balance on the year's operations to meet interest on capital? That is £188,799 6s. 4d.

863. What is the deficiency on the year's operations? £26,578 15s. 3d. You see we still have that £28,000 worth of interest to carry forward this year, the interest on the Potts Hill reservoir, and the duplicate pipe line to Potts Hill. That was the cause of the decrease last year.

864. What is the estimated value of the free-water services? £19,535 17s.

865. What were the arrears of rates and charges outstanding? £42,455 8s. 4d.

866. Will you give me the items included in the arrears, say the meter accounts? Meter accounts included in the arrears £16,364 9s. 6d. That represents principally the accounts rendered to the 30th June, 1897.

867. Accounts just rendered? Yes.

868. What were the rates, charges, &c., held in abeyance? £7,990 9s. is the amount owing on churches, Sunday schools, and charities.

869. I think you are not likely to recover that? I think not, because we have always given the people to understand that, at the wish of the Minister, it would not be enforced. We had no power to exempt.

870. You gave them to understand that it would not be collected? Yes.

871. What are the arrears of rates on vacant lands, owners unknown? £7,741 17s. 1d.

872. Will you give me, please, the capital cost of the works, both on account of water supply and sewerage? Water supply, £4,244,550; sewerage, £2,018,120.

873. What is the number of municipalities and districts reticulated? Water supply, 57; sewerage, 24.

874. What is the mileage of reticulation? Exclusive of trunk and pumping mains—water-mains, 947 miles; sewers, 274 miles.

875. What is the estimated population served? Water, 418,512; sewerage, 228,446.

876. What is the aggregate revenue from the inception of the Board? Water, £1,486,414; sewerage, £654,072.

877. What is the capital cost of the works constructed by the Board and by the Government, respectively? Works constructed by Government loans, £5,499,978.

878.

878. That is not respectively—that is together? I thought you wanted them together.
879. You have not got them now? No.
880. What is the cost of the works taken over from the municipalities? £762,693.
881. Does that include the City Council? Yes; the City Council's Water Fund.
882. What is the total cost of the Board in salaries and fees since its inception? £18,604.
883. What is the number of rate-notices issued during the year ending June, 1897? 279,101.
884. What is the number of meter accounts for the same period? 10,468; the number of meters fixed being 6,844.
885. What is the number of the office staff in the professional division and the clerical division? The total at the 30th June was 443, but owing to a misconception this morning I am unable to divide the figures up. I will send it to you.
886. Will you please get the salaries as well? Yes.
887. What was the deficiency last year? About £28,000.
888. This year it is £26,000? Yes.
889. Do you see any chance in the ordinary course of events for that to be overtaken unless some remedial measures are taken? I think what will be done first will be that the 5 per cent. discount will be removed. That represents £9,000.
890. And then there is a proposal to increase the minimum rate from 10s. to 15s.? And that represents £9,000 odd.
891. *Mr. Wilson.*] Is it proposed by the Board to seek Legislative consent to raise the rate? Yes.
892. What do you estimate would be the additional revenue to be obtained by thus raising the minimum rate to 15s.? Water, £6,903 15s. 6d.; sewerage, £2,744 11s. 3d.; making a total for water and for sewerage of £9,648 6s. 3d.
893. In thus raising the minimum rate, would there not be a likelihood of evoking the cry of poor *versus* well-to-do ratepayers—that is, would it not be said that the increase would affect only the poorest ratepayers, without adding any corresponding burden to the richer classes of ratepayers? The Board considers that small properties are let off too lightly. For instance, in a small property there may be six or more inmates, and all they pay is 5s. per half-year. There was a discussion on the matter in the Board a few weeks ago, and I think the vote was unanimous, and they considered that if there were tanks and wells it would cost more for buckets and ropes to haul the water up than the 5s. for which the people have the water carried to their door.
894. At 10s. the Board think they are selling the water too cheap? Yes.
895. At 15s. would it be too cheap? They consider that would be about right.
896. Might it not also be alleged that the Board are trying to make the poor ratepayers responsible for the loss incurred by the Board's operations? I think the answer to that is that the smaller people have got off a great deal too lightly for the value they have received already—that they have not paid commensurately with the value they have received.
897. They will be paying no more than their share? We do not consider they have paid their share.
898. Is it the case that the landlords as a rule pay all rates, including water and sewerage rates, on that class of properties which come under the minimum rate? Yes, as a rule they do.
899. Could the discontinuance of the 5 per cent. discount be considered as an increase in the rates paid by the richer class of the community, corresponding to the proposed increase of the minimum rate? It is the people with the property lists chiefly who benefit by the discount.
900. It has been stated that the present sewerage rate of 7d. in the £ is insufficient to produce the revenue required to meet working and maintenance expenses and the interest payable on the capital cost of the sewerage works, more particularly in those districts where storm-water drains have been merged in the general sewerage system;—is that so? Yes, that is so. Certainly, the 7d. is insufficient, and will be insufficient. With regard to the western suburbs and the North Shore works, which matters will have to be dealt with very soon now that the outlets are nearly ready, the matter was discussed by the Board when the Amending Bill was before them, and they are seeking power to raise the rate, if necessary, to 8 per cent. on the assessed value; at present they are limited to 5 per cent. It is recognised that 7d. in the £, or even 1s., will not pay in the case of the western suburbs and North Sydney.
901. *President.*] The rates are 7d. in the £ now? Yes.
902. When the main sewers are constructed the debt on the storm-water sewers will be merged into the general debt? Yes.
903. Have you estimated at all what increase in the general rate is required to meet that larger capital debt? I prepared some returns for the Board, when they were considering that clause in the Bill. I got out four returns for them. The first was at North Sydney. The return shows the amount expended to date and the estimated amount to complete, and I have put in the cost of the storm-water ducts, and everything that will be charged to the sewerage over there, and what will be charged for reticulation; and on the other side I show the interest on the cost at 3½ per cent., and the annual instalment to redeem the renewable works at the end of 100 years, and also the annual chargef or maintenance and management; and with the revenue from the properties that will be rateable, I find it will be necessary to charge there 1s. 6d. in the £. 1s. is our maximum at present.
904. Will that meet all the charges? I think it will at present. The next is the western suburbs. I have dealt with that in the same way, and I find that, taking the revenue at 2s. 2d. in the £, it will only just about pay. The cost of the work has very largely exceeded the estimate. That is one cause; and then the cost of the storm-water channels was not anticipated at the time, and not included in Mr. Stayton's estimate. There is £200,000 there.
905. I think you are wrong there. It was always anticipated that storm-water channels would have to be constructed. You will find that that was mentioned in the Public Works Committee's report? I have not seen it. Then, the estimate of revenue by Mr. Stayton was based on the whole of the ratable properties of the boroughs; but a great deal of the property will not be ratable for sewerage at all, because the only property that can be rated is property within 150 feet of the sewer. Then it was anticipated that it would increase to a very great extent, so that by the time the sewerage was completed the ratable property would have increased to something like £3,300,000; but, instead of that, it has gone down.
906. That was in the boom time, I suppose? Yes, it was.

W. Holmes. 6 Sept., 1897.

907. One will require 1s. 6d. and the other 2s. 2d. in the £? Yes. Then I have prepared another return, including the city and the whole of the suburbs, pooling the whole lot, and charging one uniform rate. That works out at 10½d. in the £. Then, if North Sydney were put in, it does not make much difference—about 10½d. or 11d. in the £ would do it there then. If you make a uniform rate throughout the whole of the areas, you will come within the 5 per cent.; but if it is considered right to keep them as separate schemes, then we will have to increase our maximum and pass the 5 per cent.

908. The western suburbs will be wholly discharged at the western out-fall sewer? Yes.

909. None of it will go into the Bondi sewer? The eastern suburbs will go to the northern out-fall; others will go to Botany.

910. You have pointed out that the metropolitan area, including the western suburbs, gives 10½d.? Yes.

911. But if you strike out the western suburbs a much lower rate can be levied on the metropolitan area? The city and suburbs at present draining into Bondi and Botany are charged 7d., and that is hardly sufficient. If you deal with the western suburbs by themselves it will require 2s. 2d., but if you add the two together and charge a general rate for the lot, it would raise the rate for the valuable properties in the city to 10½d. If the western suburbs are left out, the city will pay as it is now.

912. So the increase in the rate that the city will have to stand if it takes on the debt of the western suburbs will be 3½d.? Yes; Sydney would have to pay 3½d. to supply the outside properties with sewers. The matter was discussed by the Board, and they thought that ought to be dealt with separately.

913. Is it not a fact that a good portion of the drainage of the city goes into the Botany out-fall? Yes.

914. Is it not a fact that some of the western suburbs drain into the Botany out-fall also? Portions of Alexandria and Newtown do. Newtown is on the ridge. Some portions of Newtown drain to Botany, other portions on the other slope we cannot drain until the western out-fall is completed.

915. Does the Board propose to ask Parliament for power to increase the present sewerage rates? That, I think, I have just answered. Yes. Not the sewerage rates generally; the sewerage rate in the western suburbs and North Sydney they propose to ask Parliament for power to increase, if necessary, to 8 per cent. on the assessed value, instead of 5 per cent. as at present.

916. That is simply on account of the storm-water channels? Not only on that account, but on account of the great cost of the western suburbs sewers.

917. *Mr. Wilson.*] It is not proposed to pool them? No. It is recognised that it would be unfair to heap up the sewerage rate on the city properties for providing sewers for Strathfield and Burwood and the other outlying suburbs.

918. What is the amount of the additional revenue required to balance the revenue and expenditure in respect of the sewerage works? I cannot answer that question as you have put it. I have got out the returns in a different way. I have given you the result as to what rate it will be necessary to charge. 7d. in the £ will not pay for the storm-water channels, and I am quite sure another 5d. will not pay for the completed sewerage; but if the people pay for the sewerage they will not have to pay for their closet pans, as at present, or drainage rates.

919. *President.*] You have some other returns to hand in I believe? Yes. Here is a return showing the number of properties rated, and the population supplied with water at the time the Board assumed control in 1888, together with the districts reticulated, also a corresponding return as on the 30th June, 1897. And then you asked also for a report made up to the end of June last as to the Board, so I have prepared another return to take the place of that previously furnished, showing what the total cost has been from the inception of the Board.

920. Speaking about the deficiency;—you made portion of that up, did not you? That is another matter. There should be an authority to take credit for the free services rendered.

921. That would more than cover the deficiency? If they had that and the discount it would more than cover the deficiency. You see it is not a rate; it is actually water supplied. It is a service rendered.

922. Which has cost you money;—the deficiency has arisen partly on account of you having to do that? Yes. The figures had never been got out before. The most of it was, and is, pumped water.

923. In other words, that free service represents an actual cost to the Board for which you get no credit whatever? Yes. We have tried to get over that difficulty in the Amending Bill by putting in a provision that the Board may (the same as the Hunter District Board), but shall not be obliged to, supply the water mentioned in section 63 of the Act. There should certainly be some power to take credit for it as revenue.

924. The ground on which the churches were remitted was that they actually did not get the water. Wherever the water is used there they pay, but a large number of them do not get the water? No; it is not supplied at all. I have carefully excluded them from my statement.

925. *Mr. Wilson.*] But even they get the benefit for fire protection? Yes.

THURSDAY, 9 SEPTEMBER, 1897.

Present:—

JOSEPH BARLING, Esq., J.P (President).
GEORGE ALEXANDER WILSON, Esq., J.P.
JAMES POWELL, Esq., J.P.

William Holmes, Secretary to the Metropolitan Water Supply and Sewerage Board, further examined:—

W. Holmes. 9 Sept., 1897.

926. *President.*] When here last you gave us some statistics to show what rating would be required to enable interest and expenses to be paid on the sewerage for the western suburbs;—2s. 2d. was the rate required? Yes.

927. We then asked you to put the matter in another form, showing what would be required if a general health rate were struck for the whole drainage area, leaving the balance to be paid by those who have actually connected with the sewers? Yes.

928. Have you prepared that return? I have considered the matter very carefully, and produce for your information a memorandum I have prepared on the subject, dealing with the western suburbs sewerage scheme

W. Holmes.
9 Sept., 1897.

scheme and the North Shore scheme; also two examples, showing how property will be affected if this new rate is brought into force, as follows:—

WESTERN SUBURBS SEWERAGE SCHEME.

MEMORANDUM as to striking a general or health rate for the whole of the sewerage area, and also a special rate on properties adjacent to the sewers, instead of one uniform rate only on properties which can connect.

It is anticipated that the cost of the sewerage system of the western suburbs, when ultimately completed, including storm-water channels, will be £1,279,042. This sum I have divided up as follows:—

Permanent works, which will not require renewal £955,862
Renewable works, which will probably last 100 years £323,180

The assessed annual value of the ratable property, including vacant land, within the boroughs and municipalities concerned, is £959,480.

In order to pay interest at the rate of 3½ per cent. per annum on the cost of permanent works, the sum of £33,455 is required, and the annual instalment necessary to redeem the cost of renewable works in 100 years, at 3½ per cent., is £11,686, making the total sum to be provided by a general rate on all properties, including vacant land, within the municipalities or sewerage area, of £45,141.

To raise this amount it will be necessary to strike what might be termed a health rate of 11¼d. in the £ on the assessed annual value.

The assessed annual value of the ratable property, including vacant land, adjacent to the sewers, or which would be liable under the existing system of rating, is £593,091.

In order to provide for expenses of maintenance and management of all works, permanent and renewable, of a value of £1,279,042, at 1½ per cent. per annum, a sum of £19,185 will be required.

To raise this, a special or sewerage rate of 7¾d. in the £ must be struck on all properties which can connect, or, rather, which are liable under existing system, in addition to the health rate before alluded to.

The total rate, therefore, on properties which can make use of the sewers will be 1s. 7d. in the £, and on those which cannot connect, 11¼d. in the £.

As this latter seemed to me a rather high health rate I have worked out, for the information of the Commission, the rates that would be necessary if those distant from the sewers were charged only on the cost of the permanent works, while the sinking fund, and maintenance and management, are debited to those who can make use of the works. The result is as follows:—

Permanent works.

£955,362, at 3½ per cent—£33,455; general health rate, 8¼d. in the £.

Renewable works.

Annual instalment to pay off £323,180 in 100 years at 3½ per cent., £11,686 ..... } £30,871; special sewerage rate, 12½ in the £.
Maintenance and management, £,1279,042, at 1½ per cent., £19,185 ..... }

The total rate on properties which can connect would thus be 1s. 8¾d. in the £, and 8¼d. in the £ on all others.

It must be borne in mind that these statistics are based on the ultimate cost of the scheme when finally completed but the figures in regard to revenue are on the properties at present in existence. The subject is therefore presented in its worst form, and it is almost certain that it will never be necessary to impose such high rates as those mentioned, as it is only reasonable to suppose that before the works are all carried out there will be a considerable increase in the number of houses.

It should also be remembered, with reference to those premises liable for the higher rate, that immediately the sewers are available for connection—or, rather, as soon as the houses are connected—the charge at present levied by the local council for attending to the dry earth-pans will cease. The charge in many of the boroughs for this service is high, in Strathfield being as much as £3 12s. per house per annum for attending to one pan twice a week. The drainage rates at present charged will also cease.

If the system of rating at present in force in the city and other districts now reticulated is to be followed in the western suburbs, it will be necessary, on the figures above furnished, to levy a rate of 2s. 2d. in the £.

WESTERN SUBURBS SEWERAGE.

Ultimate cost of Works.	Amount.	Total.	Ultimate revenue required.	Total.
Government Main Sewerage Ducts—	£	£	Interest on total cost of Governments Works—	£
Cost to date	321,650		£955,862, @ 3½ per cent. per annum.....	33,455
Amount to date.....	434.212		Annual instalment to redeem £323,180 in 100	
		755,862	years, @ 3½ per cent. per annum	11,686
Government Storm-water Sewer Ducts—			Maintenance of works reckoned @ 1½ per cent.	
Cost to date	134,410		on total cost, £1,279,042	19,185
Amount required to complete.....	65,590			
		200,000		
Board's Reticulation Sewers—				
Cost to date	25,575			
Amount required to complete	297,605			
		323,180		
	£	1,279,042		£64,326

Examples.

(*a*) House, Redmyre-road, Strathfield. Assessed annual value, £117—

Sewerage rate, at 2s. 2d. in the £		£12	13 6
Less drainage rate	£3 8 3		
Less earth-pan fees	2 12 0		
		6	0 3
Additional amount for complete sewerage system		£6	13 3
Health and sewerage rates, at 1s. 7d. in the £		£9	5 3
Less drainage rate	£3 8 3		
Less earth-pan fees	2 12 0		
		6	0 3
Additional amount		£3	5 0
Health and sewerage rates, at 1s. 8¾d. in the £		£10	2 3
Less drainage rate	£3 8 3		
Less earth-pan fees	2 12 0		
		6	0 3
Additional amount for complete sewerage system		£4	2 0

(*b*)

W. Holmes. 9 Sept., 1897.

(b) House, Albert-street, Homebush. Assessed annual value, £108—

	£	s.	d.
Sewerage rate, at 2s. 2d. in the £	11	14	0
Less earth-pan fees	2	12	0
Additional amount for complete sewerage system	£9	2	0
Health and sewerage rates, at 1s. 7d. in the £	8	11	0
Less earth-pan fees	2	12	0
Additional amount for complete sewerage system	£5	19	0
Health and sewerage rates, at 1s. 8¾d. in the £	9	6	9
Less earth-pan fees	2	12	0
Additional amount for complete sewerage system	£6	14	9

NORTH SYDNEY SEWERAGE.

The estimated cost on full completion of this scheme, including storm-water ducts, is £204,500—

Permanent works	£135,000
Renewable works	£69,500

The assessed annual value of ratable property within the municipality is £202,460.

The amount required to pay interest of 3½ per cent. on the cost of permanent works is £4,725, and the annual instalment necessary to redeem the cost of renewable works in 100 years, at 3½ per cent., is £2,513. The total sum to be provided by a general or health rate is therefore £7,238.

To raise this sum a rate of 8½d. in the £ must be struck.

The assessed annual value of ratable property, including vacant land, which would be liable under the present system of rating, is £134,996.

To provide for maintenance and management of all works valued at £204,500, at 1½ per cent., a sum of £3,067 will be required.

To raise this a special or sewerage rate of 5½d. in the £ must be charged.

The total rates on properties which can make use of the sewers would therefore be 1s. 2d. in the £, and on others 8½d. in the £.

If the interest on cost of permanent works only is to be raised by a health rate, charging the sinking fund on renewable works and maintenance and management to those who can connect, the result will be—

Health rate	5½d. in the £
Sewerage rate	10 ,,

The total rate on properties which can connect would then be 1s. 3½d. in the £, and on others 5½d. in the £.

If the system of rating at present in force is adopted, a sewerage rate of 1s. 6d. in the £ must be charged.

NORTH SYDNEY SEWERAGE.

Ultimate cost of Works.	Total.	Ultimate revenue required.	Total.
	£		£
Government Main Works—Constructed and in progress	110,000	Interest on cost of Main Works—£135,000, @ 3½ per cent.	4,725
Board's Works—Constructed and in progress or under surveys	45,000	Annual instalments to redeem renewable works —£69,500, with interest @ 3½ per cent. in 100 years	2,513
Storm-water Ducts, for which authority has been obtained by Public Works Department	10,000	Maintenance and management—£204,500, @ 1½ per cent.	3,067
Amount paid Borough Council for their drains	4,500		
Portion Neutral Bay sub-main	15,000		
Reticulation	20,000		
	£204,500		£10,305

929. *President.*] Are you aware what system they adopt in the Old Country with regard to their rates? No; not with regard to sewerage, but I understand that in Melbourne they follow the system about which you are seeking information, *i.e.*, the general rate for the whole sewerage area, and a special rate for those who can connect. I have no information, however, as to how that is working. Mr. Thwaites, the engineer, is in Sydney, but I have not been able to see him.

MONDAY, 13 *SEPTEMBER*, 1897.

PRESENT:—

JOSEPH BARLING, ESQ., J.P., PRESIDENT.
GEORGE ALEXANDER WILSON, ESQ., J.P.
JAMES POWELL, ESQ, J.P.

Joseph Davis, Engineer for Sewerage Construction, Public Works Department, further examined:—

J. Davis. 13 Sept., 1897.

930. *President.*] On Thursday last Mr. Holmes, the Secretary to the Metropolitan Water Supply and Sewerage Board, gave us certain evidence in connection with the probable financial results of carrying out the sewerage scheme of the western suburbs. These results are surprisingly different from those which were submitted to the Public Works Committee when this scheme was before that body. I have given you a copy of Mr. Holmes's evidence, and now we ask if you can kindly give us some explanation of the large difference which appears in the results from those put before the Public Works Committee. You have read Mr. Holmes's evidence? Yes.

931. We would like you to put it in your own way, and will be glad if you will first give us the statement that Mr. Stayton made? I propose to read from the Committee's report several extracts which will put before the Commission the case as it appeared to the Committee.

932. And then we want to know the real case as it appears now? First of all, with regard to the cost of the scheme which was submitted to the Committee in 1888: Mr. Stayton, in the first instance, prepared a report, in which he went very fully into his proposals, and, at the same time, gave the cost of the scheme.

On

J. Davis
13 Sept., 1887.

On page 29 of his report, which is attached as an appendix to the Committee's report, he gives the cost of the proposal as £830,304. When being questioned by the Committee he went into the matter more fully, and, in answer to question 111, on page 5 of the evidence, referring to the cost, he handed in a supplementary paper giving the ultimate estimate of cost of completing the sewerage system throughout the western suburbs. That statement is contained in Appendix C 1, and given on page 382 of the Committee's report. . He makes the ultimate cost of the works £1,817,896. In that estimate is included the £830,304 already given; and, in addition thereto, the completion of the main works, £400,000 for reticulation and £20,000 for the Marrickville stormwater sewer. The Committee referred to the evidence, and also to Mr. Stayton's report in their report on page 9 section 7, in which they give the cost of the works submitted to them as £830,304; and also in paragraph 8 give the estimate, which was stated by Mr. Stayton as £1,817,896, as being the ultimate cost of the scheme. The matter was again before the Committee when that body considered the reticulation on 6th February, 1890, when the then Under Secretary, Mr. Barling, referred to the previous report very fully, and brought under the notice of the Committee the fact that they had considered this large sum of £1,817,896 at that time; and that, therefore, the question of reticulation, which was then submitted, was simply a matter of form. It is evident that the Committee took that view of the case, and recommended that the works then submitted to them, amounting to £400,000, should be carried out. I refer to these statements in order to show that the cost of the work itself was quite understood from beginning to end.

933. You have read Mr. Holmes' statement here; he gives the approximate estimate of £1,297,042; just explain the difference between that and the £1,817,896? I was coming to that. In the £1,817,896 given by Mr. Stayton, in his statement, includes a sum estimated for works to cost £878,678. Mr. Holmes deals with the same works, and estimates that they will cost £755,862. Then again, in the £1,817,896 is included £400,000 for reticulation. Mr. Holmes has given the ultimate cost of the reticulation as £323,180. The £200,000 given by Mr. Holmes, for the stormwater channels, was not included in the sum I have given, £1,817,896.

934. Does that bring it out right? Included in that £1,817,896 is a large quantity of work which it is not proposed to carry out for the present. Mr. Holmes states that he has excluded that also. I think Mr. Holmes must have got those figures from our office.

935. Is it largely reticulation that is left out? No; only £77,000 of reticulation is left out.

936. And what is the large balance made up of then? I can give you precisely what it is:—Canterbury and Enfield main sewer, first part, £20,741; Marrickville stormwater drainage, £20,000; completion of Canterbury and Enfield main sewer, £65,410; Low-level system, £119,650; completion of Marrickville pumping station, £6,817; completion of sewage farm, £32,600; proportionate cost of works in northern and southern outfall systems, £274,000, and reticulation, £76,820; saving, £122,816.

937. But is not that included in your estimate? No; it is not included.

938. But so far as the scheme is at present concerned you think this £1,297,042 might be taken as fairly correct? Yes; but I will check the figures given carefully. I feel some hesitation, at the present moment, in speaking as to it.

939. Did you give these figures to Mr. Holmes? No; one of my officers gave the first figures on that statement. I will give now the total cost of the work to the 1st June, the date on which I got my returns for the western suburbs work included in the £830,304, plus the completion of the western outfall sewer, £48,374, making a total of £878,678: The total cost of the works to the 1st June comprised in that sum is £509,829, and the estimated cost of completing the works included in that sum is £246,033, or a total of £755,862—a difference between the estimate given by Mr. Stayton, in favour of the work when it will be executed, of about £120,000.

940. That is to say, you will save £120,000 on Mr. Stayton's estimate given to the Public Works Committee? Yes. I have here the cost of the northern system, as far as the Public Works Department is concerned; but perhaps I need not trouble the Commission with that.

941. I think we need not trouble with that, because the great discrepancy is in the western; you see the figures given by Mr. Holmes are the figures given by you, so there is no discrepancy in that? Perhaps it will be necessary for me to say a word with regard to the stormwater channels. The cost of the stormwater channels up to date is £203,726; but included in that sum are the following sewers and sums which I anticipate will not be transferred to the Board, because the sewers are really necessitated by the reclamations. They are as follows:—

	£	s.	d.
University Orphan School Creek	1,218	7	3
Neutral Bay	5,374	17	6
Careening Cove	1,200	0	0
Johnston's Creek	8,500	0	0
" "	1,152	15	8
Callan Park Reclamation	17	9	5
Long Cove Creek	661	5	6

There is an amount of £8,185 12s. 1d. for Beattie-street, Balmain, a proportion of which only will be charged to the Board; but I am not in a position to say what proportion. The stormwater channels under construction are estimated to cost £25,986, £6,000 of which will not be chargeable to the Board.

942. What will that come to. You see the Board give the cost of the stormwater sewers to date as £134,000 odd, and the amount required to complete as £65,000 odd, total £300,000? That is £202,266, approximately the same as the Board gives.

943. Is there anything else you wish to say? Not with regard to the cost.

944. Then we might take that £1,279,042 as being a fair statement? Yes.

945. I think you suggested that some of the amounts charged here to the western system ought really to go to some of the other outfalls? Well, what I say is this, that the continuation of the northern system into Balmain from the junction of the Newtown and Parramatta Roads to the termination is included in that sum; in addition to which is included the completion of the southern system.

946. That should undoubtedly come out. Can you tell me what that amount should be? I might explain that the whole of the area dealt with by Mr. Stayton, including the completion of the northern system, the completion of the southern system, and the initiation and completion of the western system, was included in what was known as the western suburbs scheme, and that accounts for the sums being included

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included in the way they are. Mr. Stayton, in preparing his statement, debited the western suburbs scheme, the area that he dealt with, with a proportion of the cost of the Bondi outfall, and also a proportion of the cost of the southern outfall. Those sums he made as follows:—Northern outfall, proportion of cost £88,000, southern outfall and sewage farm £186,000, making a total of £274,000; it was money actually spent.

947. The meaning of that is that a portion of that expenditure would be required for the completion of the southern and northern areas? No. The money had actually been spent at the time of the report, and he credits the western suburbs area with the amounts I have given.

948. In other words a portion of the work had been carried out chargeable to the votes which had been taken up to that time, but should really have been debited to the western suburbs scheme? Yes.

949. Now, I should like to know how such of the moneys given here as chargeable to the western suburbs, scheme should really have been debited to the northern and southern schemes? As far as the northern system is concerned £122,927 10s. 10d.; that contains an estimate of £12,000 for a contract that is not let.

950. Still that ought to be taken out. Now, the other? £13,345 6s. 6d.

951. That is £136,272 17s. 4d., and Mr. Holmes's estimate should be reduced by that? These are the actual figures prepared from the accountant's books.

952. And they should be deducted from the estimate for the western suburbs? Yes. I should like to point out this, that in that reticulation of £323,000 given there, there would no doubt be a like proportion that has been carried out in conjunction with the northern and southern systems.

953. Now, about the stormwater ducts. The Board state that you have spent a larger sum on the stormwater ducts than the actual necessities of the sewerage scheme demand—that is to say, that you have carried out what ought to have been municipal stormwater sewers as if they belonged to the sewerage system proper? The stormwater ducts above, where they can be made use of as overflows, would certainly not be adjuncts to the sewerage scheme proper, but at the same time the special circumstances under which the stormwater channels were carried out have to be borne in mind. At that time it is well known that these creeks were in a very insanitary condition, and there was very much fever in the western suburbs, and the two questions were considered, the providing of overflows for the sewerage system, and dispensing with a very undesirable state of things, and it was concluded that the best plan would be to carry out these ducts, which could be executed very quickly, in anticipation of the scheme. No doubt, if you look at the ducts strictly in accordance with the sewerage system itself, there is a proportion, only a small proportion though, that is not absolutely necessary for the overflows.

954. How much do you think that would come to? I have never looked into the thing carefully. I can do that if you wish the information, but I should say not more than 10 per cent.

955. So that £20,000 would cover that? Yes. The upper portions of the channel are small, and these are the parts which would not be required; and the lower portion would be required, and they are the costly portions.

956. When the sewerage works proper are carried out I suppose the upper parts of the stormwater sewers which are now used to carry off the foul water will not be necessary at all? They will not be necessary to carry sewage, but still they will be useful as stormwater ducts, and then it might be a question whether the municipality would not have to do that work themselves; but seeing that the ducts were required at the time for the purpose of carrying off the liquid sewage, in anticipation of the sewerage proper, there is no question the Government did what was right in carrying them out.

957. As a matter of fact, will not the people have good value for their money even if they have to pay a higher rate for it? I think so.

958. Do you think £20,000 would be sufficient to pay for the excessive stormwater ducts over and above the stormwater ducts proper? Yes. The question of stormwater ducts is no new scheme. I can read several quotations from Mr. Stayton's report in which he contemplates that they should be carried out. First of all, in page 15 of the appendix attached to the Committee's report, in Mr. Stayton's report he refers to the existing drains, and advises that those drains that have been constructed and can be made use of should be taken over from the municipal councils, and that has been done.

> "Several of the municipal councils have expended considerable sums of money from time to time in the construction of drains and culverts in various streets for the removal of refuse water from the surface channels. The adoption of these measures may have afforded relief in the immediate vicinity, but the nuisance has only been removed to an adjacent watercourse or creek. Although these works cannot be otherwise regarded than as temporary expedients for the removal of liquid refuse, they may, however, be hereafter utilised with advantage for the removal of surface waters during rainfall."

Then, on page 19, referring to the necessity for overflows to assist the proposed sewers, he says:—

> "The proposed sewers are designed to carry off the foregoing combined quantities when flowing about three-quarters full, but should a heavier rate of rainfall occur during the six hours of maximum sewage flow the excess of stormwater would be carried off by overflow-weirs, which would act as safety-valves in case of sudden emergency. It must be borne in mind that the capacity of the sewers is such that several years must necessarily elapse before the actual catchment area would become so great as to cause over-charging or back-flooding. This, however, could always be prevented by making sufficient stormwater overflows, or by providing relief sewers hereafter as may be found necessary. The small quantity of sewage contained in stormwater so discharged into natural watercourses would be so greatly diluted as to be rendered perfectly unobjectionable."

Then, again, on page 30 of his report he refers to the stormwater drainage in a paragraph which he devotes to that subject, and he says:—

> "A sewerage scheme alone will certainly not meet the whole of the sanitary requirements of the western suburbs. The frequent floods at Marrickville Valley, and the removal of stormwaters generally, is a question which must necessarily be dealt with; and although no sum is included in the foregoing estimate for sewers and other works, the following remarks will show that the subject has received careful investigation; that it has been fully considered; and that the execution of certain works is absolutely necessary."

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Then he goes on to detail the works at the Marrickville Valley, for which he includes the sum of £30,000 in his estimate. Then on page 31 of the Appendix, referring to creeks and watercourses generally, he says:—

"The necessity for utilising the existing creeks for the removal of rainfall has already been strongly urged. Natural streams or watercourses should not be arched over to form sewers, but should be improved, regulated, and lined in accordance with local requirements, in order to more readily remove surface water and extreme falls of rain."

In addition to that the Committee, on page 14, refer to the same subject:—

"An excessive combination of rain-water with sewage dilutes the sewage to a degree that injures it as a fertiliser, and the admission to the sewers of more than a certain proportion of rainfall would necessitate the construction of larger sewers than are considered desirable; and therefore Mr. Stayton recommends that a certain catchment area should be allowed for back-yards and for roof surfaces, and that the other part of the rainfall should be conducted to the street channels, whence it would flow into storm-water drains or culverts, and be discharged into natural watercourses."

Then again on page 10, section 13:—

"Storm-water may cause considerable difficulty in any system of sewerage, and the subject has not been overlooked in the present proposals. Overflow weirs will carry off any excess of storm-water, or, if necessary, at some future time, relief sewers can be provided, and the small quantity of sewage contained in storm-water so discharged into natural watercourses would be so greatly diluted, it is considered, as to render it perfectly unobjectionable. These provisions for storm-water would not be sufficient to prevent flooding in a portion of the Marrickville Valley, and for the effectual draining of that locality from any excess of storm-water certain special works would have to be carried out. The same thing would probably be necessary in other localities."

I was going to say that when the Johnston's Creek Storm-water Channel was submitted to the Public Works Committee they regarded the question as being virtually settled by this Committee, and that it was simply a matter of form to submit the storm-water channel to them; so that, all through, I think it was contemplated that these storm-water channels would have to be carried out; and therefore the action of the Department in carrying them out when they did, in order to get over a very serious difficulty, was what was perfectly justifiable.

959. Now we come to the question of the revenue? The question of the revenue estimated by Mr. Stayton when dealing with the proposal included in the Western Suburbs Scheme, is dealt with in his report on page 29 and page 30. He says:—

"According to particulars recently ascertained from the various council clerks, and from other sources, it appears that at the commencement of the past year, the annual ratable value of the nineteen boroughs and municipalities which constitute the area included in the scheme, amounted to £1,460,000. During the two previous years the ratable value of the whole of the suburban area increased no less than 35 per cent., and it may reasonably be assumed that the subsequent increase in the western portion has at least maintained a similar rate. Under these circumstances the ratable value will probably amount to at least £2,000,000, at the end of 1889, in which case a rate of 1d. in the £ throughout the area to be sewered would produce about £8,300."

960. What date was that? That was the 10th January, 1888.

961. That is really the assessment of 1887? Yes. Then he deals with the interest, and with repayment, on page 30, and shows that if the money could be got for 3½ per cent., repayable in sixty years, the rate which it would be necessary to strike would be 5·12d. in the £ per annum. That is, on the basis that the property to be rated would be £2,000,000.

962. He reckons upon a 35 per cent. increase on the previous year? Yes. In his evidence on page 5, he goes more fully into it, and hands to the Committee another statement. In answer to Question 111 he handed in Appendix C2, and in doing so he remarks as follows:—

"This has a very important bearing on the question. It shows that the ratable value, which, in 1884, was £1,116,000, is now £1,700,000; and that on the completion of the first three sections, according to the present rate of increase, it would be at least £2,200,000, in which case a penny rate would produce £8,900 net. At the final completion of the entire scheme in, say, from fifteen to twenty years' time, when the population will be double or nearly treble what it was 1887, the ratable value may be fairly estimated at £3,300,000, in which case a penny rate would produce £13,400 net."

Then the statement shows the amount of interest and the amount of rate. It also shows that in 1884 the ratable value of the nineteen boroughs and districts comprised in the western suburbs of Sydney and included in the scheme was £1,116,000; in 1886 it was £1,437,000; in 1887, £1,571,000; and in 1888, £1,700,000; and he goes on to say that in 1894 the annual ratable value will have increased at that rate to £2,200,000.

963. Now we want to know the final figures put before the Committee as to the revenue to be derived? The Committee in their report on page 16, section 29, in dealing with the rate, go into the matter very fully, and evidently adopt Mr. Stayton's view. After discussing the propriety of getting the interest reduced to 3½ per cent., they go on on the supposition that it will be 3½ per cent., and then they say:—

"The sewerage rate upon the cost of the works immediately before the Committee, £830,304, would be, under the existing Act, 6·68d., and under the extended period for the repayment of the loan, 5·12d.; but as this deals with only a portion of the entire scheme, and the entire scheme must eventually be carried out, it is advisable that the people of the western suburbs should understand what they ultimately will be called upon to pay, and that as already stated, will be 7d. or 6½d. This rate will provide interest, repayment and working expenses."

964. You have read Mr. Holmes' statement as to the financial results; we shall be glad to hear any remarks you have to make as to that? With regard to the cost of the works, the evidence that I have given shows pretty conclusively that the cost will be within the estimate—well within the estimate. That arises, not from faulty estimates, but from the fact that the cost of work has materially decreased since the estimate was made, and, moreover, during the progress of the works it has been found advisable to make certain alterations that were contemplated in a way by Mr. Stayton, because he had meagre information on which to prepare his scheme, and we have been able to make great improvements, which will save very large

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large sums of money; so that what with the reduced cost of the work, and the saving that we have been able to make through altering the lines and other things, we shall be well within the mark when the work is finished. Then with regard to the revenue, I think that the figures that I give speak for themselves. The estimate has not been realised. The fact that the ratable value of property has gone down probably by 50 per cent., or even more, is the cause of the difference.

965. The Committee say it will cost 6½d. or 7d. in the £; Mr. Holmes shows that it will cost 2s. 2d. in the £. Apparently the Committee's estimate is based on the main works, leaving out the reticulation? I do not think so. With regard to that the Committee, in paragraph 28, the one preceding that dealing with rate, state that the complete scheme is to cost £1,817,896, and in paragraph 29, after mentioning the £830,304, they say:—

"But as this deals with only a portion of the entire scheme, and the entire scheme must eventually be carried out, it is advisable that the people of the western suburbs should understand what they ultimately will be called upon to pay, and that, as already stated, will be 7d. or 6½d."

966. Then you see there is a discrepancy of 1s. 7d. in the £ between the 7d. and the 2s. 2d., and that you say is due to the drop in the value of property? I think Mr. Stayton's estimate is on the ratable value of the whole of the property, while the Board's estimate is on the property that will connect. He estimates that £400,000 will construct the whole of the reticulation and his estimate is on that. This is quite clear. To begin with, 400 miles of reticulation were included in the estimate for the complete scheme at £1,000 per mile. That £400,000, it was thought and estimated at the time, would reticulate the whole of the area that would be covered by these main sewers, and comprised in the Western Suburbs Sewerage Scheme.

967. You point out that 7d. in the £ evidently includes the whole of the ratable area? Certainly.

968. Although a great deal of it is not intended to be reticulated from the sum given in the estimate of the capital cost? I think it was intended to be reticulated, and that that 7d. in the £ contemplated that the scheme would be complete in every respect. The Committee evidently looked at it in its complete state, and they evidently got an estimate from Mr. Stayton comprising the whole of the money that would have to be spent in order to complete it, and then they went to work to see what revenue they would require to pay for that.

969. The figures you have now brought out show a very startling discrepancy between the figures given to the Public Works Committee and those now given to the Commission; we ask you, in concert with Mr. Holmes, to revise the whole matter, and bring before us a revised estimate in which an explanation can be given of the discrepancy between the figures previously given and those now supplied? Mr. Holmes, very naturally and properly, looks at it from a different standpoint to what Mr. Stayton did.

970. What we want to do is to find out what Mr. Stayton really meant, and then we can show how the figures have completely altered since then. You can find out what that 7d. in the £ meant;—did it mean the whole of the ratable area, and was the whole of the reticulation included in the capital sum? I am satisfied in regard to that.

971. I hardly think it can be;—otherwise you do not agree with Mr. Holmes? I am perfectly sure on both points, both in regard to the reticulation and the rate that will be necessary. There were no plans prepared for reticulation. The streets were measured up, and sewers were provided for each street.

WEDNESDAY, 15 *SEPTEMBER*, 1897.

PRESENT:—

JOSEPH BARLING, ESQ., J.P., PRESIDENT.
GEORGE ALEXANDER WILSON, ESQ. J.P.
JAMES POWELL, ESQ., J.P.

Joseph Davis, Engineer for Sewerage Construction, Public Works Department, further examined:—

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972. *President.*] When we last met it was shown that the distribution of the capital debt, as given to us by Mr. Holmes, was not quite correct. It was found necessary to revise the whole estimate, and you and Mr. Holmes were requested to jointly look into the matter, and then come before us to-day and report the result. Of course it is understood that the fault in the estimate was not due to Mr. Holmes? In so far as the estimate of the ultimate cost of the works is concerned, I am able to give the result; Mr. Holmes will be able to supply the rest. The main sewers comprised in the western suburbs proper are estimated to cost £619,590. The storm-water channels are estimated to cost £155,000, as against £200,000 shown in previous statement; and the reticulation sewers, I understand, remain as they were, £323,180.

973. And that will make up a total of? £1,077,770.

974. That is against the estimate already given of £1,297,042? That is so.

975. You will now be able to give us the explanation of the difference between this estimate and that given by Mr. Stayton as the cost of the whole work, £1,817,896? Mr. Stayton, in the grand total named, included the following sums which are not included in the total given, £1,077,770:—

	£
Proportionate part of Northern Outfall	88,000
Proportionate part of Southern Outfall and Sewerage Farm	186,000
Canterbury and Enfield Main Sewer, first part	20,741
Marrickville Storm-water Drainage	20,000
Completion of Canterbury and Enfield Main Sewer	65,410
Low-level Systems, Shone's	119,650
Completion of Marrickville Pumping Station	6,817
Completion of Sewage Farm	32,600
Reticulation	76,820
Estimated saving	122,816

976. Did not the Committee, in arriving at the rate of 7d. in the £, reckon in the capital cost of those items you have excised? Yes; they looked at it somewhat differently to what the scheme is looked at now. The scheme before the Commission is the western suburbs system proper. The Public Works Committee, in

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in considering the scheme, included, in addition to the area under consideration now, a large portion of the northern system, and also a portion of the southern system, together with a proportion of the cost of the outfalls of those two last-mentioned systems.
977. Will it not be necessary to take those works in with a view to striking a rate in connection with the areas to which the works referred? If there is to be a comparison made with the rate arrived at by the Public Works Committee, then certainly.
978. If we are to make a comparison with what the Public Works Committee did we must cover the same ground? Yes; if you are to make a comparison you must look at it from the same point of view that they looked at it.
979. You say those works will have to be carried out? Yes; the works that I have indicated as not being required for the present will eventually be carried out, no doubt; and then will be the time when you can compare actually the figures you get at the completion with the estimate.
980. But, in the meantime, this 7d. rate was given as the outcome of larger works than are included now? Yes; and also a portion of the northern and southern systems.
981. We shall have to modify Mr. Holmes's estimate of the rates required for the other system? Exactly; but I would like to point out this to the Commission it is very difficult, if not almost impossible, to get the comparison with what the Public Works Committee had before them. In order to get at what the rate would be likely to be, they made an estimate, and to check what they did would be almost impossible. At this stage, most certainly, it will be their figures against ours—that is to say, their estimate against ours.
982. Then the £1,077,770 will cover the whole of the western suburbs system? Yes.
983. And the other figures will have to be added on? Yes; while on that subject I would like to say that I give it as my opinion for what it is worth that it is a most dangerous thing to look at one area of the sewerage district apart from the other areas. I am of opinion that it will get those concerned into all kinds of complications, and it does seem to me that in all matters of government there are those directly concerned and those indirectly concerned, and those indirectly concerned have to pay in just the same as those directly concerned.
984. Then you argue that the citizens of Sydney should bear the same rate as the people of the western suburbs to pay for works in the western suburbs? I say the citizens of Sydney are interested indirectly in the sewerage of the western suburbs, and I should say that you should look at it as a whole the same as with the water supply; although the western suburbs can be isolated, in regard to the sewers. But the western suburbs scheme cannot be wholly isolated, because it must be looked at in conjunction with the southern system. The same farm will be used to treat the sewage and the same staff of men will be required to deal with the sewage on the farm; and which part of the farm will be used for the western suburbs, and which part for the southern, it is almost impossible to say. In that way they run together; otherwise, in regard to the sewers, they are isolated. But as a matter of policy I question the propriety of isolating the western suburbs from the other suburbs of Sydney and the City of Sydney itself. Under existing circumstances I understand that Randwick, which is quite by itself and has no connection whatever with either the northern or southern systems, is rated under existing circumstances precisely the same as the city and the other districts such as Newtown, Alexandria, and Waterloo.
985. Would it be the case in regard to Randwick, that the debt incurred there would require a greater rate? I am not in a position to say. I have made the statement after due consideration, and I feel sure that it is of sufficient importance to warrant the matter being very seriously thought out before any departure is made from the present system.
986. You say then that it is practically impossible to separate the southern and western systems? I say it is quite impossible in regard to the disposal of the sewage.
987. Would that apply to the northern? No. If it is thought desirable to look at it as an utterly separate system, then, no doubt, the northern can be isolated, and the western suburbs too, as far as the sewers are concerned, but not the disposal of the sewage.
988. Even in regard to the northern system it is one management and would have to be apportioned? Yes.
999. Can you tell us what is the actual difference between the estimated cost and what will be the actual cost? I think the best way to answer that question would be to say that there will be sufficient saved in the construction of the main sewers approximately, to cover the cost of the stormwater channels which were not included in the estimate first submitted. I estimate that there will be saving of £122,000.
990. Is it a fact that some of the works excised from that £1,817,896 will be required for the western suburbs, such as Marrickville Valley? I think so.
991. Are you not putting in pumping engines now? That is included in the estimate.
992. What is the additional pumping shown? That is for the extension of the pumping plant which will not be required until the population has greatly increased, and in that way the rates would be greatly increased too.
993. So that can be left out altogether? Yes. The first instalment is included in the estimate. If you were to divide up the systems you would find one part of a borough on one side of the street paying a very high rate, and another part of the borough on the other side of the street paying a comparatively low rate.
994. Even the southern system is complicated with the northern system? Most certainly, and the only line of demarcation to my mind is the fact that one portion of the sewage flows one way and the other flows the other way.
995. That is to say, one side of the street might be paying a very high rate and the other side a very low rate, about half? Yes; because of the sewage flowing different ways.
996. How long will it take to complete the sewerage works included in that estimate of yours? The bulk of it will be finished in three years. There may be a little sweeping up after that.
997. May we say the whole will be complete in four years? It should be.
998. The bulk will be completed in three years? Yes.
999. Did you look into that question of the 400 miles of sewers estimated by Mr. Stayton? Yes; the 400 miles included in the estimate, which he said would cost £400,000, was intended to reticulate the whole of the area that he provided for in his scheme, both in the northern, southern, and western suburbs schemes. When Mr. Stayton was asked to report he was not asked to deal with any set of suburbs separately.

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separately. If he could have taken all the northern outfall he would have done so, but he found it necessary to take some to different outfalls.

1000. Will you and Mr. Holmes, in conjunction, get out a statement in which the southern and western suburbs are combined, and strike a rate? Yes.

1001. And in quoting that rate of 7d. I think you said the Public Works Committee included these items that you have excised? Yes.

1002. So, in giving this similar estimate, it means a comparison of say 7d. in the £ as against what we shall require now? I am not sure about that, because the outfall sewer will serve for the ultimate population and the ultimate revenue, and then the ramifications of the system only want extending, and they are less costly, so that it would tell the other way—the costly work being carried out really in anticipation. We have provided for people and for rates that we have not got at present.

1003. So that when you carry out the additional works you will bring in a much larger population? Exactly. The Board have recognised the same principle in their reticulation. They say that they must have a return for the reticulation of 6 per cent. That means that they have already anticipated the reticulation in the main works, and that they want to recoup themselves for that.

William Holmes, Secretary to the Metropolitan Water and Sewerage Board, further examined:—

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1004. *President.*] I believe you and Mr. Davis have conferred with regard to the ultimate cost of the sewerage works? Yes, in regard to the cost, and I have written this memorandum:—"As a result of the conference between Mr. Davis and myself, at the wish of the Commission, I have prepared an amended statement showing the probable total cost of the scheme when completed to be £1,077,770 as against £1,272,049 as per previous statement submitted by me, Mr. Davis having pointed out that the latter sum included the sum of £136,272 which was really expended on the sewerage works draining into the main northern and main southern outfalls; and should not, therefore, be debited to the western suburbs. A reduction has also been made in the cost of stormwater channels—the item £65,000, which was shown as the sum required to complete, having been deleted, as Mr. Davis is of opinion that no further expenditure under this head will be necessary. The amount for stormwater channels, therefore, now appears as £135,000. I have ascertained beyond a doubt that the item £323,180 entered in my first statement will all be required for the reticulation sewers within the gravitation areas draining into the western suburbs outfall. Taking the assessed annual values of the properties at present in existence, as given in my previous memorandum, I have calculated what the rate required would be on four different bases, as follows:—

"(1) Charging one general rate on all properties within the municipalities concerned, in both gravitation and low-level areas, 1s. 1½d. in the £ will be required."

This is contemplating keeping the whole of the western suburbs separate.

"(2) Charging one general rate on properties within the gravitation areas, 1s. 10d. will be required.

"(3) Charging a health rate on all properties within both the gravitation and low-level areas, to meet interest on permanent works, and annual instalment on renewable works, 9½d. in the £ will be required. Charging a special or sewerage rate on properties within the gravitation areas to provide expenses of maintenance and management, 6½d. in the £ will be required. Total rate on properties in gravitation areas, 1s. 4d. in the £. Total rate on properties in low-level areas, 9½d. in the £.

"(4) Charging a health rate on all properties within both gravitation and low-level areas, to meet interest on permanent works only, 6½d. in the £ will be required. Charging a special or sewerage rate on all properties within the gravitation area to provide annual instalment on renewable works and meet expenses of maintenance and management, 11¼d. in the £ will be required. Total rate on properties in gravitation areas, 1s. 5¾d. in the £. Total rate on properties in the low-level area, 6½d. in the £."

"In dealing with this matter it is very difficult to satisfactorily compare the estimate of revenue furnished by Mr. Stayton, with the figures now supplied, as Mr. Stayton's report all through deals with the drainage of about nineteen separate municipalities, six of which, though classed as western suburbs, really drain into the Bondi and Botany main outfalls; whereas the districts dealt with in this memorandum are those which will discharge into the main western suburbs outfall at Arncliffe. The report clearly anticipated that a rate of 6½d. or 7d. in the £ on all premises within the areas to be drained would be sufficient on the final completion to provide interest, repayment, and working expenses; but this estimate was based upon the assumption, at that time a reasonable one, that the assessed annual value of properties would enormously increase; whereas the reverse has actually happened, as will be seen from the following figures:—

"Year.	Mr. Stayton's Estimate.	Actual Values.
"1889	£2,000,000	£1,656,842
"1894	£2,200,000	£1,633,300

"It was also estimated that the ratable values on the final completion of the entire scheme would be £3,300,000; but it is not at all likely that this will be even approached, as the assessed values, according to last returns (1897–8), have receded still further, and now amount to £1,478,595. It must be remembered that although the rates per £ appear high, the assessments have been reduced in some instances as much as 50 per cent." I think the crux of the whole thing is in those figures.

1005. It would be as well now to combine the southern and the western, and strike a rate, and also strike a rate over the whole area? The same difficulty crops up when you are dividing the southern from the northern; there is a portion of Redfern which goes one way, and a portion goes the other way.

1006. Have you anything to say about Mr. Davis's evidence, that the different districts should not be separated? The matter was discussed at the Board meeting, and it was considered then that in the report of the Public Works Committee on this scheme, all through, it was laid down most clearly, that the residents of the western suburbs would have to find the necessary funds for this scheme, and it was looked upon by some members of the Board that it would be rather unfair if the city had to pay an increased rate of 3d. or 4d. in the £ to provide a sewerage system for districts 9 or 10 miles away. Of course a difficulty would crop up where there was a ridge in a municipality, and one portion of the drainage went to the Botany outfall and the other portion to the western suburbs, or to Bondi; and the same thing happens in regard to the stormwater areas. Perhaps there is a stormwater channel here and another one there

there [indicating]: the rate in this one would be only 3d., and the rate on that one 7d., and the houses on one side of the street on the top of the ridge would be paying 3d., while those on the other side of the street were paying 7d. W. Holmes. 15 Sept., 1897.

1007. *Mr. Wilson.*] How is this dealt with in Melbourne? I understand they have one general health rate and one special rate. I do not know whether they charge the special rate. I know they charge the health rate, and it extends back a long distance. Of course, it has not been definitely decided; the Board did not have this before them to strike the rate, but simply to get power in the bill to be able to strike the rate if it is decided to treat the two areas separately.

1008. *President.*] You say the 8 per cent. would be about 1s. 7d. in the £;—is that sufficient? No; but of course, as I pointed out in my previous memorandum, my figures are simply based on the properties now in existence, and there may be an increase, although judging from past experience there may not.

1009. *Mr. Wilson.*] The increase may be balanced by a further fall in values? Yes; they have been falling since 1889.

1010. *President.*] Now, how much have you included for reticulation? I have put down £323,180. It is usually looked upon as £1,000 per mile.

1011. So that you have not included so much? Only the portions draining to Arncliffe. The other estimate includes portions draining to Botany.

1012. Will that include all the reticulation that will be necessary? Yes. All through the Committee's report it is considered that the interest will be paid by the western suburbs:—"On the scheme as a whole must be calculated a sewerage rate which the residents of the western suburbs will have to pay." And further on the report goes on to say: "The money required for the proposed works will have to be obtained by loan, and to that extent the public indebtedness of the Colony will be increased; but the interest, and, within a fixed period the principal, will be paid by the residents of the western suburbs. The general public will not be called upon to contribute in any degree."

1013. You think that the Public Works Committee in dealing with the matter looked upon it as a problem which the western suburbs would have to solve? I do, sir; and their representatives were given to understand at that meeting which the Minister for Works presided over that they would have to pay as a separate scheme.

1014. You have given in your statement what rate would be required if the whole of the sewerage were looked upon as one? Yes.

1015. You have not given it as applying to the southern and western? No.

1016. I think we had better have it in that way. Will you, in conjunction with Mr. Davis, get out a statement in which the southern and western suburbs are combined, and strike a rate? Yes.

MONDAY, 20 SEPTEMBER, 1897.

PRESENT:—

JOSEPH BARLING, ESQ., J.P., PRESIDENT.
GEORGE ALEXANDER WILSON, ESQ., J.P.
JAMES POWELL, ESQ., J.P.

Joseph Davis, Engineer for Sewerage Construction, Public Works Department, further examined:—

1017. *President.*] When you were last before us you were asked to give us certain information as to the cost of the sewerage works divided up into districts? Yes. J. Davis. 20 Sept., 1897.

1018. What is the result? The ultimate cost of the main sewers draining into Bondi would be £1,039,932; that for the southern outfall to Botany, £310,502; to Randwick, £42,759; the western suburbs, as already given, amount to £619,590 for the main works, and for the stormwater channels £135,000; and at North Sydney, £110,000 for the main works and £10,000 for the stormwater channels.

1019. I think we asked you to put more emphatically the view you gave us the other day as to the almost impossibility of dividing up the systems as between the western suburbs out all and the southern outfall? The returns that have been prepared will show that, as a matter of fact, it will make very little difference whether they are divided or not; that is to say, the rate that will be required for the south will be almost precisely the same as that required for the west, so that as far as those two systems are concerned it will not make any material difference whether they are assessed as one or two. The northern outfall is different, inasmuch as it is quite by itself, and has an advantage over the west and south, because it comprises pretty well the whole of the city.

1020. It is a very thickly-populated area? Yes; and, while it has attained pretty well nine-tenths of the ultimate population, the western and southern, I suppose, have not attained more than half the ultimate population, so that the cost of the works for the northern district can be paid without very much trouble by the population at present occupying the area drained, while in the west and the south the population have to pay for the works as a whole, although there are not more than half the people that can be served by those works settled there.

1021. Is it a fact that the capital expenses would remain the same if there were double the population? Yes; I have prepared a statement which will give the approximate position of that aspect of the case. The present population is about 190,000 supplied by the western suburbs outfall scheme; the ultimate population provided for in the sewers is about 372,000, so that although we shall have to spend £1,077,770 on the western system, and that will provide for a population of 372,000, a population of 190,000 will have to pay for it.

1022. Practically the capital charge will remain the same when the population is doubled? Yes.

1023. In other words, the population now have to pay double the rates they will have to pay when the area is fully populated? That is the approximate position.

1024. Of course, when the Public Works Committee arrived at their estimates they had the idea that it would be pretty well populated by that time? They thought that the population would increase very much faster than it has.

1025. And that is where the trouble has come in? Yes; in addition the ratable value has very much decreased, and the population has become stationary, or nearly so. The intercepting of the low-level sewerage is included in the figures given, but that will give no new revenue.

1026. Will you have a plan tinted showing the parts that are not included in those estimates? Yes.

William

W. Holmes. William Holmes, Secretary to the Metropolitan Water Supply and Sewerage Board, further examined :—

20 Sept., 1897. 1027. *President.*] You have prepared returns? At the request of the Commission I have conferred with Mr. Davis.

1028. You and he both agree now as to the capital cost? Yes; I have got from Mr. Davis a statement of the capital cost of the Government works, but it does not come within £63,000 of the figures which we previously received from the Public Works Department; that is, we have the capital debt set down in our books £63,000 for permanent works more than the figures now supplied by Mr. Davis; but Mr. Davis's officer has been very carefully through it, and I understand is satisfied that the figures which he now hands to us represent the proper amount expended by the Government on the main work. I think there has been some overlapping before, so that we have really charged up as our capital debt £63,000 more than the figures which Mr. Davis has now given us; but I have worked out the returns required by the Commission on the figures as now supplied to us.

1029. And which you are satisfied with? Yes. I have added on to that the cost of the reticulation works carried out by the Board, the debentures taken over from the various councils, and the value of all land purchased and resumed in connection with the Board's operations,—so that I think our statements now truly represent what the ultimate cost of the scheme will be when it is completed. I have prepared a statement, which I hand in, showing the figures in regard to—(1) the Bondi outfall, (2) the Botany outfall, (3) the Randwick outfall, (4) the districts draining into the western suburbs outfall at Arncliffe, (5) the districts draining into the outfall at North Sydney, (6) Botany and western suburbs combined, and (7) the whole as one scheme. [*vide Appendix.*] On the front page I have tabulated the whole. The first column shows the different systems of rating according to the memoranda previously handed in by me, and then each following column shows the amount of rate which will have to be struck to get sufficient to meet requirements. First there is the Bondi outfall.

1030. That is as it is now? Yes; that is accounted for by the fact that about nine-tenths of the city properties drain to Bondi, so that there is a great deal more revenue from the Bondi outfall than from any other. Then the Botany outfall is more expensive than Bondi, and Randwick is a very expensive outfall when by itself, because there is very little draining into it. There is a large portion of the Randwick locality sewered already, and draining into Bondi, so that Bondi gets the revenue.

1031. The Randwick people draining to Bondi get the benefit of the 7d. rate? Yes. Then the second last, the Botany and western suburbs combined,—you asked that a statement might be prepared combining those two. You will see in comparison that there is not very much difference between that and the western suburbs by itself. Then the last column of all treats the whole as one scheme.

1032. This is one general rate on all properties, whether they are connected or not? Yes; and the next line is one general rate on properties which can be sewered; and then the next line shows a health rate on all properties, and so on. I have put the totals there for the sewered areas, and then also the total rates outside sewered areas.

1033. What you propose to do in this is, to charge a general rate of 3d., and then to those who actually connect 7½d.? If you treat Bondi by itself that is what would be required; that is, under the system of charging the health rate on the permanent works only. If you lump the whole lot you will have to increase the city properties rate from 7½d. to 10¾d. In connection with the assessed values, I might state that during the last year, although the Board laid 55½ miles of water mains and about 30 miles of new sewers, bringing in new districts liable to be rated, the total year's assessed rates were £7,500 less than the previous year's, showing that the values of properties are still falling.

1034. Of course, you are charging the rates on the completed works? Yes.

1035. Have you allowed for any increase at all in the population? No, I have not.

1036. That is, on the ground that it is still going down, and you are, therefore, afraid to to give any estimate? It may become worse than it is. Our total revenue for last year is more, but that is due to a large meter consumption, and garden fees, and special rates, but the rates from assessed properties are abut £7,500 less.

037. Have you anything to suggest? No.

1038. How do propose to deal with Randwick? That is charged just the same as the city at present. If you separate Randwick, and charge them on their own outfall, they will have to pay a high rate.

1039. Why should Randwick get the benefit of being included in the lower rate, and the western outfall be not included? A great proportion of Randwick revenue is robbed by Bondi.

1040. The Bondi sewer gets the benefit of a great deal from Randwick? Yes.

1041. Would not the same argument apply to Newtown? Yes; of course, it is a very different question. We make no division at present; they are all charged the one rate. My reason for looking at the western suburbs as a separate scheme was that it was recommended by the Public Works Committee as a separate scheme, and the money was voted as a separate scheme, and the residents were always given to understand that on that separate scheme the western suburbs would have to pay.

1042. Have you found out what rates they ought to pay on the expenditure up to the present date, that is, supposing the scheme to be completed. I understand they are not paying nearly enough now? I have given you a return already of the loss on the sewerage for the last year, and I told you it was intended to strike off the discount from the first of the year, and there is a provision in the Amending Bill to raise the minimum rate from 10s. to 15s., and that is to overtake this loss to some extent. That is to apply to both the water and the sewerage. When the financial clauses are passed there will be charges for accumulated interest that will have to be added on to the capital cost. That has never been calculated; we have never been handed the figures. The loss last year was £26,000 for water and sewerage; £12,000 for the former and £14,000 on the latter. Dr. Kendall is preparing a report on the influence of the swerage on the mortality from phthisis, and he handed me this morning a portion of his report showing the reduction in the mortality from 1890 to 1896 through the laying of sewerage, which I now hand in.

1043. We should like a return similar to that already handed in showing what would be required to make up the deficiency with the capital debt as it stands now. We are dealing with a thing that is not to be completed for some four years hence? There would be a very small rise in the rates to provide for the deficiency. There is £9,000 for discount, and there would be about £8,000 or £9,000 in the rise in the minimum rate, so that a very small increase in the general rate, probably a halfpenny or a farthing in the £, would be sufficient to cover the deficiency. That, at present, is a very small thing.

1044. And that is due to the fact that the increased expenditure is not carrying with it a proportionate increase in revenue? Yes.

THURSDAY,

THURSDAY, 7 OCTOBER, 1897.

Present:—

JOSEPH BARLING, Esq., J.P. (President).
GEORGE ALEXANDER WILSON, Esq., J.P.
JAMES POWELL, Esq., J.P.

William Holmes, Secretary to the Metropolitan Water Supply and Sewerage Board, further examined:—

W. Holmes. 7 Oct., 1897.

1045. *President.*] In Mr. Stayton's report which was submitted to the Public Works Committee he showed that the estimated cost of the sewerage works for the western suburbs would amount to £1,817,896? Yes.

1046. What would be the financial result at the present time, taking that as the basis of cost? In Mr. Stayton's report he estimated that about 7d. in the £ would have been sufficient to provide the necessary funds, but he was calculating on properties of an ultimate assessed value of £3,300,000. I have worked out now for the Commission a table, accepting Mr. Stayton's estimate of cost at £1,817,826, on the assessed values of properties in those same boroughs as at present existing. The assessed values, instead of being £3,300,000, are now about £1,550,000. Therefore, charging interest on the cost of the main works at 3½ per cent., and an annual instalment to redeem the cost of renewable works in 100 years at 3½ per cent., and the maintenance and management at 1½ per cent., I find it will be necessary, instead of 7d. in the £, to charge one general rate for the whole area of 1s. 2¼d. in the £. This return also shows one general rate over the sewered area of 1s. 4¾d., and I have also worked out in the same way as the previous returns a health rate and a special rate under the two schemes which were adopted formerly. I will now hand in the return. [*Vide Appendix*].

1047. I gave you a letter which we received from the Secretary to the Melbourne and Metropolitan Board of Works, in which he showed the method of rating adopted in Melbourne. We shall be glad to see what the result would if that plan were adopted in connection with the Sydney metropolitan works? I have looked into that matter, and I find that the assessed value of properties within the municipalities which will be outside the sewered area for the present is £707,413; the assessed values of properties which can be sewered at once is £3,770,613; or a total value of £4,478,026. The revenue required to be provided amounts to £169,354. Twopence in the £ on £707,413, the value of properties which cannot at present be sewered, will give £5,895. The amount to be provided by the sewerage rate is, therefore, £163,459, and to raise this sum a rate of 10⅝d. in the £ must be struck on all properties which can be sewered.

1048. This, I think, is as near a comparison as you can make? Yes.

1049. The Melbourne plan is to charge a 2d. rate, and a 1d. rate on the outside area? The 1d. rate is on the area which will never be sewered. I have not treated with any area like that. I have treated with a low-lying area which will eventually be sewered, but not at present.

1050. In the capital debt of £6,262,670 I understand you have debited a sum of £103,437 on account of works carried out by the Government, and charged to revenue? Yes.

1051. You have not charged interest on that? Interest has not been charged on that.

1052. Why have you not charged interest on that? Because, as it was paid from revenue and not from loans, it was thought unnecessary to debit the ratepayers with interest on that, as no interest had to be paid on it, and as the whole matter was in an unsettled state—that is, the capital debt has never yet been properly ascertained, although the Board has for the past six years been, year after year, writing to the Minister with a view to getting that capital debt definitely settled. First of all, Mr. Christie took it in hand, but did not complete it. Then the Board approached the Works Department, and it was given to Mr. Johnston, an accountant in that Department, but the result of the work of those two gentlemen has never been handed over to the Board, and it was thought it was no use making any change until the whole thing was definitely settled, both in regard to the sewerage and the water supply, where there is another similar item.

1053. But as this sum has been obtained from the revenue of the country, do you not think it would be fair to the country that they should get the benefit of the interest on it? I have no doubt that will be charged up against the Board when those returns are completed.

1054. You are looking at this merely as a suspense account? Yes.

1055. Now, with regard to the sum of £377,382 which has been included in the water supply debt; why have you not charged interest on that? Because we do not look upon it as a debt at all. It is not a liability or money that is owing to anybody, and certainly no interest has to be paid upon it by the Government. It represents the value of some works which were transferred from the City Council in 1888, and which were really paid for from rates collected from the citizens, and as the Government has not to pay any interest at all upon it, it was thought that it should be omitted. But the Board has not been working on its own responsibility in this matter, as they have on several occasions approached the Minister with a view to having that sum wiped off the capital debt, and the reply received by the Board was, that it was better to let matters remain as they were, and that when the Amending Bill was passed with the financial clauses the whole matter would be settled then, so that the Board has left it.

1056. Your contention is that that sum represents the value of the works which have actually been paid for out of the revenue of the water-works? Yes, collected by the Council.

1057. Of course that stands on a very different footing from the other? Yes.

1058. We want you to give us a short statement showing the result of the management of the Liverpool Water-works, and those at Richmond and Campbelltown? I hand in returns extracted from the last Annual Report. The cost of those at Richmond is not included in the Board's capital debt, because the source of the supply is outside the county of Cumberland, and the Board's jurisdiction does not at present extend beyond the county of Cumberland; but in the Amending Bill, which is now in draft, provisions is made for extending to any town outside, and then we will have proper powers to rate Richmond, and it will be added up then in the Government debt. At present we are simply managing on the Government's behalf at the Minister's request.

APPENDIX.

ROYAL COMMISSION—METROPOLITAN WATER SUPPLY AND SEWERAGE BOARD.

APPENDIX.

A.

PARTICULARS respecting constitution and expense of Board.

Surname.	Christian Name.	Whether appointed by Governor or elected.	Date of Expiry of Office.	Attendance at Meetings during year ended 30th June, 1897.			Rate of Remuneration.	Amount of Salaries and Fees paid during year ended 30th June, 1897.
				Meetings held.	Present.	Absent.		
								£
Rowe	Thomas	Appointed by Governor	22 Mar., 1900	62	62	Nil.	Salary of £600 per annum ..	600
Taylor	John	Elected by City Council	22 „ 1900	62	58	4	Paid by fees at the rate of £5 per week for one or more meetings not to exceed £250 per annum each.	250
Mansfield ...	Geo. Allen...	Appointed by Governor	22 „ 1900	62	54	8		245
Macpherson...	John	Do do	22 „ 1898	62	54	8		250
Buckle	Francis	Elected by City Council	22 „ 1898	62	53	9		240
Davis	David	Elected by Suburban Council	22 „ 1898	62	59	3		250
Ahearn	John	Do do	23 „ 1900	62	58	4		250

The Board meets weekly on Wednesdays at 11 a.m. Very often a second meeting is held, and in addition visits are paid to works completed and in progress.

THE total amount of Salary and Fees paid to Members yearly from date of inception to the 30th June, 1897, was as follows:—

Year.	Salary of President.	Fees to Members.	Total.
	£ s. d.	£ s. d.	£ s. d.
1888	689 10 3	564 0 0	1,253 10 3
1889	900 0 0	993 5 0	1,893 5 0
1890	1,000 0 0	1,485 0 0	2,485 0 0
1891	1,000 0 0	1,485 0 0	2,485 0 0
1892	608 17 4	1,475 0 0	2,083 17 4
1893	333 6 8	1,385 0 0	1,718 6 8
1894	250 0 0	1,445 0 0	1,695 0 0
1895	125 0 0	750 0 0	875 0 0
1895-6	530 12 11	1,500 0 0	2,030 12 11
1896-7	600 0 0	1,485 0 0	2,085 0 0
	6,037 7 2	12,567 5 0	18,604 12 2

B.

MINUTES of Board Meeting held 28 April, 1897.

Present:—T. ROWE, Esq., President, in the Chair; J. TAYLOR, Esq., Vice-President; D. DAVIS, J. AHEARN, G. ALLEN MANSFIELD, J. MACPHERSON, and F. BUCKLE, Esquires.

1. The minutes of Board meeting held 21st April, 1897, were confirmed.

2. The Secretary laid on the table a statement of moneys collected from 1st July, 1896, to 24th April, 1897, showing the amount to be £200,102 7s., as against £181,371 15s. 9d. for the same period of the previous year, or an increase of £18,730 11s. 3d.

3. From engineer, submitting a diagram showing the height of water in the Prospect reservoir, and a return of the quantity discharged into and out of the same during the week ended 24th instant.

4. From engineer, reporting as to the effect on the water supply of the city and suburbs by the recent rains.

5. From engineer, reporting that the supply of water to Kippax Lake, Moore Park, had been shut off in accordance with the instructions of the Board, and also that the overflow from Wahroongah tanks, complained of by the Vice-President at the last meeting, was due to a defect in connection with the electric indicators, but that this matter had been since put right.

6. From engineer, report on a type of concussive tap fixed at the Equitable Buildings, George-street, brought under notice by Alderman Davis, and stating he could not recommend the type for general adoption on account of the likelihood of causing a ram in the pipes by the sudden shutting off of the water. At the Equitable Buildings, where the fitting was in use, the water is controlled by an overhead tank, and the company have accepted all risk in connection with the use of the fitting. He also submitted a sample of a non-concussive tap, manufactured by J. Danks and Son, which had been subjected to test at the Crown-street reservoir and found satisfactory.

The Board approved of the concussive tap being used, but only in such positions as will cause no ram in the pipes.

7. Mr. Buckle drew attention to the large quantity of water consumed in connection with the Botanic Gardens, and Mr. Davis also mentioned that he understood that a very large quantity of water would be required for the fountain at Governor Phillip's Statue, now being erected in the Palace Garden.

It was decided that a report be prepared as to the quantity of water consumed in each case.

8. From engineer, submitting returns showing that during the week ended 24th instant, 1,062 yards of watermains were laid, 220 yards cleaned, 86 yards lowered, and 9 hydrants fixed.

9.

9. From comptroller of stores, return of water-pipes received, issued, in stock, and ordered during the week ended 24th instant.

10. From assessor, return of summons work carried out in his branch during the week ended 24th instant.

11. From assessor, return of ten persons reported by the waste-water inspectors for illegally using the water of the board for stock, gardens, &c.

Referred to the solicitor for prosecution.

12. The Board approved of the following applications for leave of absence :—

R. Eagar, assistant district clerk ..... Two weeks.
T. G. Hume, junior clerk, assessor's branch ..... ,,
J. C. Hugo, turncock ..... One week.

13. On the recommendation of the Medical Officer, the Board approved of the following leave of absence being granted on account of ill-health :—

J. Chisholm, messenger, engineer's branch ..... One week.
J. Colvin, mechanic, meter branch ..... ,,
R. Russell, engine driver, Chatswood ..... ,,

14. From engineer, reporting the occurrence of a fatal accident at the Wattle-street sewer, whereby two of the Board's maintenance men, P. Sullivan and W. Macpherson, lost their lives, and suggesting that a son of each family, if old enough, be appointed to the stormwater sewer gangs.

Discussion on this matter was deferred until after the inquest is held. In the meantime letters of condolence to be at once forwarded to the families of the deceased men.

15. From assessor, for authority to pay the usual allowance of 12s. per week each to three officers engaged on summons work, which cannot be attended to during the ordinary office hours.

Approved by the Board.

16. At the instance of Mr. Davis, the Board directed that the Secretary be instructed to draw up a report as to the advisability of outside officers, such as district clerks, sanitary inspectors, &c., being required to report themselves at Head Office each day at the conclusion of their work.

17. From Secretary, Board of Health, forwarding a report by the Government Analyst on the result of analyses of samples of water from Annandale and other places. Mr. Hamlet described the water as standing unrivalled in excellence, and a really good, wholesome drinking water, suitable for all domestic purposes.

The Board resolved that a copy of the report be forwarded to the Press for publication, and also to the Annandale Council.

18. From comptroller of stores, requesting authority to expend the sum of £40 in cleaning and fettling about 40 tons of 6 in. pipes, taken out of ground.

Approved by the Board.

19. From F. C. McIntosh, appealing against the assessment of his land, Stony Creek Road, Pymble.

On the recommendation of the assessor it was resolved that the assessment be reduced from £50 to £27.

20. From J. Sainty, appealing against the assessment of his land in Smith-street, Turramurra.

On the recommendation of the assessor, it was resolved to reduce the assessment from £70 to £35.

21. From Mount Kembla Coal and Oil Co., Ltd., requesting permission to erect a dam at the head of a small creek or feeder of the Cordeaux River, situated on the catchment area of the Sydney water supply.

A minute by the engineer was read stating that the quantity of water to be impounded by this dam is so small that he did not think there could be any objection on the part of the Board to granting the request, subject to reconsideration, if at any future time it is required to extend the impounding area.

The Board resolved to grant the request, subject to the condition mentioned by the engineer.

22. From Laurence Carr, one of the settlers on the Cordeaux River, within the catchment area, on whom notice has been served by the Board's Ranger to prevent his pigs entering the stream, and pointing out that he purchased the land long before the area was proclaimed as a watershed for the Sydney water supply ; that to carry out the alterations required by the Board would cost him £100, and appealing against the decision of the Board.

A minute by the Secretary was read recommending that Mr. Carr be informed that unless he at once takes steps to keep his pigs out of the creek, and refrains from polluting the water in any other way, legal proceedings will be instituted against him with without further notice, in terms of the 82nd section of the Principal Act.

The recommendation of the Secretary was adopted.

23. From Superintendent of Fire Brigades, complaining of restricted flow of water in certain streets in Redfern, Waterloo, and Alexandria.

A minute by the engineer was read, recommending that certain existing 4-in. mains in these districts be cleaned at an estimated cost of £130 10s.

The Board approved of the work being carried out.

24. A minute by the engineer was read, recommending that the lease of lands forming portion of the Kensington Estate be continued for a further term, in order to conserve sufficient water for the use of the Board's tenants at the Engine Pond Reserve.

The Board decided to visit and inspect the Botany watershed from Kensington down, also the sewage farm, on Tuesday next, 4th May, leaving the office door at 2 p.m. A report to be furnished as to the advisability of requiring the lessees to economise the water, also whether the Board are committed under the leases to the supply of any particular quantity.

25. From E. Vindin, applying for extension of 172 yards of 4-in. water-main in Carlyle-street, Randwick ; estimated cost, £56 ; estimated revenue, £3 12s., or about 6½ per cent. on the outlay. As the local Council have guaranteed, under seal, to bear the cost of raising or lowering the main, should the present surface levels be altered, the Board approved of the work being carried out.

26. From A. Ogden, applying for extension of 150 yards of 4-in. water-main in Marriott-street, Redfern ; estimated cost, £43 ; estimated revenue, £3 6s. 8d., or about 8 per cent. on the cost.

Approved by the Board.

27. From George Hudson, applying for extension of 268 yards of 4-in. water-main in Harley and Euston Streets, Alexandria ; estimated cost, £87 ; estimated revenue, £1 9s., or 1⅝ per cent. on outlay. The applicant having agreed to guarantee the deficiency in revenue, the work was approved by the Board.

28. From Municipal Council, Concord, applying for extension of water-main in Bent-street, Concord, a distance of 54 yards, in order to couple up a dead end and improve the circulation of the water ; estimated cost of the work, £22.

Approved by the Board.

29. From E. Cornwell, applying for extension of 258 yards of 4-in. water-main in Beechworth-street, Pymble ; estimated cost, £85 ; estimated revenue, £7 14s., or 9 per cent. on the outlay.

Approved by the Board.

30. From J. B. Wood, applying for extension of 111 yards of 4-in. water-main in Victor-street, Willoughby ; estimated cost, £36 ; estimated revenue, £1 15s., or 5 per cent. on the outlay.

Approved by the Board, on condition that the applicant guarantees the deficiency.

31. From the residents of Prospect and Sherwood, applying for extension of 6-in. water-mains from the canal along Sherwood Road to Park Road, thence along the latter road to Parramatta or Lucas Road, thence along the last-mentioned road as far as Barcom Road—in all, 2,594 yards of 6-in. main, together with 2,910 yards of 4-in. main in various streets. The estimated cost of the work is £2,350, and the estimated revenue £95, or about 4⅛ per cent. on the cost of 4-in. work.

As the Board have already decided to reticulate this district on the 5 per cent. basis, and the deficiency is only £3 15s., being less than the 10 per cent. allowed, the work was recommended by the engineer. During dry seasons this district is very badly off for water supply, and the engineer is of opinion that the extension of this boon to the district will induce further settlement, and increase the revenue in a very short time sufficient to cover the deficiency.

Approved by the Board.

32. From C. S. Summers, applying for extension of 520 yards of 4-in. water-main in Peat's Ferry Road, Hornsby ; estimated cost, £169 ; estimated revenue, £9 17s., or 5⅛ per cent. on outlay.

The Board approved of the work being carried out, on condition that the applicant guarantees the deficiency.

33. From engineer, return showing lengths and sizes of sewers constructed by the Board to 24th April, 1897, also list of houses connected to the sewers in the suburbs, drainage reconstructed in the city, and plumbing work carried out in the city and suburbs.

34. From C. H. Crammond, applying, on behalf of Mrs. Hyatt, for compensation for construction of manhole on her premises, Belgrave-street, off Audley-street, Marrickville.

On the recommendation of the engineer, the Board approved of the sum of £5 being offered, without prejuice, as compensation in full of all demands.

35. From W. Cockroft, for compensation for construction of manhole on his premises, Belgrave-street, Marrickville.

On the recommendation of the engineer, the Board approved of the sum of £5 being offered, without prejudice, as compensation in full of all demands.

36. From engineer, regarding the connection to the sewer of houses in the Beaconsfield Estate, Alexandria, and stating that the owners will not be compelled to carry out the work in connection with unoccupied houses until the same become tenanted; and further, that the Board has already approved, in certain cases, of permitting the use of galvanised iron flush pipes in lieu of lead fittings.

37. From engineer, recommending extension of sewerage reticulation at the Mount Albion Estate, Waverley, at an estimated cost of £414.

Although the present revenue is only 1¼ per cent, the land on this estate is being rapidly sold, and the surrounding locality, which has been sewered, already returns a revenue of 8 per cent.; the Board, therefore, on these grounds approved of this work being proceeded with.

38. The Secretary submitted a classified list of public hospitals and charitable institutions exempt from payment of rates.

The consideration of this matter was deferred for one week.

39. The Secretary submitted copies of rules and regulations for the conduct of the office, which have been approved from time to time, and are in use, and suggested that the same be printed and distributed for the information of officers and employés.

The suggestion of the Secretary was approved by the Board.

40. The seal of the Board was affixed to the bond in connection with R. Gough's sewerage contract No. 206.

41. The following accounts were submitted and passed for payment.

C.

Number and Salaries of Staff as at 1st March, 1897.

Division.	Number of Officers	Aggregate Annual Salaries.
		£
Secretary	22	3,758
Accountant	24	3,664
Assessor	69	10,540
Engineer—Water Supply	127	21,411
Engineer—Sewerage	202	29,249
Totals	444	68,622

Number.	Position and Duties.	Aggregate Annual Salaries
	Secretary's Division Staff, as at 1st March, 1897.	
		£
1	Secretary and Chief Clerk	450
1	Solicitor	400
1	Paymaster and Controller of Stores	300
5	Auditor and Examiner of Accounts—1 at £350, 1 at £225, 1 at £200, 1 at £175, 1 at £26	976
5	Records and Correspondence Clerks—2 at £200, 1 at £156, 1 at £125, 1 at £65	746
1	Medical Officer	125
2	Rangers—1 at £168, 1 at £50	218
1	Printer	117
2	Messengers—1 at £206, 1 at £25	231
1	Lift Attendant	39
2	Office Cleaners—1 at £104, 1 at £52	156
22	Total	3,758
	Accountant's Division Staff, as at 1st March, 1897.	
1	Accountant	500
3	Receivers—1 at £275, 1 at £200, 1 at £156	631
4	Receipt Clerks—1 at £156, 2 at £104, 1 at £91	455
6	Rate Ledger-keepers—1 at £250, 1 at £200, 1 at £175, 2 at £91, 1 at £65	872
7	Ledger-keepers (General and Special)—1 at £200, 1 at £175, 2 at £156, 1 at £130, 2 at £104	1,025
2	Voucher Clerks, &c.—2 at £78	156
1	Messenger	25
24	Total	3,664
	Assessor's Division Staff, as at 1st March, 1897.	
1	Assessor	400
4	Assistant and District Assessors—1 at £225, 1 at £200, 2 at £175	775
2	Records and Correspondence—1 at £175, 1 at £78	253
21	District Clerks and Collectors—6 at £210, 4 at £175, 1 at £165, 5 at £156, 3 at £130, 1 at £117, 1 at £65	3,477
3	Charge Clerks—2 at £175, 1 at £143	493
8	New Assessments and Charges, Fees, &c.—1 at £191, 3 at £175, 2 at £156, 1 at £117, 1 at £104	1 249
4	Rate Notices—1 at £175, 1 at £165, 1 at £156, 1 at £65	561
7	Summons Works, &c.—1 at £175, 2 at £165, 1 at £156, 1 at £130, 1 at £117, 1 at £78	986
7	General and Junior Clerks—1 at £175, 2 at £91, 3 at £78, 1 at £52	643
10	Waste Water Inspectors— 9 at £156, 1 at £104	1,508
1	Leakman	117
1	Hall Porter	78
69	Total	£10,540

Number.	Position and Duties	Aggregate Annual Salaries
	Engineer Water Supply Staff, as at 1st March, 1897.	
		£
1	Engineer-in-Chief	1,000
1	Assistant Engineer	500
5	Draftsmen-Surveyors—1 at £260, 1 at £234, 1 at £175, 1 at £156, 1 at £52	877
1	Superintendent	452
3	Inspectors—1 at £402, 1 at £302, 1 at £189	893
3	Foundry Inspectors—1 at £234, 2 at £156	546
1	Clerk of Works	234
17	Mechanical Engineers, Fitters, &c.—1 at £453, 1 at £268, 1 at £250, 4 at £218 8s., 1 at £195, 1 at £182, 1 at £176, 2 at £172, 4 at £156, 1 at £91	3,457
9	Firemen and Cleaners at £156	1,404
2	Blacksmiths—1 at £156, 1 at £117	273
31	Caretakers and Maintenance Men—1 at £212, 1 at £197, 1 at £130, 1 at £125, 1 at £124, 3 at £117, 13 at £115, 2 at £112, 7 at £109 4s, 1 at £12	3,634
5	Gangers—1 at £195, 1 at £140, 2 at £125, 1 at £233	818
1	Chainman	109
19	Turncocks—7 at £179 8s, 11 at £140 8s, 1 at £117	2,917
3	Valve Attendants—1 at £195, 1 at £182, 1 at £137	514
7	Plumbers—1 at £219, 1 at £187, 2 at £140 8s, 2 at £117, 1 at £109 4s.	1,030
1	Carter	180
1	Lamplighter	118
1	Stockman	122
1	Gardener	114
5	Meter Readers—1 at £208, 1 at £195, 3 at £156	871
8	Clerks—1 at £225, 2 at £200, 1 at £182, 1 at £156, 1 at £117, 1 at £78, 1 at £65	1,223
1	Custodian of Plans	125
127	Total	21,411
	Engineer Sewerage Staff, as at 1st March, 1897.	
1	Assistant Engineer	500
5	District Engineers—2 at £350, 1 at £300, 1 at £156; 1 at £136	1,292
12	Draftsmen—2 at £300, 2 at £200, 4 at £156, 1 at £151, 1 at 136, 2 at £130	2,171
9	Surveyors—1 at £300, 6 at £234, 1 at £187, 1 at £52	1,943
5	Contract Inspectors—2 at £269, 1 at £195, 2 at £156	1,045
12	Contract Overseers—3 at £140, 2 at £133, 7 at £125	1,561
14	Chainmen at £109 4s	1,529
14	Sanitary Inspectors—2 at £307, 1 at £290, 1 at £286, 10 at £187 4s	3,062
80	Maintenance Men, Sewer Labourers, &c.—1 at £195, 1 at £156, 69 at £117, 9 at £109 4s	9,407
7	Pumping-station Engineers, &c.—1 at £208, 1 at £182, 1 at £156, 1 at £140, 3 at £117	1,037
5	Sewage Farm Labourers—1 at £156, 3 at £104, 1 at £52	520
5	Caretakers (Stores and Pipe Depôts)—1 at £175, 1 at £125, 2 at £109 4s, 1 at £78	597
8	Carters at £179 8s.	1,435
4	Mechanics, Testers, &c.—1 at £160, 1 at £156, 1 at £109, 1 at £94	519
3	Bricklayers—2 at £156, 1 at £117	429
1	Concrete Maker	117
6	Carpenters—1 at £156, 2 at £140, 1 at £125, 1 at £117, 1 at £110	788
1	Painter	109
1	Lamplighter	127
1	Gardener	109
3	Clerks—1 at £200, 1 at £156, 1 at £143	499
2	Heliographers—1 at £141, 1 at £52	193
1	Custodian of Plans	125
2	Messengers—1 at £109, 1 at £26	135
202	Total	29,249

D.

Grading of Salaries.

Clerical Division.

Junior Clerks from £25 to £100.
Senior Clerks, according to value of work performed and ability, up to £275.
District Clerks, in charge of Districts, £165 to £175, with forage in some cases.
Waste Water Inspectors, 10s. per day.
Meter Readers, 10s. per day.

Engineering Division (Water).

Draftsmen £52 to £260
Turncocks, 9s per day.
Gangers, 8s. per day.
Maintenance men, 7s. 6d. and 7s per day.
Mechanics, according to work done.
Engine Drivers, £4 4s. per week.
Firemen and Cleaners, £3 per week.
Maintenance men on Canal, £8 10s. per calendar month and cottage.

Engineering Division (Sewerage).

Surveyors and Draftsmen, £136 to £350.
District Engineers, £300 to £350
1st Class Inspectors (Construction), 15s. per day.
2nd Class Inspectors (Construction), 12s 6d. per day.
3rd Class Inspectors (Construction), 10s per day
1st Class Overseers (Construction), 9s per day
2nd Class Overseers (Construction), 8s and 8s. 6d. per day.
Chainmen, 7s per day (paid for time worked only)
Sanitary Inspectors, 10s 4d per day and forage.
Assistant Sanitary Inspectors, 12s per day
Sewer Maintenance men, 7s 6d. per day.
Labourers, 7s. per day.

E 1.

STATISTICS as at 30th June, 1897.

	Water Supply.	Sewerage.	
Capital Cost of Works (New Offices and Richmond not included) ...	£4,244,550	£2,018,120	
Number of Boroughs and Districts reticulated	57	24	
Mileage of Reticulation (exclusive of Trunk and Pumping Mains) ...	925	274	
Estimated population served	418,512	228,446	
Number of properties rated	120,901	62,657	
Revenue for year	£175,984	£87,652	
Expenses for year	£40,821	£29,680	
Aggregate Revenue from inception of Board	£1,486,414	£654,072	
Aggregate Expenses from inception of Board	£348,354	£204,344	
Capital Cost of Works—combine W. & S.—		£552,698	
(*a*) Constructed by Government Loans		£5,499,978	
(*b*) Taken over from Municipalities		762,692	
			£6,262,670
Total fees, &c., on account of Board since inception		£18,604	
For one year :—			
Rate Notices issued		279,101	
Meter Accounts (No. of meters, 6,844)		10,468	

E 2.

FINANCES as at 30th June, 1897.

For one year, 1896-7 :—			
Credit Balance available to meet Interest on Capital Cost of Works	£188,799	6	4
Interest payable on Capital Cost (Debentures and Loans only)	215,378	1	7
Deficiency on year's operations	26,578	15	3
Estimated Value of "free" services	19,535	17	0
Arrears of Rates outstanding	42,455	8	4
Meter Accounts included in arrears	16,364	9	6
Rates on Churches, &c., in arrears	7,990	9	0
Rates on vacant land	7,741	17	1

E 3.

WATER.

RETURN showing the number of properties rated and the population supplied with water at 31st December, 1888, together with the districts reticulated ; also, a corresponding return as on the 30th June, 1897.

1888.

City of Sydney.
Alexandria.
Ashfield.
Balmain.
Burwood.
Camperdown.
Canterbury.
Darlington.
Erskineville.
Glebe.
Granville.
Leichhardt.
Marrickville.
Newtown.
North Sydney.
Paddington.
Petersham.
Randwick.
Redfern.
St. Peters.
Strathfield.
Waterloo.
Waverley.
Woollahra.

Total properties rated 58,887
Population supplied 296,246

1897.

City of Sydney.
Alexandria.
Annandale.
Appin.
Ashfield.
Auburn.
Balmain.
Bankstown.
Botany.
Burwood.
Cabramatta and Canley Vale.
Campbelltown.
Camperdown.
Canterbury.
Concord.
Darlington.
Drummoyne.
Enfield.
Erskineville.
Five Dock.
Glebe.
Gordon.
Granville.
Guildford.
Homebush.
Hoxton Park.
Hunter's Hill.
Hurstville.
Kogarah.
Lane Cove.
Leichhardt.
Liverpool.
Marrickville.
Mosman.
Newtown.
North Botany.
North Sydney.
Paddington.
Parramatta.
Petersham.
Prospect and Sherwood.
Randwick.
Redfern.
Richmond.
Rockdale.
Rookwood.
Ryde.
Silverwater.
Smithfield.
St. Peters.
Strathfield.
The Island.
Vaucluse.
Waterloo.
Waverley.
Willoughby.
Woollahra.

Total properties rated 120,901
Population supplied 418,512

E 4.

SEWERAGE.

RETURN showing the number of properties rated and the population served at 31st December, 1889, together with the districts reticulated ; also a corresponding return as on the 30th June, 1897.

1889.

City of Sydney.
Darlington.
North Botany.
Paddington.
Redfern.

No. of Properties rated 22,259
Population served..... 106,843

1897.

City of Sydney.
Alexandria.
Ashfield (Storm-water).
Balmain (Storm-water).
Burwood (Storm-water).
Camperdown.
Canterbury (Storm-water).
Darlington.
Enfield (Storm-water).
Erskineville.
Glebe.
Leichhardt (Storm-water).
Marrickville.
Newtown.
North Botany.
North Sydney (Storm-water).
Paddington.
Petersham.
Randwick.
Redfern.
Strathfield (Storm-water).
Waterloo.
Waverley.
Woollahra.

Sewerage.

No. of properties rated 51,815
Population served 248,712

Storm-water Drainage Areas.

No. of properties rated 10,842

F.

RETURN of Water supplied free during 1896.

For what Purpose Supplied	Quantity in Gallons.	Value £ s. d.
Charitable Institutions and Public Hospitals	51,360,000	2,568 0 0
Public Parks and Gardens	13,566,000	678 6 0
Street washing, and watering, and flushing gutters and gullies	314,453,000	15,722 13 0
Watering Tramway tracks	6,000,000	300 0 0
Municipal Baths, Parramatta	1,440,000	72 0 0
Her Majesty's Ships of War	3,898,000	194 18 0
	390,717,000	19,535 17 0

G.

COMPARATIVE Return of Revenue, Working Expenses, Rates Charged, &c., at some of the Principal Cities of the World, in connection with Water Supply, according to latest information received (1893).

Name of City.	Yearly Rate on a house assessed at £25	Percentage over or under Sydney Rate	Meter Charge per 1,000 Gallons	Population Supplied	Percentage of Water Pumped.	Revenue	Working Expenses	Percentage of Working Expenses to Revenue.	Remarks
	£ s d					£	£		
Sydney	0 14 7		1s	390,182	51	157,426	37,141	23	Although it would appear that Sydney is charged a very low rate as compared with English towns, it must be remembered that in England, for a rental of £25 per annum, a very much larger house could be obtained than in Sydney, and consequently a larger quantity of water would be used.
Hunter District	1 5 0	41 66% over		55,000	100	22,500	6,500	29	
Adelaide	1 5 0	41 66% over	1s. to 1s 9d		½	60,810	15,150	25	
Melbourne	0 12 6	14 28% under	1s	455,000	Gravitation	175,365	36,824	20	
London (East)	1 5 0	41 66% over	6d to 9d		100	157,287	63,038	40	
London (Kent)	1 8 0	92% over	10d		100				
Lambeth				639,129	100	254,622	94,726	37	
Southwark and Vauxhall	1 5 0	41 66% over	6d to 9d H L water 25% addition	869,337	100	230,166	98,578	43	
Liverpool	1 8 2	93 14% over	7d to 10½d	850,000	41	253 274	80,380	31	
Manchester	1 5 0	41 66% over	4d to 6d.	1,000,000	Gravitation	246,467	57,870	23	
Leeds	1 1 0	44% over	6d	420,000	46	106,829	24,536	23	
Birmingham				600,000		175,916	58,803	33	
Edinburgh	0 15 8	7 42% over	6d	375,000	Gravitation	85,694	27,232	31	
Glasgow				870,000	7	177,950	46,371	26	
Belfast	1 0 10	42 85% over	5½d to 10d.	280,000	Gravitation	44,957	13,354	30	
Dublin	0 14 7	Equal	4d to 6d	360,000	Gravitation	47,044	26,580	58	
Bradford	1 15 0	140% over	6½d to 9d	420,000	Uncertain	126,728	23,071	18	
Dundee	1 7 1	85 71% over	7d to 8d.	280,000	Gravitation	48,681	5,918	12	
Nottingham	1 5 0	41 66% over	6d to 1s		100	64,700	22,600	35	
Newcastle on Tyne	1 5 0	41 66% over	5d to 1s 2d	390,000	43	105,328	30,445	29	
Boston	1 0 10	42 85% over		368,700			88,946	37	

H.

RETURN showing total cost of Supervision, Manufacture, and Maintenance of Board's hired-out Meters, and Revenue received for rentals of same from February, 1894, to 30th June, 1897.

Dr. *Cr.*

Maker	Size in	No	Value £ s. d.	Amount £ s. d.		Amount. £ s. d.
John Danks and Son	½	16	32 1 4		Total amount received for rental of Board's meters from April, 1894, to 30th June, 1897	1,849 16 6
	¾	573	1,294 0 6			
	1	105	301 0 0			
	1¼	58	201 11 0			
	1½	43	176 2 5			
Davies, Shepherd, and Co	¾	1,237	2,474 0 0			
	1	119	321 6 0			
	1½	17	65 17 6			
	2	1	7 17 6			
	..	2,169	4,873 16 3			
Supervision of contracts Nos. 216 and 249	...	...	160 0 0			
Examination and test	...	...	286 6 0			
Total amount chargeable to Loans	...	...	5,320 2 3			
3½ % interest on £5,320 2s. 3d. for 3¼ years				605 3 3		
General supervision, at £5 per month				195 0 0		
Inspections, repairs, and disconnections (wages)				397 0 10		
Allowance for collection of rentals 1½ % on £1,849 16s. 6d				27 15 0		
„ clerical work				150 0 0		
Total amount chargeable to maintenance £				1,374 19 1		1,849 16 6
						1,374 19 1
					Net profit on rentals £	474 17 5

= £8 9s. %.

	No	£ s. d.
Meters hired out	2,169	4,873 16 3
Meters sold	280	665 18 2
Meters in stock, 30th June, 1897	138	400 18 2
Sample meters at head office	5	10 15 7
Total number of Board's meters dealt with, and contract values	2,592	£5,951 8 2

Supervision, examination, and test ... £509 15s.

J.

Report by Dr. Kendall, Medical Adviser to the Metropolitan Water Supply and Sewerage Board, on the Sanitary Value of Storm-water Sewers.

To the Secretary, Royal Commission on Metropolitan Water Supply and Sewerage Board,—

Sir, Sydney, 28 August, 1897.

I have the honor to state that, owing to the fact that the Registrar-General does not possess the same facilities for analysing and classifying the certificates, my statistical information differs from that approved by him.

Since the institution of the Metropolitan Board of Water Supply and Sewerage, in the year 1888, when the Metropolis received the benefit of the New Water Supply, the general death-rate continued to decrease yearly, so that although it had reached 19·0 per 10,000 of the population before that year, it stood at the end of the year 1891 at 16·8. It was during this last-mentioned year, 1891, that the Sewerage System came under the control of the Board, and the death-rate fell more rapidly till it now stands at 12·7 per 10,000 of the population. The years 1891 to 1896, inclusive, were very remarkable for the scanty rainfall, which decreased yearly, and for the excessive temperatures which persisted during the summer months. This excessive heat and dryness, together with the prevailing commercial depression, induced an adynamic state of health which rendered people more prone to contract disease. It would not, therefore, have caused any great amount of surprise had such diseases as diphtheria, diarrhœa, phthisis, and enteric fever become more frequent and more virulent. Such, however, was not the case, and, with the exception of an isolated epidemic, the mortality from these diseases has materially decreased, notwithstanding the difficulties and prejudice the Board has had to cope with during the extension of the sewerage system.

In a metropolis such as ours, destitute of a Building Act, where the midden system had so long prevailed, and so little heed had been given to the condition of a building site, it could only be expected that such neglect would meet with its due reward in the shape of a devastating disease; but although such diseases have existed during the continuance of the Board's operations, still, so great has been the success attending on the extension of the water and sewerage systems, these diseases have been effectually combatted, and their spread to any serious degree prevented. Had further powers been possessed by the Board, the check on disease would have been greater; but, as it is, through the extension of our water supply and sewerage systems, boroughs, which in former times were noted for their extreme unhealthiness, have become cleaner, healthier, and now show a decreased mortality. The value of foul-water and storm-water sewers may be well estimated by the improvement which has become apparent in the death-rate in their various localities, and there can be no question at all but that storm-water sewers have improved the health of those localities in which they have been constructed.

Since the construction of these storm-water and foul-water sewers, there has been a great variation in the earth temperatures of the various localities, and as these temperatures have an important relation with the disease, diarrhœa, it is most satisfactory to note that the mortality from this disease has been reduced during the last eight years from 10·9 to 6·2 per 10,000 of the population. Although diphtheria does not altogether arise from the faulty sanitary circumstances connected with defective drainage, still such defects tend to induce a state of health which indirectly assists in the propagation of this disease. The value, therefore, of these storm-water and foul-water sewers will be more fully appreciated through the remarkable decrease in the mortality of this disease, the death-rate falling from 5·2 in 1889 to 3·1 per 10,000 of the population in 1894, and since then, assisted by the powerful aid of antitoxin, to ·9 per 10,000 of the population.

The decrease of the mortality from these two diseases in those places where storm-water sewers only exist has been most marked, and should be emphasised. Phthisis is now considered to be a disease of a micro-parasitic nature, intimately connected with damp soils, and of such a character that its infection is capable of being transmitted by means of a specific microbe or virus. The construction of storm-water sewers has brought about an extension of the area thoroughly drained, thus abolishing stagnant pools, and indirectly improving the quality of the air. Since the installation of the present water supply and sewerage systems, the mortality due to phthisis has greatly decreased, viz., from 16·8 to 9·5 per 10,000 of the population. The experience of other countries has been very similar to the above, as after the institution of sanitary works the mortality from phthisis has very considerably decreased.

The principal disease with which the Board has had to deal in the extension of its several systems is enteric, or typhoid, fever. This scourge for years past had been an annual visitor, and had greatly interfered with the national health, causing a mortality the existence of which ought to have been avoided. During the operations which have been necessary for developing the sewerage system, it has been impossible to avoid stirring up into activity the germs of disease which lay latent in the soil. This, however, was a temporary evil, which must be in the end followed by good, and clearly demonstrates the criminality of polluting the soil in the careless manner which is very evident in every one of our suburbs. It is to remedy and prevent such pollution that the storm-water sewers prove of such value in those places which cannot yet be provided with a proper system of sewerage, more especially as they have turned foul creeks and ditches into clean concrete channels with a proper fall, so that there is no stagnation of slopwaters.

Epidemics of disease will break out occasionally notwithstanding all attempts made to abolish the evil; but the source of such epidemics will generally be traced to some locality where advantage has not been taken of the existing sewer, or where no sewer has been laid.

In Alexandria, last year, there was a terrible epidemic of typhoid fever, chiefly in a locality where a sewer existed and no advantage had been taken of it; now this sewer is fully used, and only two cases of this disease have been reported from that locality.

In the Borough of Macdonaldtown—where such diseases as typhoid fever and diarrhœa were so rife that it might be called the hot-bed of disease—since the storm-water sewer has been constructed, the incidence of these diseases has been so reduced that this borough may now be called healthy. In Redfern also, which is a densely-populated suburb, the construction of the foul-water and storm-water sewers has greatly decreased the death-rate. Rushcutters' Bay, and the low-lying portions of Woollahra known as Double Bay, have benefited very greatly since the opening of the storm-water sewers, as formerly the mortality in these districts was very high. In Erskineville (or Macdonaldtown), the mortality has fallen from 101 per 10,000 of the population to 48. In Redfern, the mortality has fallen from 125 per 10,000 of the population to 44. In Waterloo, the mortality has fallen from 140 per 10,000 of the population to 65 per 10,000. The whole of this change has taken place since the construction of the storm-water sewers, and, in Redfern and Waterloo, of the foul-water sewers. The death-rates of Petersham and North Sydney have also decreased, but the construction of the Homebush Creek storm-water sewer is too recent to judge of its working; and I attribute the decrease in the death-rate of its surrounding districts to the extension of the water supply, which has not only proved of great benefit to houses, but also has improved the milk supply through the purity of the water supplied to the cattle, and used for cleansing the utensils. I have no doubt, however, that, judging from the results obtained in other districts, the benefit to be derived from this storm-water sewer will be very great. It is not beyond the mark to state that, judging from the mortality table above, the saving to the national wealth through improved health has been about £110,000 per annum during the last seven years; and, if we were in a position to define the table of sickness, this saving would be found to be much greater.

I regret that the short time allowed did not permit me to go into this interesting subject of the value of the storm-water sewers more fully.

I have, &c.,
THEO MAILLER KENDALL,
Medical Adviser,
M.W.S. & S. Board.

COMPARISON of the Death Rate from Typhoid Fever in the Cities (excluding suburbs) of Sydney, Melbourne, Brisbane, Adelaide, Perth, and Hobart.

City.	Area in acres.	Population.	Density per acre.	Deaths from Typhoid Fever.			
				Excluding Hospitals.		Including Hospitals.	
				Number.	Rate per 10,000 of Population.	Number.	Rate per 10,000 of Population.
Sydney	2,226	100,000	44·1	9	·9	42	4·2
Melbourne	6,000	68,749	11·4	5	·7	72	14·4
Brisbane	6,400	61,743	9·6	16	2·4	28	4·5
Adelaide	3,632	40,384	11·1	8	1·9	34	8·4
Perth	3,850	34,129	8·8	35	10·2	84	24·6
Hobart	1,270	27,765	21·8	3	1·08	23	8·2

PHTHISIS.

REDUCTION of Mortality (since the laying of Sewers) in the Sewered Districts.

	Density of Population per acre.	Mortality. Rate per 10,000 of the Population.	
		1890.	1896.
City	44·4	13·6	9·8
Glebe	37·0	11·5	6·2
Newtown	48·5	6·1	3·9
Redfern	55·9	12·1	5·2
Waterloo	11·7	15 9	6·4
Paddington	48·3	13·6	7·2
Woollahra	3·9	6·1	4·2

K 1.

EXPENDITURE on Storm-water Sewers in Districts where a Sewerage Rate is charged. Cost of these works, carried out by the Works Department, and in respect to which no Drainage Revenue can be levied, is merged in the Sewerage Capital Debt, and Interest and Maintenance met from Sewerage Revenue:—

Contract No.	Particulars.	Paid from Revenue.	Paid from Loans.
	Camperdown—	£ s. d.	£ s. d.
17a	University connection with Bligh-street	484 0 8	.....
74	University, Orphan School Creek	.....	1,218 7 3
29	University Storm-water Channel	1,221 11 5	.....
	Glebe—		
59	Pyrmont Bridge-road Channel	2,000 0 0	1,428 7 5
	Alexandria—		
18	Eveleigh Yards, along Alexander-street	2,477 15 10	.....
48a & part of 55a	Alexander to Copeland street	833 10 1	.....
48	Alexander to Copeland street	.....	2,610 0 0
55 & part of 55a	Copeland-street to Henderson-road	.....	1,500 0 0
61	Alexandria Park Sewer	.....	2,185 0 0
71	Eveleigh Siding to Park	.....	1,825 10 8
	Redfern—		
19	Dowling-street Storm-water Sewer	6,120 0 0	.....
	Redfern and Waterloo—		
91	Shea's Creek, from Baptist and Phillip streets to McEvoy-street	.....	8,620 9 7
85	Rose Bay Side Drainage	.....	2,899 18 0
20	Lincoln Crescent Drainage	.....	706 3 3
		13,136 18 0	22,993 16 2
	Total	£36,130 14 2	

K 2.

STORM-WATER DRAINS.

WORKS constructed, or in progress, in respect to which Drainage Revenue is not yet collected.

Description of Drain.	Amount.	Total cost on charge to 30th June, 1897.	Remarks.
Rushcutters' Bay—	£ s. d.	£ s. d.	
Board's Contract No. 187, &c.	.....	588 7 10	In progress.
Double Bay—			
Wages of Board's Staff	.....	100 0 0	„
North Sydney—			
Municipal Council's Works	.....	4,423 0 0	Drainage area in course of preparation; probably be rated from 1st Oct., 1897.
Board's Contract No. 136	.....	4,733 7 3	„ „
„ 188	666 10 9		
„ 200	2,235 14 3		
„ 208	493 17 4		
Board's Sundry Amounts	6 14 9		
Sundry small amounts expended by the Board, distributable over the whole of Storm-water Drains	.....	3,402 17 1	In progress; works only just commenced.
		120 17 10	
		£13,368 10 0	

L.

Melbourne and Metropolitan Board of Works,
Office, 501 Collins-street, Melbourne, 17 September, 1897.

Sir,

In reply to your letter of the 15th instant, received this morning, asking for information as to the system adopted by this Board in respect to the levying of water and sewerage rates within the metropolitan boundaries, I beg to state as follows:—

The Board's operations in regard to water and sewerage rating are kept entirely distinct.

Although the Board has been in existence since March, 1891, no sewerage rate has yet been levied in consequence of the surplus revenue from water supply having been sufficient to meet the interest on moneys borrowed till within a recent date. It was intended to have struck a sewerage rate last year; but, as amending legislation was pending, action was deferred. Under the provisions of an Amending Act passed by Parliament last month, the differential principle upon which sewerage rates will be levied is as follows:—

The entire metropolitan area (which consists of twenty-four municipalities and parts of two other municipalities) is divided into two sections—an outer fringe, which has been defined by the Engineer-in-Chief of the Board as the area which will not be sewered until a very remote period, if ever, and an inner area, which includes all the portions of the metropolis which are to be immediately or eventually sewered. The existing relative valuations of these areas are at present:—

Inner area..... £3,975,699
Outer area 243,035

Parliament has provided that upon all properties in the outer area a rate of 1d. in the pound is to be levied for a period of nine years. Upon all unsewered properties within the inner area a rate of 2d. in the pound is to be levied for a period of nine years. Upon all sewered properties within the inner area a rate of 1s. in the pound is compulsory so long as any rates are made upon the unsewered properties.

It is intended that a sewerage rate upon the differential basis indicated shall be struck during the present financial year, which ends on the 30th June, 1897, and this rate will date as from the 1st July, 1897. The Board is only waiting for the completion of certain legal preliminaries prior to taking the necessary action in this direction.

As to water supply, the Board has continued the practice that prevailed under the Government, viz., of charging a rate of 6d. in the pound up to £300 valuation, and £1 10s. per cent. above £300 valuation on all ordinary tenements; but for buildings built and used for storage purposes, such as bonded stores, &c., the rate is reduced above the £300 valuation to £1 per cent. instead of £1 10s. per cent.

A charge of 1s. per thousand gallons is made for water supplied by measure, the minimum charge in all cases where meters are affixed being £1 per annum.

The capital expended to the 30th June last was—on waterworks construction, £3,681,327, and sewerage construction, £2,077,197.

I enclose copies of Board's original Act and Amending Act, also copy of By-law No. 7, which is awaiting the approval of the Governor-in-Council.

Any further information you may desire I will be most happy to furnish.

Map and Schedule also enclosed.

I have, &c.,
GEO. A. GIBBS,
Secretary.

The Secretary, Royal Commission on Metropolitan Board of Water Supply and Sewerage,
Care of Public Works Department, Sydney.

Melbourne and Metropolitan Board of Works,
Office, 501 Collins-street, Melbourne, 17 September, 1897.

Sir,

My letter of this morning, in reply to yours of the 15th inst., was very hurriedly written prior to a visit of inspection to some of our works.

The statement contained on page 3 relative to the minimum meter charge requires modifying so as to read, that in cases where the supply is solely for purposes other than domestic, the minimum charge is £1 per annum; but where the supply is for domestic purposes, the minimum charge is the assessed rate.

I have, &c.,
GEO. A. GIBBS,
Secretary.

The Secretary, Royal Commission on Metropolitan Board of Water Supply and Sewerage,
Care of Public Works Department, Sydney.

M 1.

TABLE showing, approximately, the Sewerage rate per £ which it would be necessary to charge under different systems of rating to meet requirements on the ultimate final completion of the Sewerage Scheme, calculated upon the present assessed annual values of properties.

System of Rating.	Districts draining into Main Northern Outfall at Bondi.	Districts draining into Main Southern Outfall at Botany.	Districts draining into Outfall at Randwick.	Districts draining into Western Suburbs Outfall at Arncliffe.	Districts draining into Outfall at North Sydney.	Botany and Western Suburbs Combined.	Treating the whole as one Scheme.
	d.	s. d.	s. d.	s. d.	s. d.	s. d.	d.
1. One General Rate on all Properties ...	7	1 0½	1 5½	1 1½	1 0¼	1 1¼	9
2. One General Rate on Properties which can be Sewered.	7½	1 2	4 3½	1 10	1 6¼	1 6¾	10¾
3. Health Rate on all Properties, to meet Interest on Permanent Works, and Annual Instalments on Renewable Works.	5	0 9	1 0¼	0 9½	0 8½	0 9¼	6½
4. Special or Sewerage Rate on Properties which can be Sewered, to meet expenses of Maintenance and Management.	2¼	0 4	1 3½	0 6½	0 5½	0 5½	3
Total Rate, Sewered Areas	7¼	1 1	2 3¾	1 4	1 2	1 2¾	9½
Total Rate, Outside Areas	5	0 9	1 0¼	0 9½	0 8½	0 9¼	6½
5. Health Rate on all Properties, to meet Interest on Permanent Works only.	3	0 6	0 7	0 6½	0 5½	0 6¼	4¼
6. Special or Sewerage Rate on Properties which can be Sewered, to provide Annual Instalment on Renewable Works, and meet expenses of Maintenance and Management.	4½	0 7½	2 6¾	0 11¼	0 10	0 9¾	5¾
Total Rate, Sewered Areas	7½	1 1½	3 1¾	1 5¾	1 3½	1 4	10
Total Rate, Outside Areas	3	0 6	0 7	0 6½	0 5½	0 6¼	4¼

M 2.

Main Northern Outfall, Bondi.

Ultimate Cost of Works.	£ s. d.	Total. £ s. d.	Ultimate Revenue required.	Tota £ s. d.
Government Works—				
Cost to date	821,254 0 0		Interest on cost of Government Works, £1,039,932, at 3½ per cent.	36,397 0 0
Amount required to complete	218,678 0 0	1,039,932 0 0	Annual instalments to redeem cost of renewable works, £606,123, in 100 years, at 3½ per cent	21,918 0 0
Board's Sewers—				
Cost to date	235,000 0 0		Maintenance and management, £1,646,055, at 1½ per cent.	24,690 0 0
Amount required to complete	115,000 0 0	350,000 0 0		
Debentures and Overdrafts—				
City Council	248,110 0 0			
Balmain Council	2,500 0 0			
Darlington Council	5,000 0 0			
Land purchased by Board	513 0 0	256,123 0 0		
	£	1,646,055 0 0		£83,005 0 0

M 3.

Main Southern Outfall, Botany.

Ultimate Cost of Works.	£ s. d.	Total. £ s. d.	Ultimate Revenue required.	Total. £ s. d.
Government Works—				
Cost to date	310,502 0 0		Interest on cost of Government Works, £310,502, at 3½ per cent.	10,867 0 0
Amount required to complete		310,502 0 0	Annual instalment, to redeem cost of renewable works, £152,830, in 100 years, at 3½ per cent.	5,526 0 0
Board's Sewers—				
Cost to date	91,330 0 0		Maintenance and management, £463,332, at 1½ per cent.	6,949 0 0
Amount required to complete	26,500 0 0	117,830 0 0		
Debentures—				
City Council	5,000 0 0			
Redfern	30,000 0 0	35,000 0 0		
		£463,332 0 0		£23,342 0 0

M 4.

Randwick Outfall.

Ultimate Cost of Works.	£ s. d.	Total. £ s. d.	Ultimate Revenue required.	Total. £ s. d.
Gunnedah Works—				
Amount required to complete		42,758 0 0	Interest on cost of Government works, £42,758, at 3½ per cent.	1,496 0 0
Board's reticulation sewers—				
7,500 Board's sewers (Cash to date.) 9,571 debentures	17,071 0 0		Annual instalments to redeem cost of renewable works, £29,071, in 100 years, years, at 3½ per cent	1,051 0 0
Amount required to complete	12,000 0 0	29,071 0 0	Maintenance and management, £71,829, at 1½ per cent.	1,077 0 0
		£71,829 0 0		£3,624 0 0

M 5.

Western Suburbs Sewerage.

Ultimate Cost of Works.	£ s. d.	Total. £ s. d.	Ultimate Revenue required.	Total. £ s. d.
Government Rain Sewerage Ducts—				
Cost to date	185,278 0 0		Interest on Total Cost of Government Work, £754,590, at 3½ per cent. per annum	26,410 0 0
Amount required to complete	434,212 0 0	619,590 0 0	Annual Instalment, to redeem £323,180 in 100 years, at 3½ per cent. per annum	11,686 0 0
Government Storm-water Sewer Ducts—Cost to date		135,000 0 0	Maintenance of Works, reckoned at 1½ per cent. on Total Cost, £1,077,770	16,166 0 0
Board's Reticulation Sewers—				
Cost to date	25,575 0 0			
Amount required to complete	297,605 0 0	323,180 0 0		
		£1,077,770 0 0		£54,262 0 0

M 6.

North Sydney Sewerage.

Ultimate Cost o Works.	Total.			Ultimate Revenue required.	Total.		
	£	s.	d.		£	s.	d.
Government Main Works—Constructed and in progress	110,000	0	0	Interest on Cost of Main Works, £135,000, at 3½ per cent	4,725	0	0
Board's Works—Constructed and in progress or under survey	45,000	0	0	Annual Instalments to redeem Renewable Works, £69,500, with interest at 3½ per cent. in 100 years	2,513	0	0
Stormwater Ducts, for which authority has been obtained by Public Works Department	10,000	0	0	Maintenance and Management, £204,500, at 1½ per cent.	3,067	0	0
Amount paid Borough Council for their Drains	4,500	0	0				
Portion Neutral Bay—							
Sub-main	15,000	0	0				
Reticulation	20,000	0	0				
	£204,500	0	0		£10,305	0	0

M 7.

All Districts Combined.

Ultimate Cost of Works.				Total.			Ultimate Revenue required.	Total.		
	£	s.	d.	£	s.	d.		£	s.	d.
Government Works—										
Cost to date	1,562,134	0	0				Interest on cost of Government Works, £2,282,782, at 3½ per cent.	79,895	0	0
Amount required to complete	720,648	0	0							
				2,282,782	0	0	Annual Instalments, to redeem cost of renewable works, £1,180,704 in 100 years, at 3½ per cent.	42,694	0	0
Board's Reticulation Sewers—										
Cost to date	413,976	0	0							
Amount required to complete	471,105	0	0				Maintenance and Management, £3,463,486, at 1½ per cent.	51,949	0	0
				885,081	0	0				
Debentures, &c.				295,623	0	0				
			£	3,463,486	0	0	£	174,538	0	0

N.

Melbourne System of Rating.

	£
The assessed value of properties within Municipalities, but outside the area which will be sewered is	707,413
The assessed value of properties which can be sewered is	3,770,613
Total values	£4,478,026
The revenue required to be provided amounts to	169,354
2d. in the £ on £707,413 is	5,895
The amount to be provided by the sewerage rates is therefore	£163,459

To raise this sum a rate of 10⅔d. in the £ must be struck on all properties which can be sewered.

Sydney: William Applegate Gullick, Government Printer.—1897.

SYDNEY AND SUBURBS
SEWERAGE SYSTEM.

Scale, 40 Chains to an Inch.

Laid upon the Table, and referred to the Printing Committee.
F. W. W. 20/10/97.

NOTES.

- NORTHERN SYSTEM, constructed and to be constructed. Draining into BONDI OUTFALL shewn
- SOUTHERN SYSTEM, constructed - - - - - " " BOTANY SEWAGE FARM "
- WESTERN SUBURBS, constructed and to be constructed " " ARNCLIFFE SEWAGE FARM "
- RANDWICK, to be constructed - - - - - " " COOGEE OUTFALL "
- NORTH SYDNEY, constructed and to be constructed - " " WILLOUGHBY OUTFALL "
- ENFIELD and CANTERBURY, proposed to be constructed " " ARNCLIFFE SEWAGE FARM "
- LOW LEVELS, proposed to be constructed - - - - - - - - - - "

Sig. 278.

1897.

LEGISLATIVE ASSEMBLY.

NEW SOUTH WALES.

PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS.

REPORT

TOGETHER WITH

MINUTES OF EVIDENCE, APPENDIX, AND PLANS,

RELATING TO THE PROPOSED

DUPLICATE MAIN FROM PROSPECT TO POTTS' HILL.

Presented to Parliament in accordance with the provisions of the Public Works Act, 51 Vic. No. 37.

Printed under No. 11 *Report from Printing Committee,* 15 *July,* 1897.

SYDNEY: WILLIAM APPLEGATE GULLICK, GOVERNMENT PRINTER.

[2*s.* 6*d.*] *87—*a* 1897.

MEMBERS OF THE COMMITTEE.

LEGISLATIVE COUNCIL.

The Honorable Frederick Thomas Humphery, Vice-Chairman.
The Honorable James Hoskins.
The Honorable Charles James Roberts, C.M.G.
The Honorable William Joseph Trickett.
The Honorable Daniel O'Connor.

LEGISLATIVE ASSEMBLY.

Thomas Thomson Ewing, Esquire, Chairman.
Henry Clarke, Esquire.
Charles Alfred Lee, Esquire.
John Lionel Fegan, Esquire.
Thomas Henry Hassall, Esquire.
George Black, Esquire.
Francis Augustus Wright, Esquire.
Frank Farnell, Esquire.

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Minutes of Evidence.
Appendix.
Plans.

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APPENDIX.

To evidence of J. M. Smail. Alleged Deficient Water Pressure ..... A

PLANS.

Sydney Water Supply—Plan showing proposed improvements between Prospect and Potts' Hill.
Longitudinal Sections—Diagram showing Existing Arrangements—Type Sections of Canal.

PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS.

DUPLICATE MAIN FROM PROSPECT TO POTTS' HILL.

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, the Public Works Act Amendment Act of 1889, 52 Vic. No. 26, and the Public Works (Committees' Remuneration) Act of 1889, 53 Vic. No. 11, to whom was referred the duty of considering and reporting upon "the expediency of constructing a duplicate main from Prospect to Potts' Hill, in connection with the Sydney Water Supply," have, after due inquiry, resolved that it is not expedient the proposed duplicate main should be constructed; but they recommend that the amended scheme submitted by the Engineer-in-Chief for Public Works, by which the sides of the canal between Prospect and the Pipe Head Basin shall be raised, the canal strengthened, and the 6-foot pipe-line between the Basin and Potts' Hill Reservoir duplicated, be adopted, at a cost of £109,317; 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:—

THE PROPOSED WORK.

1. In order to increase the quantity of water flowing daily from the reservoir at Prospect to Potts' Hill, and thus meet the growing requirements of Sydney and its suburbs, it is proposed that the capacity of the canal between Prospect and the Pipe Head Basin shall be enlarged by raising the sides of the canal 2 feet 6 inches, and generally strengthening the canal, and that the 6-foot pipe-line between the Basin and Potts' Hill Reservoir be duplicated.

The water in the Prospect Reservoir when it is full, is 195 feet above high-water mark. After leaving Prospect it passes along the canal, which is open and about 4¾ miles long, with a bed-fall of 6 inches to the mile, into a line of 6-foot pipes of about the same length as the canal, and thence into the reservoir at Potts' Hill. The level there varies with the consumption, but it is generally about 170 feet in summer time, and 173 feet in winter, above high-water mark.

This height of water at Potts' Hill is not sufficient in summer, by at least 4 feet, to fully supply the requirements of the metropolis. The canal, in its present condition, and the single pipe-line, are not capable of conveying into the reservoir more water than they are now doing. It is explained that in the hot seasons of the last three years it was found that the higher levels of the areas receiving water by gravitation were insufficiently supplied, for though there was plenty of water at Prospect it could not be brought quickly enough to Potts' Hill.

At first it was thought a duplicate pipe-line of 4-foot pipes from Prospect to Potts' Hill, the canal remaining as it is, would be the best method of effecting the necessary improvement, and this is the proposal referred by the Legislative Assembly to the Committee; but investigation showed that a pipe-line of this description would be inadequate, and this and another scheme—by which it was proposed to lay a 6-foot pipe-line from Prospect to Pott's Hill, leaving the canal unaltered—were relinquished for the present proposal. With the enlarged canal and the duplicate 6-foot pipe-line, not only can a level of 174 feet be maintained at Potts' Hill, but the supply in the reservoir can be added to as may be necessary to meet increased

consumption,

consumption, for the proposed alterations will practically double the present maximum output of water from Prospect. At a level of 174 feet the reservoir at Potts' Hill will contain about 90,000,000 gallons of water, which, though in itself only a three or four days' supply, will be sufficient, it is stated, for all purposes. The present average daily consumption of water is about 17,000,000 gallons, and, with the proposed improvements, 47,000,000 gallons a day can be supplied to Potts' Hill, and thence, if the water be maintained there at the 174-foot level, the existing pipes can convey 30,000,000 gallons to Sydney.

Parramatta and Granville are at present supplied through a line of pipes which draw off the water from the 6-foot pipe-line at a point below the Pipe Head Basin, an arrangement which, of course, slightly affects the discharge into Potts' Hill Reservoir; but if at any time it be necessary to give the full discharge to Potts' Hill it will be easy to do so, the Committee were informed, by laying a short additional length of pipes to take the supply for Parramatta and Granville directly from the Pipe Head Basin.

The work of raising the sides of the canal may be carried out without interruption to the daily water supply. By laying half a mile of 4-foot pipes on the lower side of the canal, from Prospect, and running the water from the canal through that pipe-line, the work of raising the sides of a section of the canal, half a mile in length, can be performed without difficulty. When one section is finished another may be proceeded with, after similar fashion, until the whole be completed. On completion of the work the pipes thus temporarily used—the cost of which is included in the general estimate—may be afterwards utilized in effecting any further repairs that may be necessary.

Measures will also be taken in connection with the work to improve the screening of the water. At present the water passes through a grating at the Pipe Head Basin and then through a screening tank at Potts' Hill. It is intended under the improved arrangements to screen it at the Pipe Head Basin, just as it is screened at Potts' Hill, except that the mesh of the screens will be a little coarser.

Estimated Cost.

2. It is estimated that the proposed improvements will cost £109,317—or £39,112 for the canal portion of the scheme, and £70,205 for the duplicate pipe-line. The amount to be expended on the canal will cover the cost of strengthening it as well as that of raising its sides. The weak points of the canal are known, and it is intended to reconstruct the parts where indications exist of defective work, and to reline the banks with concrete. By these means the canal, it is believed, will be made in all essential points permanently sound and serviceable.

The cost of the work will be a charge against the Metropolitan Board of Water Supply and Sewerage, who will be responsible for the payment of interest, and therefore will raise the revenue necessary for that purpose. In their work of supplying water to the public, the Board must keep pace with the public requirements, and to enable them to do this, they ask for the proposed improvements between Prospect and Potts' Hill, the cost to be added to the capital cost of the whole scheme of water supply in connection with the metropolis.

Comparison of the Schemes.

3. A comparison of the three schemes which have been under consideration shows that recommended by the Department to be the best in respect of both cost and discharging capacity. A duplicate 4-foot pipe, as first suggested, would cost £82,171, and, when Prospect Reservoir is full, would add less than 14,000,000 gallons a day to the Potts' Hill supply, but during the late drought would not have contributed 9,000,000 gallons a day. At that time the present canal and pipe-line were bringing down 20,000,000 gallons a day, and a duplicate line of 4-foot pipes would not have increased the quantity to 29,000,000 gallons, because, it is explained, keeping up the level at Potts' Hill would lessen the discharge from the pipes. With a 6-foot pipe from Prospect to Potts' Hill, the supply to Potts' Hill Reservoir would be approximately about 40,000,000 gallons a day; but this scheme would cost £134,000, apart from any expenditure upon the strengthening of the canal. The proposal finally decided upon can be carried out for £25,000 less than the 6-foot pipe from Prospect, and will supply to Potts' Hill daily 47,000,000 gallons.

THE PRESENT WATER SUPPLY.

4. From a statement furnished by the Engineer of the Metropolitan Board of Water Supply and Sewerage, it appears that the places supplied with water from Prospect include, besides Sydney and suburbs and Parramatta, Penshurst on the South Coast railway, Smithfield on the Southern railway, and Hornsby Junction on the Northern railway. At the date of the last report, the number of persons receiving water was 408,282, as compared with 326,035 when the Board took over the works,—an increase of a little over 25 per cent. in eight years, or an average increase of about 3 per cent. per annum.

The increase of population served is due, it is explained, to the rapid extension of the mains into the different suburbs. As most of the populous suburbs are now being supplied, it is not probable that the increase will be in the same proportion in the future.

With regard to Sydney the Centennial Park Reservoir, when completed, will be the principal source of supply for the city wherever high pressure is required, the low pressure water being continued from the reservoir in Crown-street.

EFFECT OF THE PROPOSED IMPROVEMENTS ON THE WATER SUPPLY.

5. It is thought that if the proposed improvements be carried out sufficient water will be brought to Potts' Hill daily to meet all requirements for the next twenty years, or, it may be said, for the next forty or fifty years, but one or two additional pipe-lines will probably have to be laid during the latter period to convey the water from Potts' Hill to Sydney. Apart from the want of better means for increasing the flow to Potts' Hill, the facilities for supplying Sydney and the suburbs appear to be satisfactory. The recent very dry season (combined with the fact that the repairs to the canal above Prospect Dam had limited the intake) lowered the water in the Prospect Reservoir considerably; but it would be necessary for a period of drought to continue much longer than was the case recently before it would cease to be possible to obtain water from Prospect by gravitation, and should the gravitation supply fail pumping could be resorted to, all the machinery required for that purpose being a centrifugal pump suitable for a low lift. The rapidity with which the water in the reservoir may be replenished is shown by the circumstance that recent moderate and scattered rain on the watershed raised the water-level 2 feet, which is equal to an addition of 557,000,000 gallons.

The Superintendent of Fire Brigades complains of an absence of sufficient pressure of water in Sydney for fire extinguishing purposes, and expresses the opinion that this want could be met if an additional pipe-line were laid from Prospect to Sydney. The evidence of the Engineer of the Board of Water Supply, however, shows that when the reservoir now being constructed at the Centennial Park is completed a greater pressure will be provided, as that reservoir will be 245 feet above high-water mark, and close to Sydney, while the reservoir at Prospect is but 195 feet and 24 miles away.

THE COMMITTEE'S RECOMMENDATION.

6. The Committee consider that the evidence given in the inquiry justifies the adoption of the amended scheme submitted to them, and they, therefore, recommend that this scheme be carried out.

Their decision is embodied in the following resolution, extracted from the Minutes of Proceedings :—

"Mr. Trickett moved—

'That, in the opinion of the Committee, it is not expedient the proposed duplicate main from Prospect to Potts' Hill, referred to the Committee by the Legislative Assembly, be carried out; but they recommend that the amended scheme submitted by the Engineer-in-Chief for Public Works, by which the sides of the canal between Prospect and the Pipe Head Basin shall be raised, the canal strengthened, and the 6-ft. pipe-line between the Basin and Potts' Hill Reservoir duplicated, be adopted, at a cost of £109,317.'

"The motion was seconded by Mr. Hassall, and passed."

THOS. EWING,
Chairman.

Office of the Parliamentary Standing Committee on Public Works,
Sydney, 8 June, 1897.

PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS.

MINUTES OF EVIDENCE.

DUPLICATE MAIN FROM PROSPECT TO POTTS' HILL.

TUESDAY, 4 *MAY*, 1897.

Present:—

THOMAS THOMSON EWING, Esq. (Chairman).

The Hon. Frederick Thomas Humphery.	Charles Alfred Lee, Esq.
The Hon. James Hoskins.	John Lionel Fegan, Esq.
The Hon. Charles James Roberts, C.M.G.	Thomas Henry Hassall, Esq.
The Hon. William Joseph Trickett.	George Black, Esq.
Henry Clarke, Esq.	Francis Augustus Wright, Esq.

Frank Farnell, Esq.

The Committee proceeded to consider the expediency of constructing a Duplicate Main from Prospect to Potts' Hill, in connection with the Sydney Water Supply.

Robert R. P. Hickson, Under Secretary for Public Works, sworn, and examined:—

1. *Chairman.*] I understand that you have a general Departmental statement to make? Yes, general. We are not in a position to say at present what the cost of the approved scheme will be. R. R. P. Hickson. 4 May, 1897.

The necessity for additional means for conveying water to the distributing point, Potts' Hill screening tank, was felt to a marked degree during the summer of 1894-5 and 1896.

It was found that although there was plenty of water at Prospect it could not be brought in quick enough to maintain a sufficient head in the screening tank.

The present summer consumption averages about 20 to 21 millions, and has been as high as 25 millions per day. If the increase experienced in the past eight years continues, in twenty years the consumption will probably reach 35 to 36 million gallons per day. It is only with difficulty the present supply can be kept up efficiently, there being such an increased demand for water on the higher zones, which involves more continuous pumping, and which rapidly reduces the level in Crown-street reservoir, and eventually is felt back to Potts' Hill. If we could make sure of maintaining a water level at Potts' Hill at, say, R.L. 174·00 then there would be no difficulty in Crown-street, but it falls daily to about 170·00, and at this level the water will not come forward rapidly enough. To get over this difficulty Mr. Smail, Engineer to the Metropolitan Water and Sewerage Board, recommended that a 4-foot main should be laid from Prospect to Potts' Hill, and estimated the cost at £100,000, which sum was placed on the Estimates and voted. He proposed to tap the outlet main direct at Prospect, so as to take advantage of the full head of water available in the reservoir, which, when full, is 20 feet over top level in canal. In dealing with this matter Mr. Darley reports that this proposal would give a good discharge to the 4-foot main to Potts' Hill as long as Prospect reservoir remained full. Seeing, however, that the reservoir lately fell over 11 feet, the head would have been reduced by this amount, in which case the 4-foot main discharging only 9 millions per day would not bring down sufficient water to keep up the supply. Moreover, the canal and pipe cannot work together, for if the pipe should keep the water level at Potts' Hill up to 174, then the canal would be practically inoperative. Whatever is done it is desirable that any pipe laid should be duplicated, one being able to keep up at least the winter supply, say, 13 to 14 millions per day, while the second pipe is laid off for cleaning. A proposal to lay a 6-foot pipe right through was then investigated, but on full consideration Mr. Darley thinks that the best result will be obtained by raising the canal and duplicating the 6-foot pipe for the remainder of the distance. It is this proposal which will be laid before the Committee, and for which estimates are now being prepared.

2. *Mr. Hoskins.*] Will not the giving of additional facilities for the consumption of water create a danger of scarcity? No more water will be taken from Prospect than can be used in Sydney, no matter how many pipes you put down.

3. But the greater the facilities for getting water in Sydney, the greater the probable waste? The water inspectors are supposed to look after that.

4. *Chairman.*] Does the whole of the Sydney water supply come through Potts' Hill? Yes.

5. There is no trouble in delivering it from Potts' Hill? No.

6. All your pumping appliances are up to date? Yes.

7. *Mr. Hoskins.*] If you increase the facilities for bringing water into Sydney will the Crown-street reservoir be able to take it? Yes; it will take all that we can bring in.

8. *Mr. Humphery.*] The only deficiency is at Potts' Hill? Yes.

9. *Mr. Hoskins.*] If the Sydney consumption increased from 18,000,000 to 35,000,000 gallons a day do you think that there would be sufficient water in the Prospect reservoir to meet the demand? I think so. We have an enormous catchment behind the reservoir.

10. But I read in the newspaper some time ago that all the aqueducts and canals there were dry? Yes; they happened to be dry for a short time. It was an exceptional season.

WEDNESDAY,

WEDNESDAY, 12 *MAY*, 1897.

Present:—

THOMAS THOMSON EWING, Esq. (Chairman).

The Hon. Frederick Thomas Humphery.	Charles Alfred Lee, Esq.
The Hon. James Hoskins.	John Lionel Fegan, Esq.
The Hon. Charles James Roberts, C.M.G.	Thomas Henry Hassall, Esq.
The Hon. William Joseph Trickett.	George Black, Esq.
The Hon. Daniel O'Connor.	Francis Augustus Wright, Esq.
Henry Clarke, Esq.	Frank Farnell, Esq.

The Committee further considered the expediency of constructing a Duplicate Main from Prospect to Potts' Hill.

Cecil West Darley, Engineer-in-Chief for Public Works, Department of Public Works, sworn, and examined :—

C. W. Darley. 12 May, 1897.

11. *Chairman.*] Have you a statement to make to the Committee? The scheme now before the Committee originated in a proposal of the Engineer to the Metropolitan Water and Sewerage Board that a sum of money should be placed on the Estimates for the laying of a pipe-line from Prospect to Potts' Hill, in order to increase the water-level in the Potts' Hill reservoir, and thus improve the Sydney supply. His intention was to lay a 4-foot main from Prospect to Potts' Hill. The proposed route of that line is marked on the plan in red. For the first three-quarters of a mile it would follow the canal route. Then, leaving the canal, it would go along a road locally known as Back-lane. From that point it would be necessary to resume a strip of land, about a mile long, until the line got on to another road, and eventually came on to the land through which the present pipe-line runs, at the Sherwood Road bridge. From that point it would run parallel to the present canal and pipe-line on land belonging to the Water and Sewerage Board. The Minister decided, however, that if the work was to be carried out he should be the constructing authority, and the matter was accordingly transferred to the Department of Public Works, and came to me for investigation. The water in the Prospect reservoir, when the reservoir is full, stands at a level 195 feet above sea-level, but it is drawn off at a point 25 feet below that level, so that there is a loss of 20 feet of head when the reservoir is full. Leaving Prospect, the water passes along an open canal, some 4¾ miles in length, and having a bed-fall of 6 inches to the mile, until it enters a pipe-line of about the same length as the canal, which conveys it into the reservoir at Potts' Hill. The discharge through this canal and pipe-line is not sufficiently large to keep up the level of the water in Potts' Hill reservoir above 170 feet in summer time. That is, the water-level at Potts' Hill falls to 170 feet on a summer day, and rises to the 171-foot level at night. In the winter time it gets as high as 172 feet; but we always counted upon keeping it at the 174-foot level. At that level there are about 90,000,000 gallons of water in the Potts' Hill reservoir.

12. *Mr. Wright.*] That is about a five days supply for Sydney at the present consumption? It would not be safe to call it more than a three or four days supply. At the time I investigated Mr. Smail's proposal the recent severe drought had commenced, and the reservoir at Prospect fell 12 feet, showing that we cannot always count upon having a full head there to force the water through the pipes.

13. How much did that fall reduce the quantity of water in the Prospect reservoir? The reservoir was depleted to the extent of 3,400,000,000 gallons.

14. What proportion was that of the quantity of water that could be stored in the reservoir, and be available by gravitation? The quantity of water in the Prospect reservoir available by gravitation is about 6,000,000,000 gallons, so that about one-half of the available gravitation water disappeared during the drought.

15. What proportion of the total capacity of the reservoir was lost? A little less than one-third. When I investigated the proposal to lay a duplicate 4-foot pipe I came to the conclusion that it did not look sufficiently far ahead. If the reservoir were full it would add less than 14,000,000 gallons a day to the Potts' Hill supply; but during the late drought it would have brought down less than 9,000,000 gallons more a day. At that time the present canal and pipe-line were bringing down 20,000,000 gallons a day, but a duplicate 4-foot pipe-line would not have increased the supply to 29,000,000 gallons a day, because by keeping up the Potts' Hill level you would lessen the discharge of the canal. Therefore I came to the conclusion that it would not be safe to carry out the scheme as proposed, because it would probably not be long before another pipe was required. I then investigated two or three other schemes for dealing with the difficulty. One of these was to lay a 6-foot pipe from Prospect to Potts' Hill. I found that that would bring down about 28,000,000 gallons a day, or about three times as much as a 4-foot pipe; but the cost of the work would be £134,000 as against £82,000. I also investigated the proposal to lay a 6-foot pipe from Prospect to the pipe head basin, and a 4-foot pipe from the pipe head basin to Potts' Hill. Such an arrangement would enable the present 6-foot pipe to be cleaned, and would very largely increase the supply. I relinquished that scheme, however, in favour of the present proposal, which is to raise the sides of the canal 2 ft. 6 in., and to duplicate the present 6-foot pipe-line. We should then start at Prospect with a water-level of 177·50 feet, which would give us 177 feet at the pipe-head, and 174 feet at Potts' Hill, with a fall of 3 ft. 6 in. The present pipe-line, if clean, would deliver 23,400,000 gallons daily to Potts' Hill, and by putting down a duplicate pipe-line we could obtain a daily supply of 46,800,000 gallons. The canal, when the walls are raised as proposed, would bring down about 53,000,000 gallons a day to the pipe-head basin, or more than two and a half times as much as would be brought down by the present canal and a 4-foot pipe.

Sydney Water Supply.—Proposed Additional Works.

Canal and Pipe.—Estimated cost.

Raising the existing canal at upper end 2 ft. 6 in., and lower end 2 ft. (4·723 miles from Prospect Reservoir to Pipe Head, including removing and enlarging gauge, weir, raising and strengthening brick aqueduct, renewing defective pitching and concrete lining, raising or renewing flumes, bridges, &c., temporary pipe, 4-ft. diameter, ½-mile long, temporary bulkheads, dams, penstocks, &c., and new screens at Pipe Head Basin	£39,112
New (duplicate) steel pipe, from Pipe Head (4·74 miles) to Potts' Hill reservoir, 6 ft. in diameter, ⅜-in., $\frac{5}{16}$-in., and ¼-in. thick, laid complete alongside existing pipe	70,205
Total	£109,317
Should the superstructure of the existing brick aqueduct be replaced by a cast-iron channel, then to the above must be added	7,800
Total	£117,117

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16. The canal, if its walls were raised as proposed, would bring down more water than two 6-foot pipe lines could carry away? Yes; but the water required for Granville and Parramatta is drawn off not very far from the pipe-head basin. If it were necessary to give the full discharge of the two pipes to Potts' Hill it would be easy to lay a short additional length of pipes to take the supply for Parramatta and Granville directly from the pipe head basin.
17. The water delivered from the canal will be ample to keep the two pipe-lines full, and to supply Parramatta and Granville? Yes; by this arrangement we shall be able to keep the water at Potts' Hill up to the 174-foot level, or even at 174·50 feet. By thus increasing the water-level at Potts' Hill we prolong the time that the two existing 4-foot mains will be able to carry on their work of supplying the city and suburbs. If the water-level at Potts' Hill is not kept up we shall in a few years have to lay a third 4-foot main from Potts' Hill to Sydney; but if the water in Potts' Hill reservoir is kept at a level of 174 feet, the existing mains from Potts' Hill to Sydney will deliver all the water required for some years to come.
18. What amount of water would these 4-foot mains deliver per diem with 174 feet at Potts' Hill? One of those mains, with a head of 174 feet, will deliver 15,000,000 gallons a day at Crown-street. They do not draw much water into Crown-street from the second main at the present time, because it is used to supply Balmain, Petersham, Pyrmont, and a large part of the lower portions of the western suburbs, and it is generally shut off at Crown-street to keep up the supply in these districts. Of course any surplus can be drawn into Crown-street reservoir.
19. If the one main will supply 15,000,000 gallons a day, I suppose the other will do the same? Well, the second main is 48 inches as far as Petersham, and 42 inches from there on.
20. Could we calculate upon getting 27,000,000 or 28,000,000 gallons a day from the two mains? The two mains are equal to supplying 30,000,000 gallons a day. Of course, we are not dealing only with the city—we are dealing with the city and the suburbs. These two mains can carry away from Potts' Hill 30,000,000 gallons a day.
21. *Mr. Trickett.*] All the water for the eastern suburbs flows into the Crown-street reservoir? Yes.
22. And from there it is pumped into the Waverley and Ocean-street reservoirs? Yes; to Paddington, Woollahra, and Waverley reservoirs.
23. *Mr. Wright.*] Have you carefully thought out the proposal to raise the walls of the canal? Yes; very carefully.
24. The canal passes over one or two aqueducts? Over one.
25. Is that aqueduct sufficiently strong to stand the weight of an increased volume of water? It is. I have put a sum down in the estimates for strengthening it, and for raising the walls of the canal.
26. Did not the aqueduct break down some years ago? A portion of one side came out.
27. It has been strengthened with tie-bolts since? Yes.
28. And you think that there is no danger of its breaking down again? No. I have an alternative estimate for taking away the sides of the canal where it passes over the aqueduct, and putting up a cast-iron trough; but I am more in favour of adhering to brickwork.
29. What was the original cost of the aqueduct? I cannot say. The estimate of the scheme before the Committee—that is, for raising and strengthening the canal throughout, and taking away all doubtful work and reconstructing the places where it occurs, re-lining all the banks, and doing everything in a very substantial manner—is £39,112.
30. Do you propose to re-line the banks? I propose to re-line all the banks with rich concrete.
31. I thought that the canal was lined with dry pitching? In the cuttings it is, and I can leave that because it is quite safe; but I have allowed for going a considerable distance into cutting with concrete. We know all the weak points of the canal now, and I propose to strengthen them.
32. Have all the leakages been discovered? They are all known. They show themselves.
33. You pass through shale in one or two places;—is that cemented or concreted? There is a shale cutting at the Smithfield Road, but that is not concreted.
34. Is there no leakage there? I do not think so.
35. Is it possible that there may be unobserved leaks? There may be a little leakage, but none of any moment.
36. Is it possible that any perceptible quantity of water may leak away? No; I think there is no serious leakage.
37. There is a considerable leakage at the aqueduct now? There is a leakage at the ends, where it joins the banks.
38. When the Committee saw it the other day there was a leakage in the middle? I think the leakage there would take a long time to fill a 400-gallon tank.
39. Your estimate includes the cost of making the aqueduct perfectly sound? Yes.
40. What would be the cost of laying a wrought-iron pipe across it? I would not think of laying a pipe across it. It would require too big a pipe. The alternative scheme is to take away the sides of the canal at this point, and to build a cast-iron trough across the aqueduct.
41. What would that work cost? It would increase the estimate by £7,800, bringing the total amount up to £46,900 for the canal.
42. You have no doubt that the canal will be able to stand the increased weight of water if its sides are heightened? None whatever. My estimate for raising the sides of the canal and generally strengthening that portion of the work is £39,112, and I put down £70,205 as the cost of the duplicate pipe-line from the pipe-head basin to Potts' Hill, making the total cost of the work £109,317. If, instead of raising the walls of the aqueduct, we put a cast-iron superstructure upon it, the estimate would be increased by £7,800, and would then stand at £117,117.
43. What is the estimate for the other two schemes you spoke of? A 4-foot pipe-line throughout is estimated to cost £82,171, and a 6-foot pipe-line throughout would cost £134,844.
44. I suppose it is almost necessary to duplicate the pipe line to allow of the present pipes being cleaned? Yes; those pipes cannot be cleaned now, as the water cannot be let off.
45. How long would it take to clean the whole length of pipes? I should say three months. I think it is time they were cleaned and re-coated.
46. Have you considered the possibility of keeping up the supply supposing the present consumption in the city and suburbs were doubled? Yes; this scheme would provide for more than double the present consumption.
47. The present consumption is about 20,000,000 gallons a day? 16,000,000 gallons a day was the average for last year. On some days the consumption is as high as 20,000,000 and 21,000,000 gallons.

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48. If the consumption of the city increased to 36,000,000 or 38,000,000 gallons a day, you could still keep pace with the demand? If this scheme were carried out we could deliver more than that quantity of water at Potts' Hill; but it might be necessary to lay another line of pipes from Potts' Hill in order to provide for the city consumption.
49. If the proposed scheme is carried out, there will be sufficient water available at Potts' Hill to supply double the present consumption? Yes.
50. If the present consumption were doubled and there were a dry season, how long could you continue to draw from Prospect reservoir? If the consumption last year had been twice what it was we could have still continued to bring water by gravitation from Prospect.
51. I understood you to say that half the available quantity of water had been taken away by the drought? Yes, half the gravitation water.
52. That being so, if the consumption had been twice what it was, the whole of the available water at Prospect would have been used? Yes; we should have been just about at a balance. The recent drought, however, was almost unprecedented.
53. You have no doubt about the Prospect reservoir catchment area being sufficiently large? None whatever. And it must be remembered that at the worst there remains one third more to be pumped with a comparatively small lift. I do not think it will be necessary to increase the storage reservoir for many years to come. What made matters a little worse during the recent drought was that the Board had been re-lining a portion of the canal near the Camden Road, and had shut off the water for many months; so that instead of flowing into the reservoir it has been flowing down the rivers.
54. Had the water been allowed to flow into it the reservoir would not have fallen so low? It would have been in a better position. The water has been going down the river instead of going down the canal.
55. In the event of your being unable to obtain water from the reservoir by gravitation, what appliances have you at Prospect for pumping? None at all; but I think that Mr. Smail has a scheme matured.
56. If the gravitation supply were to fail, how long would the inhabitants of Sydney have to wait for you to get your pumping appliances into order? Long before the water available by gravitation is drawn off, the pumping appliances will be ready.
57. If the recent drought had continued for another three months the gravitation supply would have been exhausted? Well, you could have had pumping appliances fixed up within three weeks.
58. Do you not think that in the interests of the public pumping appliances should be erected at Prospect, so that they might be available on any emergency? No, because the machinery would only be perishing there. All that would be required would be a centrifugal pump suitable for a low lift. The late rain, which was not very heavy on the upper parts of the watershed, raised the water-level in the Prospect reservoir 2 feet. That shows how quickly the water rises in the reservoir after a decent shower.
59. *Mr. Humphery.*] What would that rise of 2 feet represent in gallons? 557,000,000 gallons. On a large part of the watershed no rain fell at all.
60. *Mr. Wright.*] In connection with the laying of a 4-foot main right through, was it not proposed to draw the water from Prospect at a lower level than that from which it is taken at present? No; the proposal was to put the full head of the reservoir on to the main, and to leave the canal as it is at present.
61. I understood that it is proposed to tap the reservoir at a lower level than that at which it is now tapped? No, you could not do that. The 4-foot pipe would connect with the mains that come from the reservoir, and would get the advantage of the full head available.
62. The difference in height between the Prospect and Potts' Hill reservoirs would not allow of the water being taken at a lower level? No, because the fall is too little.
63. Do the pipes from Potts' Hill to Sydney require cleaning? No; cast-iron pipes do not require as much cleaning as wrought-iron pipes.
64. I suppose, too, that the screening at Potts' Hill keeps a great many foreign substances out of the cast-iron pipes which have to come through the wrought-iron pipes? Yes; and then, too, there is not as much growth on the cast-iron pipes as there is on the wrought-iron pipes.
65. Consequently, there is not the same necessity for cleaning them? No. Some time ago, when the 4-foot main at Canterbury broke, I went into it for a considerable distance and examined it, and I was surprised to find it almost as bright as it was when first put down. The process of coating seems to save the pipes for a great many years. I have also been into the 6-foot pipes, and I have seen a great growth there.
66. Suppose the aqueduct broke down, how long would it be before you could repair the damage so as to permit of the supply being continued? When it broke down before we were supplying water again in about two days, or two nights and a day.
67. If three or four of the arches broke away, do you think you could continue the supply within forty-eight hours? I think we could certainly continue it within that time.
68. And you always have sufficient water in the Potts' Hill reservoir to keep Sydney supplied for two or three days? Yes. I would like to say, however, that there is not the remotest chance of the arches giving way. That is about the last thing that would go.
69. I suppose there is no fear of the sides of the canal giving way? No; they are well consolidated now.
70. You apprehend no break-away that would inconvenience the people of the city and suburbs? No. In carrying out the work of raising the sides of the canal I propose to use half a mile of 4-foot pipes with flanged joints, the cost of which is included in the estimate. At the commencement I would lay these down on the lower side of the canal and bring the water from the reservoir into the canal, at a point half a mile further towards Sydney than that at which it at present enters the canal, having previously constructed bulkheads across the canal both above and below. Thus, while I was building up the sides of the canal and strengthening it, the supply would be undisturbed, and when the first section was finished I would begin with a second, and so on until the whole work was completed. Afterwards, when the whole thing was finished, these pipes would be available to meet the case of any breakdown that might occur. All that would be necessary to do would be to cart them to the scene of the disaster, and lay them, and turn the water through them. This could be done within twenty-four hours.
71. You intend to keep these pipes as a stand-by? Yes.
72. You feel confident that by carrying out the scheme you recommend to the Committee the water-level at Potts' Hill can be kept always at 174 feet? Yes.
73. What amount of water is required for places like Parramatta and Liverpool,—how would the consumption of water in other places affect your proposal? The water supply at Liverpool is not taken from the canal at all.

74.

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74. But the water for Parramatta and Granville is taken at some point between Prospect and Potts' Hill? Yes.
75. You do not consider that that demand will be large enough to necessitate any additional work? No; the quantity required for those places is comparatively small.
76. *Mr. Hassall.*] Is there any proposal to increase the capacity of the Prospect reservoir? The engineer has spoken to me about raising the water-level a foot or 18 inches, and when the puddle wall has been raised I think that may be safely done.
77. Such an arrangement would materially increase the available supply? By raising the water-level of the reservoir 18 inches we shall add 500,000,000 gallons to the supply.
78. So far as the quantity of water coming into the reservoir is concerned, could you increase the water-level there beyond 18 inches? The water comes into the canal from a much higher level than the surface level of the water in the canal.
79. There is a considerable fall in the canal supplying the reservoir? There is a fall of 40 feet. The water comes into the reservoir through a canal emptying into the reservoir at a point about half-a-mile from the western end of the bank, and within a very short distance of the reservoir it has a fall of 40 feet.
80. So that in raising the water-level in the reservoir you will not interfere with the supply coming through the canal? No.
81. What is the size of the feeding canal? The feeding canal is capable of carrying 155,000,000 gallons a day. It was made large in order to take advantage of a rise in the river.
82. The capacity of the feeding canal is three times as great as the capacity of the outlet will be if you carry out this scheme? Yes; but there is not always that quantity of water to be brought down. After rain the rivers often rise to a volume of 7,000,000,000 or 8,000,000,000 gallons a day, and when there is sufficient water in the river we can bring 155,000,000 gallons a day into the reservoir. Recently, for a few days, the canal was bringing down about 120,000,000 gallons a day.
83. In calculating the supply for the city, do you make allowance for any leakage or soakage? Yes; an allowance for leakage is made by the officers of the Board.
84. Do you know what the allowance is? Something like 100,000 gallons a day, but I do not think the leakage approaches that.
85. You supply Smithfield from the canal? Yes.
86. Do the people there take much? No; only a small quantity.
87. The tank we saw on the pipe-line is their supply tank? Yes. A 6-inch pipe carries the water to Smithfield. The people there take about as much as one street in Sydney.
88. I suppose if this scheme is carried out every care will be taken to keep the water as pure as possible;—would it still be run into the Potts' Hill reservoir and screened? Yes, and it will also be screened at the pipe-head basin. It only passes through a grating there now; but we propose to screen it there, just as it is screened at Potts' Hill, only the mesh will be a little coarser.
89. What is the gauge of the Potts' Hill screens? 900 to the inch; but such close screening as that at the pipe-head basin would retard the flow of the water too much.
90. But it will be sufficiently screened at the pipe-head to remove any impurity? Yes. The screens there will prevent small fish and leaves from getting into the pipes.
91. No solid matter will get into the pipes? No; all the solid matter will be removed from the water before it enters the pipes.
92. Is it proposed to do anything with the pipe-line from Potts' Hill to the city? No.
93. It is not necessary to improve those arrangements? No; not at the present time. The pipes at present in use will carry all the water required for a long time to come.
94. Will it be necessary in duplicating the present pipe-line to increase the capacity of the Crown-street reservoir? No. The Centennial Park reservoir will hold 20,000,000 gallons, and the Board are taking steps to put down a larger pump at Crown-street to supply that reservoir. The proportion of water supplied by pumping is yearly increasing. People are not satisfied with the gravitation supply. Years ago the lower levels of the city were supplied from Crown-street by gravitation; but as the buildings get loftier people demand more pressure, and the greater part of the city will eventually have to be supplied from the Centennial Park reservoir. At the present time about 40 per cent. of the water used in Sydney is pumped.
95. But the storage reservoir at Centennial Park will meet all requirements for some time to come? Yes, and by having that reservoir the Board will be able to get their pumping done more cheaply, because the pumps will be able to work continuously instead of intermittently as at the present.
96. What is the storage capacity of the Ocean-street reservoir? 1,000,000 gallons.
97. I suppose the North Shore supply comes from Sydney? It comes from Potts' Hill.
98. Does the water run into a reservoir at Gordon? No; into a reservoir at Ryde. There is a 30-inch main from Potts' Hill through a portion of the land reserved for the Rookwood Cemetery, but not yet used, and on to the railway bridge on the Northern line, where it crosses the Parramatta River, finally entering a tank at Ryde which holds 2,000,000 gallons, and the top-water level of which is about 80 feet over high-water level. From there it is pumped to Chatswood, where there are two tanks, each holding 1,500,000 gallons. These tanks supply North Shore.
99. In view of the increase of population at North Shore, do you think it will be necessary to increase the storage capacity of these tanks? No; though it may be necessary to increase the pumping power.
100. As population increases, all that will be necessary will be stronger pumping appliances? Yes; and provision is made in the engine-room for another pump and engine.
101. The pipes from Potts' Hill will meet all requirements for many years to come? Yes.
102. *Mr. Roberts.*] In Mr. Hickson's statement the estimate for a 4-foot main is put down as £100,000? That amount was put down before Mr. Smail had gone into the matter in any detail. The present estimate is £82,171. I know that Mr. Smail agrees with me in regard to that estimate.
103. Is the proposed duplicate pipe-line a measure of precaution against breakdowns, or is it to facilitate the delivery of the water? It is to increase the delivery of the water, in order to raise the water-level in the Potts' Hill reservoir. When the water-level in that reservoir falls below 174 feet, the water does not flow towards Sydney with sufficient rapidity.
104. There will be no increase of revenue in consequence of this outlay, but the expenditure is necessary, in order to keep pace with the requirements of the public? Yes; though, of course, as revenue increases, the population increases. You must meet the requirements of the people.
105. *Mr. Black.*] In carrying out this proposal to raise the banks of the canal it will not be necessary to deepen the canal? No.

106.

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106. Is the bottom of the canal below or above the bottom of the reservoir? It is 50 feet above the bottom of the reservoir; but the water at a lower level than the bottom of the canal cannot be drawn off by gravitation.
107. I understand that the bottom of the canal represents the level at which you can draw off water with sufficient force to supply the needs of the metropolis? Yes.
108. *Mr. Farnell.*] As a matter of fact the Ryde reservoir is not capable of supplying the whole of the Ryde district? No; but it supplies the whole of the township.
109. Can you tell us how it is proposed to supply those portions of the district which are not supplied at the present time? I do not know how far exactly the district of Ryde extends, but the higher parts will have to be supplied by pumping the water from Chatswood to Gordon or Wahroonga, and letting it gravitate from there. Parts of that district are as high as 600 feet above sea-level.
110. *Mr. Hoskins.*] You told Mr. Hassall that people in Sydney preferred to use water which has been pumped instead of water supplied by gravitation;—how do they know the difference? They may not; but they complain of the want of pressure in the higher buildings. The Superintendent of Fire Brigades complains that he has not sufficient pressure in some of the mains.
111. A greater pressure is obtained by pumping the water? Yes. The Crown-street reservoir will not send water to the top of this building at any pressure, and in order to supply fire-extinguishing apparatus it is necessary to have tanks on the top of some of the larger buildings. They are putting a tank on the top of the Government Printing Office which they will not be able to fill from the Crown-street reservoir, and at the present time we have a pipe from the Paddington main right down Macquarie-street to Bridge-street.
112. The reason why people prefer water that has been pumped to that supplied by gravitation is that the water that has been pumped can be supplied at a higher level than water conveyed by gravitation? Yes.
113. What is the average daily consumption of water in Sydney? 16,000,000 gallons per diem was the average for the last eighteen months, but this month the average will be about 18,000,000 gallons per diem.
114. If the consumption of water in Sydney should reach 25,000,000 gallons a day, would this proposed duplicate pipe-line enable you to supply the demand without any trouble? Yes. We should be able to supply from 46,000,000 to 50,000,000 gallons a day to Potts' Hill, and from Potts' Hill, if the water there is kept up to the 174-foot level, we can supply 30,000,000 a day by means of the existing pipes.
115. Which method of conveying water do you prefer—a canal or pipes? So far as the quality of the water is concerned, I do not think it matters much. I do not think the water suffers any contamination in the canal.
116. Would not the leakage from a canal be greater than the leakage from pipes? A little; but the leakage is such a small fraction of the whole quantity passing through the canal that it is not worth talking about.
117. Is there not a risk that animals going to the canal for water may gradually break down the sides, and thus cause a waste of water? No; the canal is wholly enclosed with strong fences and wire netting. Horses or cattle cannot stray inside or get at the water.
118. Is there not a danger of contamination when water is flowing through a canal? There can be no serious contamination in this case. The water supplied to the city of London has to pass through an open canal.
119. I suppose you know that the quality of the water so supplied is the source of pretty frequent complaints? London is held up as an example of a city supplied with pure water.
120. Two or three weeks ago the Prospect reservoir was not being fed by water from the Nepean and Cataract Rivers? No; the canal was shut off for a time.
121. Was the reservoir lower then than ever before? Yes.
122. Suppose we had a prolonged drought, when no water flowed into the reservoir, how long could you keep the people of Sydney supplied? We have just gone through one of the severest droughts on record in this part of the Colony, and only about half the available quantity of water was drawn out of the reservoir. The recent drought would have to be doubled in intensity before it would cease to be possible to obtain water by gravitation, and when the gravitation supply failed we could still get a supply by pumping.
123. When the water in the reservoir falls below a certain level, it has to be pumped? Yes; but hitherto only about half of the quantity available by gravitation has been drawn upon.
124. Did it ever occur to you that the Municipal Council of Sydney should recently have been warned that the water at Prospect was getting low, so that they might flush out the drains and sewers with salt water? The Municipal Council have nothing to do with the sewers; they are under the control of the Water and Sewerage Board.
125. Was not the pumping-house in Woolloomooloo Bay erected by the Sydney Municipal Council? Yes; to supply water for watering the streets.
126. During a time of prolonged drought would it not be advisable to flush the sewers and drains with salt water? No; the flushing caused by the house drainage is almost sufficient.
127. *Mr. Humphery.*] Are the Committee to understand that the difference in cost between a 6-foot pipe-line from Prospect to Potts' Hill and the present scheme is something like £25,000 in favour of the present scheme? Yes.
128. What quantity of water would you supply to Potts' Hill if a 6-foot pipe-line were laid between Prospect and Potts' Hill? Approximately, about 40,000,000 gallons a day.
129. And how much will be supplied if your present scheme is carried out? 47,000,000 gallons a day.
130. That is, by your present scheme you will get a larger supply at a less cost? Yes.
131. *Mr. Lee.*] Do the water and Sewerage Board anticipate receiving additional revenue on account of this work? No; but the revenue increases every month and every year because of the increase in the number of consumers, and they must supply water to meet the demand.
132. How is it proposed to cover the cost of this work? The work will be a charge against the Board. You could not strike a special rate for it.
133. The Board will be responsible for the payment of interest and maintenance? Yes.
134. And it will be left to them to raise sufficient revenue to cover the cost? Yes.
135. So far as the Government is concerned, it will be absolute on the part of the Water and Sewerage Board to pay interest upon this outlay? Yes; the Board have undertaken to supply water for the public, and they must keep pace with the public requirements. To enable them to do this, they ask for the proposed work.
136. This work, and all future works, will be charged against the Board in the ordinary way. They will be responsible for it, and will have to pay the interest upon it? Yes; its cost will be added to the capital cost of the whole scheme.

137. The Government will be perfectly protected in regard to the repayment of interest and principal? Yes. C. W. Darley.
138. *Chairman.*] How much do you propose to increase the discharging power of the canal by raising the sides? We shall more than double the discharging capacity of the canal. 12 May, 1897.
139. You also propose to put the canal in order;—what do you mean by that? We know all the weak places in the canal, the leaks, and so on, which it is impossible to deal with now, because we cannot stop the flow of water through the canal. I propose, however, when this work is undertaken, to re-line the whole of the banks with good concrete.
140. A great part of the canal is faced with stone? That is in the cuttings.
141. Water would pass through a canal faced with stone much less rapidly than through a canal with smooth surfaces? At a slow velocity the friction is not very much. The velocity in the Prospect canal is so low that friction does not enter very largely into our calculations. Of course, if you increase the velocity the friction increases.
142. Therefore we must not regard the rough surfaces of the canal as materially retarding the discharge of the water? No. If the whole length of the canal were plastered it would not make much difference to the discharge. Knowing all the weak points, I have provided for the practical reconstruction of the places where they occur, and the stoppage of all leaks.
143. You do not regard the risk of contamination as serious? No.
144. And the loss by leakage is not serious? No. In going through the work we will practically bring the leakage to nil. We cannot deal with the leaks now, unless we stop the flow of water, and that would be inconvenient.

THURSDAY, 20 *MAY*, 1897.

Present:—

THOMAS THOMSON EWING, Esq. (Chairman).

The Hon. Frederick Thomas Humphery.	Charles Alfred Lee, Esq.
The Hon. James Hoskins.	John Lionel Fegan, Esq.
The Hon. Charles James Roberts, C.M.G.	Thomas Henry Hassall, Esq.
The Hon. William Joseph Trickett.	George Black, Esq.
The Hon. Daniel O'Connor.	Francis Augustus Wright, Esq.
Henry Clarke, Esq.	Frank Farnell, Esq.

The Committee further considered the expediency of constructing a Duplicate Main from Prospect to Potts' Hill.

Cecil West Darley, Engineer-in-Chief for Public Works, Department of Public Works, sworn, and further examined:—

145. *Mr. Lee.*] Your present proposal in connection with this work is to increase the inflow of water from the dam to Potts' Hill, is it not? Yes. C. W. Darley.
146. Suppose that Parramatta, Granville, and other suburbs, which are not already connected with the western suburbs sewerage system, become applicants for large quantities of water, through their ultimate connection with that system, would you be able to supply the demand from Potts' Hill? Yes, unquestionably, for many years to come. The work now proposed will convey to Potts' Hill more than double the quantity of water required for present consumption. The work would take 50,000,000 gallons to Potts' Hill up to the level of 174 feet. An enlargement of the canal will enable it to carry really 60,000,000 gallons a day. The supply from Parramatta can be taken off at the end of the canal, so that it need not pass through the pipes at all. At the present time the supply for Parramatta is taken off 1½ mile down the pipe; but it would be easy afterwards to make a connection at the pipe-head, with which to supply Parramatta, if the demand grew to any extent. Neither the supply for Granville nor Parramatta comes to Potts' Hill at all. 20 May, 1897.
147. You think that the provision already made for the supply of Parramatta will be enough for many years to come, notwithstanding any extra demand which may arise for sewerage purposes? Yes.
148. And would the same remark apply to any demand which may arise on the part of any suburb which is not at the present time connected with the sewerage system? Yes.
149. I understand that in making provision for this enlargement you have practically made provision for at least twenty-five years ahead? Quite that, I think; because I do not think the supply will double itself in twenty-five years.
150. If in that time it should become necessary to largely increase the supply of water the question will arise of storing an increased quantity in the Prospect dam? Yes.
151. But you hold that the provision you are now making will cover any possible demand which may be made upon it within the next twenty-five years? Yes.
152. *Chairman.*] For what time do you consider provision would be made if the scheme for an additional pipe-line and the raising of a canal were approved of by Parliament and constructed? I think it would bring to Potts' Hill, daily, sufficient water to last for the next forty or fifty years; but one or two pipes may have to be laid during that period to bring the water from Potts' Hill into Sydney.
153. *Mr. Hassall.*] Supposing the population of Sydney continues to increase in the ratio in which it has increased in the immediate past, for what period would the water supply you are proposing to afford meet requirements? Without going into a statistical estimate, I should say from forty to fifty years. The increase of water consumption in the city will not continue to increase in the ratio in which it has increased within the past ten years, because the Water Supply and Sewerage Board has, within that period, been extending its mains into suburbs and large districts which were previously unsupplied with water. You cannot say that the increase of consumption is entirely due to the increase of population. It is due to a great extent to the energy which the Water Supply and Sewerage Board has displayed in supplying people who were not previously supplied with water. There are not many thickly-populated districts which now remain without a water supply; so that the increase of the demand in future may be assumed to be commensurate with the increase of population.
154. You are carrying out this scheme in order to meet any occurrence which might intercept the water supply? Yes.
155. And as material is fairly cheap, and labour plentiful, you think this a favourable time at which to carry out the work? Yes.

TUESDAY,

TUESDAY, 25 *MAY*, 1897.

Present:—

THOMAS THOMSON EWING, Esq. (Chairman).

The Hon. Frederick Thomas Humphery.	Henry Clarke, Esq.
The Hon. James Hoskins.	Charles Alfred Lee, Esq.
The Hon. Charles James Roberts, C.M.G.	John Lionel Fegan, Esq.
The Hon. William Joseph Trickett.	Thomas Henry Hassall, Esq.
The Hon. Daniel O'Connor.	Francis Augustus Wright, Esq.

Frank Farnell, Esq.

The Committee further considered the expediency of constructing a Duplicate Main from Prospect to Potts' Hill.

John Moore Smail, Engineer, Metropolitan Board of Water Supply and Sewerage, sworn, and examined:—

J. M. Smail. 25 May, 1897.

156. *Mr. Hassall.*] You desire to make a statement to the Committee? Yes; I have prepared a statement, which I will read. I might say that I have been in conference with Mr. Darley upon this matter, and have given him certain information, and I do not know whether the statement I am about to read will be an adjunct to the statement with which he has furnished you, or whether it will be new. It is merely a history of the matter up to the time it was brought before the Board. It is as follows:—

Additional Supply from Prospect to Potts' Hill.

In the hot seasons, from 1893 to 1896, and more especially during the summers of 1894-5-6, it was found that the high levels supplied by gravitation were insufficiently supplied with water, and various means were resorted to to improve the supply, without any material effect. It was found that if the level of water in screening tank fell below 21 feet, or 172 feet above high-water mark, the supply to the city and suburbs was affected, especially the high-level zones of gravitation area.

In order to obtain greater head between Prospect and pipe-head basin the level of water in canal was raised about 6 inches. This had the effect of augmenting the supply, but not sufficient to cope with the demand.

During the period of greatest draught the water in screening tank varied in depth from 21 feet, or 172 R.L., to 18 ft. 9 in., or 169·75 R.L.

The depth of water in balance reservoir, which controls the water in screening tank, did not gain during the day, and not more than a foot under the best conditions during the night.

Experience has shown that if the depth of water in screening tank could be kept at least 23 feet, or 174 feet R.L., which would correspond with a depth of 14 ft. 6 in. in Potts' Hill reservoir, there would be no difficulty with the supply to the city and suburbs for years to come.

The average daily supply may be taken at 17,000,000 gallons, and the number of persons supplied at time of last report was 408,282; the persons supplied when the Board took over the control of the works were 326,035, showing an increase of little over 25 per cent. in eight years, or an average increase of about 3 per cent. per annum. The ramifications of the supply from Prospect extend to Penshurst on the South Coast line, Smithfield on the Southern, and Hornsby Junction on the Northern line. The town of Parramatta is also supplied from the canal.

The increase of population served is due to the rapid extension of the mains into the different suburbs by the Board, and, as most of the populous suburbs have been served, it is not probable that the increase would be in the same proportion in the future.

In order to keep up the supply during the hot seasons to present consumers, and provide for future consumption, it is necessary to maintain a greater head in the screening chamber, and the crux of the question lies in the fact that the water must be brought faster from Prospect to Potts' Hill.

The relative levels between top-water level of Potts' Hill reservoir and canal at Prospect approximate equality, and to obtain sufficient flow due to grade of canal would mean loss of head at screening chamber, and it is this head which it is essential to maintain. With this object in view, the proposal to duplicate the present supply was initiated and brought under the notice of the Board in August, 1896. The proposal was to lay a 4-foot steel main from Prospect to Potts' Hill as an adjunct to the present supply during the summer months, and to keep up supply during any repairs to canal or 6-foot main.

That was the initiatory action on the part of the Board, and it led to the putting of a sum of money for the work on the Loan Estimates. Then afterwards the Minister informed the Board that the Department of Public Works would carry out the work, and as engineer I did not take any more active part in it, except by way of conferring with Mr. Darley upon certain particulars which his officers worked out afterwards.

157. You said that from 1893 to 1896 the level was insufficient to permit of the supply of the high-lying points? That there might be plenty of water at Prospect, but we could not get it quickly enough at Potts' Hill.

158. You mean that there was not enough water in the Potts' Hill reservoir to supply the city and suburbs entirely with gravitation? Not all the higher levels.

159. How did you overcome the difficulty? We had to do the best we could. We would pinch the valves down on the lower parts, and force the supply up to the higher parts.

160. Had the water to be cut off at intervals? No; we never cut it off.

161. You did not give the people as much as they wanted? Yes; pinching down means partly closing the valves. That will reduce the pressure at the lower parts, and take the water up to the people on the higher levels.

162. In effect, you sent water up to the higher levels by cutting off a portion of the supply from the lower levels? That is so.

163. As to the raising of the canal, you say you took steps to raise it 6 inches? Yes, between 5 and 6 inches.

164. That gave you a higher level at the pipe-head? Yes.

165. What effect had that on the Potts' Hill Reservoir? To a certain extent it augmented the supply, but the augmentation was not sufficient.

166. Did it increase it to any appreciable extent? No. I must say that during the night we gained in the Potts' Hill balance reservoir by the extra 6 inches of head, whereas before we gained nothing; but during the greater draught of the day it had no appreciable effect at all.

167. Practically, then, the Potts' Hill reservoir remained at the same level? Yes; during the period of the greatest draught.

168. The average depth of water at Potts' Hill at that time was from 21 feet to 18 feet 9 inches? Yes.

169. What is the result when the water is down at 18 feet 9 inches? We cannot supply Balmain or Petersham. We cannot supply all the higher-level suburbs.

J. M. Smail. 25 May, 1897.

170. In order to make the supply certain to the suburbs, you have mentioned it would be absolutely necessary to have the level in the Potts' Hill reservoir at 23 feet? Yes; 174 feet above high water.
171. The screening tank would have 23 feet? Yes; that is the level.
172. How did you propose to provide for that? We proposed in the first instance to lay an independent main, 4 feet in diameter, from Prospect right through to Potts' Hill.
173. That would be an additional main? Yes; independently of the canal altogether.
174. You would not take the water from the canal? No; it never touched the canal at all.
175. Would you start that pipe from Prospect on the same level as the present canal, or would you go lower? It would be lower, because it was off what we call the scour pipes. Of course we should have had whatever head was in the reservoir from 195 feet down to 180 feet.
176. You would have had so much more pressure? Yes; the 4-foot pipe with 20-foot head would give about 20,000,000 odd gallons, and with 16 feet head discharging 13,000,000 gallons in twenty-four hours. The latter is practically about the winter supply to Sydney. If I obtained that, in addition to the present supply from the canal, I reckoned that taking the ratio of increase of population, we should do very well for nineteen or twenty years.
177. No further additional supply would be necessary for the next twenty years? No; of course as the reservoir depleted, so would the 13,000,000 gallons decrease also.
178. But with the additional supply from Prospect, could you keep the water at Potts' Hill up to the 23-foot level? Yes; I reckoned we should.
179. You think that with the additional pipe-line you proposed, you would be able to keep that level? Yes.
180. Suppose there were no discharge from Potts' Hill reservoir at all, to what height would the present supply take the water? If there were no water running out of the Potts' Hill reservoir, the water level would be 175 feet.
181. Would the height in the screening tank come up to 23 feet? The water would rise to the top water level in the screening tank. It would be 175 feet if you cut the Prospect water off.
182. If you obtained the additional supply, it would not interfere, I suppose, with the inflow in the present canal? No; the screening-tank would never be under those conditions, because you would have the two 48-inch pipes and the 36-inch main taking the water away as hard as they can.
183. By the additional pipe supply, you are certain you would be able to keep the water up to the 23-foot level? Yes.
184. Would the additional pipes from the pipe-head have as good an effect, in your opinion, as an independent pipe from Prospect to Potts' Hill? The raising of the canal with the 6-foot pipe from the pipe-head to Potts' Hill would give a better discharge than the proposed 4-foot pipe.
185. It would practically keep the water at a better level than the 4-foot pipe to which you have previously referred? Yes.
186. You do not anticipate any largely increased consumption from the growth of the population? No; I do not think the population will increase in the ratio in which it has increased during the last eight years.
187. What has been your increase per annum, practically, during that period? Estimating 12,248 increase in population, and providing 50 gallons a head would mean an increase of 612,400 gallons per annum.
188. You think that in twenty years' time your present supply would have to be supplemented? With a 4-foot pipe it would, but not by raising the canal and putting in the duplicate 6-foot pipe. That is one scheme The putting in of a 6-foot pipe throughout is another scheme. That would not touch the canal. A third scheme was the proposed 4-foot pipe.
189. By raising the canal and supplying an additional 6-foot pipe, how long would the work last for the purposes of adequate supply? According to the calculations of Government officers which I have had, I should say that it would suffice for between thirty and forty years—at any rate, for another generation or more.
190. You think that if the proposed work were carried out no further alteration would be necessary for nearly forty years? No.
191. And you think that that would be ample provision under the circumstances? Ample.
192. Are there many side supplies going out of the pipe? Yes; we supply Smithfield from the canal. We take water to Granville and Auburn, and right away down to the meat preserving works at Duck River, and also the Grazier's Meat Preserving Works near the site of the proposed sewage farm.
193. Do you think there is any probability of a largely-increased demand from these sources? I think so—in fact, I am going to recommend a new trunk-main through that district in anticipation of the increased supply, taking it along the Woodville Road.
194. Does that supply come out of the 6-foot pipe? Yes.
195. The only supply running from the canal direct is towards Smithfield? Yes.
196. Is it proposed to carry that any further? It would depend upon the demand for water of course.
197. But you do not anticipate any large increase in that direction? No.
198. But you do anticipate a large increase in the demand further on? Yes; in the direction of Parramatta, and between Penshurst and Bankstown.
199. Are you supplying in that locality at the present? Yes, as far as possible.
200. Where does the supply come from? From the Potts' Hill reservoir—from the old 42-inch main.
201. As to the increase in the city of Sydney, you do not anticipate any much larger development? No; there may be an increase in the number of factories, but factories, with the exception of breweries, do not use much water.
202. Have you ever had any breakdown in the present supply? Yes.
203. How did you provide against it? As a matter of fact, if the breakdown is between Prospect and Potts' Hill, we have to draw from Potts' Hill. We shut off the canal and draw from Potts' Hill until the repairs are made. Fortunately, we have always been able to do that.
204. What has been the longest delay? The three or four days when the aqueduct carried away.
205. Was the supply short during that period? No.
206. The Potts' Hill reservoir stood the strain? Fortunately, it was just finished. If it had not been there would have been a famine.

J. M. Smail. 25 May, 1897.

207. Judging from your own experience, which has been pretty extensive, which would be the better proposal to adopt? I think that taking the discharging capacity of the canal at present under the favourable conditions of raising the head, together with the 6-foot pipes, from the pipe-head to Potts' Hill, and considering the quantity of water which that scheme will bring down for the amount of money Mr. Darley estimates, that is the best proposal of the whole. The reason we did not wish to interfere with the canal in connection with the 4-foot main is this—we had in view that perhaps in seventeen or twenty years we should want to augment the supply, and that we could deal with the canal then.

208. Could you give us any idea of the difference in the cost between the line direct from Prospect to Potts' Hill and the proposal to raise the canal? I can only give you the preliminary estimate which we sent in in the first instance. We estimated £100,000 for the 4-foot main. Mr. Darley assures me that the quantities in the case of other work have been carefully taken out, and that he has gone over them himself as regards price. He is quite prepared to take this price as correct. It amounts to £109,317. That is for the raising of the canal, and the supply of the additional 6-foot pipe.

209. Practically, there is a difference of £10,000 only in the estimated cost of the two schemes? Yes. I might say that the £100,000 is a very liberal estimate for the 4-foot pipe.

210. Do you think it will be necessary to increase the storage accommodation at Crown-street? No. The difficulty with Crown-street is that we cannot get the water in quickly enough for the pumps.

211. Why is that? Because we have not sufficient head at the screening chamber to drive it in. In other words, we have not back enough to the water. Crown-street being the main pumping-station, we have to pump from there to Paddington, to Woollahra, and to Waverley. Sydney is a peculiar place to supply with water. We have to take the Woollahra water as far back as Petersham to get on to some high ridge. The increase of pumped water from Crown-street to Paddington in eight years was 159 per cent., and from Crown-street to Woollahra in the same period 45 per cent. The increase in the quantity sent from Crown-street to Waverley in six years was 100 per cent. In the gravitation from the screening tanks through Ryde to Ryde village, and from there to Chatswood, the increase was 110 per cent. in the same period.

212. Do you anticipate the same increase during the next six years? No; I said in my statement that I did not.

213. *Mr. Wright.*] Is water supplied to the inhabitants of Wahroonga at the same price as to the inhabitants of Sydney? No; we charge 50 per cent. more.

214. *Mr. Hoskins.*] Is it a fact that the canal from Prospect leaks? It did leak in the embankment.

215. Is there any soakage through the bottom of the canal? No; it is in the sides. When the puddle was put in in the first instance a long time elapsed before the water got into the canal, and the puddle, therefore, got caked and dried. There is open-jointed pitching, and the water got to the puddling, and it melted away; but that matter has been put right now.

216. How high are you proposing to increase the sides of the canal above their height at the present time? About 2 ft. 6 in.

217. If you did that work in the summer-time, and the water were not put in immediately afterwards, would not the puddling crack as it did down below? That is one objection to touching the canal at all, but we get over the difficulty by doing the work in sections. We can put in bulk-heads, and directly the puddling is in we can let the water in on the top of it in any particular section.

218. What will be the length of the section, because the puddling will dry in a few hours? Not if it is good work.

219. What is the percentage of leak from the existing canal? There is very little now; but when the Board took it over there must have been from 5,000,000 to 6,000,000 gallons a day going away. The leaks are all stopped now.

220. But there is leakage at the present time, is there not? Yes; but it is comparatively little.

221. From your experience of embankments which are subject to the action of water flowing against them, are you not convinced that there will always be a certain amount of leakage? The banks now have settled to their normal condition. There is no movement in the banks whatever. You could cut through the banks now as you could through virgin ground. They are quite different from what they were when the canal was first made.

222. But will not water soak through even virgin ground? Of course it will, to some extent.

223. Does it not appear feasible to suppose that water would soak through the extra 2 feet 6 inches you propose putting into the canal in just the same way that it soaked through the original embankment? No, because the work will be different.

224. In what way? It will be better work; it will be better done.

225. Are not the sides of the present canal concrete? Some is concrete and some is open-jointed pitching.

226. Do you not think that, having regard to the extensive means of conservation in existence at Prospect, it would be better to save the water by bringing it down through pipes instead of through a canal. You would have less loss of water, and a greater supply to take you up to the higher levels? That is a point I have been considering for some time. It is immaterial what level you have in the dam. It will not affect the top water level in the canal, so long as it does not go below the gravitation limit. But every foot you lose out of the reservoir will affect the discharging capacity of your pipe.

227. Are you not more likely to lose by conveying the water in a canal than you would be by conveying it through pipes? Of course you lose the real head between the top-water level of Prospect and Potts' Hill by introducing a canal at all. The canal holds 50,000,000 gallons, and is unaffected by the level of the water at Prospect. I have come to the conclusion now, although I was not at first of that opinion, that you can get a larger quantity even when the canal is about half empty than you could through a 6-foot pipe. There is no doubt about this that the work now proposed to be done in the canal will make it last for ever. I have not the slightest doubt about that.

228. There has been a good deal of expenditure in the canal since the work was first commenced to make it water-tight? Yes; but of course I can only speak of the work during the time I have had charge of it.

229. There has been a good deal of expenditure even during that time? Yes.

230. Which will be the cheaper system—to increase the pipe head line by a 6-foot pipe, or to adopt the hybrid system of partly canal and partly pipe? The comparative estimate shows that the 6-foot pipe is the dearer. By putting in the 6-foot pipe, you are practically putting down another canal.

231. The increase of supply in a given number of years has not arisen so much from the increase of the population of Sydney as from the extension of the supply to suburbs previously unsupplied? That is so. J. M. Smail. 25 May, 1897.
232. When will the reservoir in Centennial Park be finished? Somewhere about next March. They had sixteen months in which to do it, and I think they have been four months at work. If they complete it in another year they will have done good work.
233. When it is finished all buildings at a high elevation in the suburbs will be supplied from it? I think the majority of them will. The Waverley reservoir has a zone of its own. There are are higher portions supplied by Woollahra, and which cannot be touched by the Centennial Park water, which will be supplied from Waverley.
234. But the water from the Centennial Park reservoir could be conveyed to the highest buildings in Sydney? Certainly.
235. You were very short of water some time ago;—the streams which feed the Prospect reservoir ceased running? Yes; the Nepean River was the only one which was running.
236. Has the Water and Sewerage Board anything to do with the supply from Sydney? Nothing whatever.
237. I suppose you are aware that the Municipal Council of Sydney some time ago ceased using salt water for watering the streets and flushing the sewers and drains;—did the Water and Sewerage Board represent to the Corporation that it ought to be resorted to again when water was getting scarce? That is a matter I do not think the Board would like to direct the City Council about, but it asked them to stop the use of the water altogether, and of course that would lead to the question of what sort of water they should use. We stopped the street washing, as it was called. In my opinion it was not street washing at all, but simply wasting water.

THURSDAY, 27 MAY, 1897.

Present:—

THOMAS THOMSON EWING, Esq. (Chairman).

The Hon. Frederick Thomas Humphery.	Henry Clarke, Esq.
The Hon. James Hoskins.	Charles Alfred Lee, Esq.
The Hon. Charles James Roberts, C.M.G.	John Lionel Fegan, Esq.
The Hon. William Joseph Trickett.	Thomas Henry Hassall, Esq.
The Hon. Daniel O'Connor.	Francis Augustus Wright, Esq.

Frank Farnell, Esq.

The Committee further considered the expediency of constructing a Duplicate Main from Prospect to Potts' Hill.

John Moore Smail, Engineer, Metropolitan Board of Water Supply and Sewerage, sworn, and further examined:—

238. *Chairman.*] I understand that you have prepared some information for the Committee as to the height of the various reservoirs? I have prepared a statement, which I will read:— J. M. Smail. 27 May, 1897.

Memoranda *re* Sydney Water Supply.

Source of Supply.—Nepean River and two of its tributaries—the Cordeaux and Cataract Rivers.

Catchment Area.—354 square miles. Across Nepean River, at Pheasant's Nest, is built a concrete dam, 10 et high, designed to divert a portion of the stream into a tunnel, 4½ miles long, to the Cataract River, where another concrete dam, same as at the Nepean River, is built just below the outlet of Nepean Tunnel, the water from the three rivers then passes through the Cataract Tunnel, about 1¾ miles long, to the open canal, by which, with intervening aqueducts, tunnels, &c., the water is conveyed into Prospect Reservoir, making about 40½ miles from the source of supply.

Prospect Reservoir.—Area when full, 1,261 acres, and capacity of 10,812,313,000 gallons, of which 6,744,343,000 gallons are available by gravitation. The water passes into canal by a valve-tower and pipes. The length of canal is 5 miles to pipe-head basin, which is 16¼ miles from Sydney. From the pipe-head to Potts' Hill, water is conveyed by wrought-iron pipes, 6 feet in diameter, for a distance of 5 miles.

Potts' Hill Reservoir.—Capacity available for gravitation 90,000,000, this is connected to screening tank through which water has to pass before it reaches trunk-mains supplying the city and suburbs. Trunk-mains are 48 inches in diameter, connected to Crown-street Reservoir; one main is kept solely for the supply of the city, the other is tapped *en route* for other districts, but is available in case of accident to the duplicate main.

Crown-street Reservoir.—Capacity, 3,250,000. Elevation, 141 feet above high-water mark. This is the main pumping station; the plant consists of No. 1 Worthington high-duty engine, capable of raising 500,000 gallons per hour to Paddington, 70 feet above Crown-street. No. 2 Worthington high-duty engine, capable of raising 210,000 gallons per hour to Woollahra, an elevation of 140 feet above Crown-street. No. 3 designed, and erected by Mort's Dock and Engineering Company, capable of lifting 100,000 gallons per hour to an elevation of 219 feet above Crown-street.

Paddington Reservoir.—Capacity, 2,000,000 gallons. Elevation, 214 feet above high-water mark, or 70 feet above Crown-street.

Woollahra Reservoir.—Capacity, 1,000,000 gallons. Elevation, 282 feet above high-water mark.

Waverley Reservoir.—Capacity, 1,087,000 gallons. Elevation, 360 feet above high-water mark.

Petersham Reservoir.—Supplied by gravitation from Potts' Hill. Capacity, 2,157,000 gallons. Elevation, 166 feet above high-water mark.

North Shore Supply.—

Ryde Balance Tank.—Capacity, 1,500,000 gallons. Elevation, 80 feet above high-water mark. Water pumped to Ryde Village tank. Capacity, 1,000,000 gallons. Elevation, 234 feet above high-water mark.

Chatswood.—Two Tanks—capacity, 1,500,000 gallons each. Elevation, 370 feet above high-water mark.

Wahroonga Tank.—Supplies districts of Gordon, Pymble, Pennant Hills, and Beecroft. Capacity, 40,000 gallons. Elevation, 720 feet above high-water mark. Pumped from Chatswood. A new tank of 1,000,000 gallons capacity to be erected, tenders for which have been accepted.

Smithfield supplied from lower canal, a 100,000 gallon balance reservoir being provided for same.

Campbelltown supplied direct from upper canal at 16 miles 40 chains.

Liverpool supplied from reservoir of 4,000,000 gallons capacity, which is fed from canal.

Ashfield Tank 100,000 gallons capacity, 223 feet above high-water mark, for supply of higher portions of Ashfield lying above gravitation zone. This tank is fed from Woollahra Reservoir.

Hurstville Tank.—Capacity, 1,000,000 gallons. Elevation, 270 feet above high-water mark.

The foregoing tank are all supplied by water from Nepean and Cataract Rivers.

The cost of pumping varies with the type of engine and coal used. The last returns show that the cost of pumping 1,000,000 gallons 100 feet high, at Crown-street pumping station, was 28s. 11d. or ·347d. per 1,000 gallons; at Ryde the cost was less, being 27s. per 1,000,000 gallons, 100 feet high or ·324d. per 1,000 gallons.

At the out-stations where engines are not of high-duty type, the cost of pumping is higher, varying from 1·65d. to 1·06d. per 1,000 gallons, 100 feet high.

J. M. Smail. 27 May, 1897.

239. *Mr. Clarke.*] The water for Smithfield, Campbelltown, and Liverpool does not pass through the Potts' Hill reservoir? No.

240. All the places you have enumerated, with the exception of Smithfield, Campbelltown, and Liverpool, are supplied through Potts' Hill? Yes.

241. The pumping from Crown-street does not cost more to Waverley than to the nearer reservoirs? It costs more per 100 feet; that is to say—if it costs ·347d. to pump 1,000 gallons 100 feet high, the cost to pump the same quantity 300 feet high will be 1·04d.

242. Whether to the higher or lower levels? Yes, in the same ratio.

243. When the Centennial Park Reservoir is completed, you will not require to pump from Crown-street to Woollahra and Paddington? No; I hope that when we get the 20,000,000-gallon reservoir at Centennial Park we shall be able to do away with the reservoirs at Paddington and Woollahra.

244. But you would still have to pump to Waverley? Yes.

245. And the suburbs of Paddington, Woollahra, and Waverley will have a better supply than they enjoy at the present time? Yes; Paddington will have a superior head when we get the Centennial Park Reservoir completed, because we shall connect the Paddington supply with the Centennial Park Reservoir. We shall supply as much of Woollahra as practicable from the Centennial Park Reservoir, and those portions of it which cannot be supplied from that reservoir will be supplied from Waverley. The pressure will be generally improved.

246. How is Randwick supplied? From Waverley.

247. I suppose the proposed plan of bringing water from Prospect to Potts' Hill will give you a much larger supply than will be afforded by the other schemes which have been suggested? I think so. The fault is, that we cannot get water quickly enough to Crown-street. That is the crux of the whole question. We have plenty of water at Prospect, but we cannot get it quickly enough to Sydney.

248. I understand that there are several plans for bringing an increased quantity of water to Potts' Hill, one being the construction of a 4-foot pipe; another, the construction of a 6-foot pipe direct from Prospect, instead of at the pipe-head; and a third being the raising of the canal, and the laying of a 6-foot pipe from the pipe-head? Yes.

249. Will there be any difficulty in raising the canal to the proposed height? No; the only difficulty which I had in view when I was considering the laying of the 4-foot pipe was this: I did not want to disturb the existing work; but, of course, if the existing work is to be taken out and new work is to be put in, there will be no difficulty.

250. There will be no danger of further leakage than at present exists? No; the leakage will be stopped, because we shall then have a chance of stopping what little leaks there are now. The extent of the leaks at present is nothing compared with what it used to be.

251. I noticed when we were at Prospect the other day that there was considerable leakage at the viaduct? If the viaduct had been lined inside with cement I do not think you would find any leakage; but it is ordinary rough brick. All bricks are porous, and the water is really leaking through the bricks themselves.

252. In the event of repairs being required to the viaduct, how would the water be brought to Sydney? It would have to come by an inverted syphon down the gully temporarily.

253. Until the viaduct had been repaired? Yes; we had an accident to it some time ago, but it took us only two nights and a day to repair it.

254. With what material do you propose to raise the canal? I take it that where stone is going in they will put a dwarf wall on the top of the existing stone-work, and where the work is in concrete the present concrete will be taken out, and the work will be rebuilt right up to the extra height of 2 feet 6 inches.

255. The material at present used is stone without any cement? Yes; you might call it dry rubble.

256. Is there not considerable leakage? There used to be; but we have puddled at the back of the stone.

257. You approve of the proposal for the 6-foot pipe, and the raising of the canal as against your proposal to lay a 4-foot pipe? It is a question of money. We can get 48,000,000 gallons for almost the same sum of money required to put down the 4-foot pipe, and it will not matter how the head in the reservoir varies; within certain limits, it will not affect the canal. The canal is so large, and will hold such a large quantity of water that it will flow into the Potts' Hill reservoir with the extra head given more quickly than it did before. As the head decreases in the reservoir so would the flow in the 4-foot pipe decrease.

258. Would the laying of the 6-foot pipe for the entire distance without raising the canal be a more expensive work? Yes; I thought that the estimate for raising the canal was very low, but Mr. Darley assured me that he himself had gone through the matter thoroughly and had put in a very liberal price. He said he had made provision for all contingencies, such as the keeping up of the supply in the meantime, so that you may take his figures as being about correct.

259. Is the quantity of water coming into the Prospect reservoir sufficient to supply Sydney for many years to come? There is no doubt about that. I might mention, however, that I have a scheme under consideration, of which plans are now being prepared, for raising the puddle bank of the Prospect reservoir, and putting another 18 inches of water into it. It will increase the quantity by about 500,000,000 gallons.

260. Would it be safe to put another 18 inches or 2 feet on the top of the present dam? When we raise the puddle bank to 200, the water will be 196·5. There is a difference between that and 200, so that we have ample freeboard. There will be no danger.

261. Supposing you used a 6-foot pipe, you would have to cut through the embankment to get the water into it? There is the outlet tunnel, which comes close by the dam. We should not tap the dam at all.

262. *Mr. Lee.*] In what proportion will the water in the service reservoir be after the proposed alterations are carried out as compared with the daily Sydney supply;—what will be the minimum or average storage capacity? The storage capacity at Potts' Hill is 90,000,000 gallons. By increasing the quantity that we bring into it, whatever is taken out during the day will be made up during the night, so that in the morning the reservoir will be always standing at about the same level.

263. At the present time the service-pipes from the reservoir to the city and the pipes for the supply of the subsidiary reservoirs convey water more quickly from Potts' Hill than you can get it there from Prospect? Yes; under present conditions.

264. You do not contemplate altering the service from Potts' Hill to the city? No, certainly not.

265. You rely on having an extra pressure at Potts' Hill, thereby obtaining a quicker and better supply for the city? That is the crux of the whole question.

266.

J. M. Small. 27 May, 1897.

266. Some serious objections have been taken to the pressure which obtains in certain parts of Sydney at the present time;—are you prepared to assure us that if this increased supply is given the pressure will be increased? It is not a question of pressure. The facts of the case are these:—I know personally that within the city some of the mains are too small. Some of them have been down for thirty or forty years. Within the last six years the Water Supply and Sewerage Board must have expended nearly £30,000 in the city alone in improving the supply, principally upon the representations of the Superintendent of Fire Brigades, who pointed out that in many parts of the city the pressure was insufficient in case of fire. But a test such as that which I will mention is worth much more than a quantity of theory. Take the fire at Lawler's place. They had the whole of the staff of engines pumping away as hard as they could. I tested the water at the top of our office, and I could send the water clean over our roof. That was taken from the same reservoir at Paddington. We have the valves so arranged in Sydney that on the alarm of fire wherever there is low-service water the valves can be opened and high-service water can be at once made available.
267. Is it part of your general system that the low levels can be at once connected with the high levels? Yes. As a matter of fact, all down as far as Hunter-street is high-pressure water. The construction of the new reservoir at Centennial Park will give the Superintendent of Fire Brigades all that he wants. In Macquarie-street, when the Centennial Park reservoir is completed, you will have 31 feet more of head.
268. That is the reservoir which is to take the place of the Paddington reservoir? Yes.
269. Paddington is the highest level for the city at the present time? Yes. We have had no complaints from the Superintendent of Fire Brigades about that.
270. Have you not had complaints from him recently as to the insufficiency of pressure in Macquarie-street, and particularly in the neighbourhood of Parliament House buildings? No.
271. Not within the last week? Not that I know of.
272. Did he report that he could obtain only some 35 of pressure there? I cannot recollect that he did. At any rate, we have given the greatest pressure that we can give until the Centennial Park reservoir is available.
273. You have been away from your office ill for some time? Yes; but I was there this morning, and there was no letter to the effect you mention. I know that some time ago the Superintendent of Fire Brigades was making inquiries on the subject.
274. Thirty-five at Parliament House buildings, with the Paddington supply, would be an abnormally small pressure? It should be over 50.
275. To what do you attribute it? I know that there is rather a small main feeding Macquarie-street, and the Water and Sewerage Board, upon a recommendation which I made some weeks ago, are going to lay a larger main down College-street, coupling it with the Macquarie-street main, and giving a higher pressure. I think it is a 12-inch pipe.
276. What will be the pressure in Macquarie-street when the Centennial Park reservoir is completed? If you have 50 now you will have over 70 when the reservoir is completed.
277. Will the reservoir at Centennial Park be equal to the supply of that pressure? Yes. I am making provision for years to come with the outlet pipes from the Centennial Park reservoir. Instead of putting down a small pipe, I am using up a large stock of 42-inch pipes, which were brought out from England. I have recommended the Board to lay those pipes. So that, instead of a 36-inch pipe supplying the city and all other places *en route*, they would be supplied by a 42-inch pipe. There would therefore be a greater back to the water. It would give other districts a better chance of drawing off without interfering with the pressure at Macquarie-street and other high places.
278. Are we right in supposing that the Centennial Park reservoir will be the chief source of supply for the city? Wherever high-pressure water is wanted.
279. The low-pressure water being supplied from Crown-street as usual? Yes.
280. Is not the low-pressure service at the present time of little value in the case of a large fire? Whenever a fire takes place, and low-pressure water is on, the valves are opened, and high-pressure water is turned on immediately. If a fire occurs anywhere in Sydney where the low-pressure water is found insufficient, they can get the high-pressure water in a few minutes.
281. In the case of the Department of Lands, the old portion of the building is said to be supplied with Crown-street water, whereas the new portion in Spring-street is said to be supplied from Paddington. It is said that the Crown-street water will not reach higher than the second floor, whereas the Paddington water would reach to the top of the dome? It is probable that the portion of the building which was built some years ago is supplied from the Bridge-street service—the low service, whereas the portion of the building facing Spring-street would be supplied from the Spring-street service, which is the Paddington service.
282. Do you not regard that as a great defect? No; it is a matter of detail which could soon be altered.
283. The difficulty you have had to contend with has been in the getting of a proper supply of water? Yes.
284. And you expect to overcome that difficulty by taking water from the reservoir at Centennial Park? By that means coupled with the proposal before the Committee.
285. When the additional supply has been provided, and when the service reservoir at Centennial Park is completed, you will be able to furnish an ample supply of water for all requirements in case of fire? Yes.
286. In any portion of the city? Yes. As a matter of fact there have been no complaints of scarcity of water ever since I have had charge of the Department, because the turncocks whenever they attend a fire send in a report the next morning through the Chief Inspector. They have to state whether the supply of water is good, and whether the pressure is good. I cannot think of any case where they have reported that the pressure has been bad.
287. I suppose you admit that some of the reservoirs are too small? Yes. When the Paddington reservoir was built, over thirty years ago, it was not thought that the water-works would extend as they have done. The same remark applies to the Woollahra reservoir.
288. The population has increased so rapidly that the demand for water has more than doubled expectations? It is not so much the increase of population as the demand for water in outlying suburbs.
289. Is it not a fact that many service-pipes even within the city were laid down many years ago to suit the requirements at that particular time? Yes.
290. And they are now being gradually taken up and being replaced with pipes of a larger size? Yes.
291. Is it the intention of your Department to complete the improved service throughout the city and suburbs? That is our intention.

292.

J. M. Smail. 27 May, 1897.

292. Necessarily some time must elapse before that work can be completed? Yes; but we have made great progress in the work already. Most of the city alterations are already finished. We are now doing the portion from Liverpool-street towards the Benevolent Asylum. That is in hand now. As a matter of fact, we are not laying, even on our smallest lanes, pipes smaller than 4 inches in diameter. I have laid it down as a rule never to recommend pipes of a less diameter than 4 inches.

293. Does the proposal before the Committee agree entirely with your views, or would you like to see it amended in any form? I think myself it is a good one. What we want is a certain quantity of water got down within a certain time. I have gone through Mr. Darley's calculations, and I find that they are on the safe side. The question is whether we can get it for the same amount of money as it will cost to put down a 4-foot pipe, the flow in the case of the 4-foot pipe being governed by the height in the reservoir, whereas the flow in the canal is irrespective of that altogether. So long as it can flow from the dam into the canal we can get water.

294. You are satisfied that the proposal will be ample to meet all requirements for many years to come? Yes.

295. You have no desire to make any alterations in the proposal? No. I have gone through it carefully. It is a scheme which may be said to look well ahead. I have looked through all the points in it. The only thing which troubled me at all was that if anything went wrong with the canal we should have then to depend on the Potts' Hill reservoir, and we could depend on that for about three days. On going into the matter with Mr. Darley he found that he had estimated so liberally for necessary work to the canal all through that there is not so much danger of anything going wrong with it. The only weak point is the aqueduct, and that will be made stronger. I should be rather inclined to expend a little extra money in putting a new top to it in preference to patching it up, as is proposed to be done.

296. That will involve an additional cost of some £7,000? Yes.

297. What part of it would require expenditure? Just the waterway.

298. Could it be done at the same time as the other work? Yes; there would be the same arrangement as is proposed now in dealing with the canal. The work would be dealt with in sections, and the water would be passed from one section to another.

299. Could you supply us with a rough sketch of the work you would propose with the estimated cost? Mr. Darley has already done that. It is included in his estimate. The cost of making the existing canal is put down at £39,000. The work would include the removing and enlarging of gauge-weir, raising and strengthening of brick aqueduct, renewing defective pitching and concrete lining, raising or renewing flumes, bridge, &c., temporary pipe (4 feet diameter) half-mile long, temporary bulkheads, dams, penstocks &c., erected, and new screens at pipe-head basin.

300. That embraces the work to which you just referred, and will, in fact, include everything? Yes. I was rather dubious concerning the estimate in the first instance. I had no plans to go by, but Mr. Darley assured me that he had gone through the thing himself, and had made what may be termed "fat" estimates, so that he might be on the right side.

301. Will the work be carried out under the supervision of your Department, or will it be carried out by the Department of Public Works? That is a point which came up between Mr. Darley and myself. If the Department of Public Works carried out the alterations in the canal there would be a conflict of authority, because the Department of Public Works are not responsible for the keeping up of the water supply to Sydney, whereas the Board is. I think it would be bad policy to take the work out of the hands of the Department which is responsible for keeping up the supply. A good arrangement would be that the canal work, or aqueduct work, right down to the basin, should be carried out by the Board. We could then make our own arrangements easily to keep up the supply, as we already have a 6-foot pipe. The Department of Public Works could go on laying down the duplicate pipe.

302. You know that if the work were carried out by the Government, no matter how much the estimate might be exceeded, your Department would have to take the work over at the actual cost? Yes.

303. Have you, therefore, gone into the estimates in detail sufficiently to enable you to assure the Committee that the work can be carried out for the amount given, with the usual addition of 10 per cent.? I have not gone into the estimate in detail, but I have taken Mr. Darley's assurance that ample provision has been made for the work.

304. Are you satisfied with Mr. Darley's estimate? Yes. We have generally found his estimates correct.

305. *Mr. Fegan.*] What would be the extra cost involved in converting the canal into a tunnel? I should not like to give an off-hand answer to that question. I daresay it would run to between £20,000 and £30,000.

306. Would it not be a great deal better to carry out that work? I would not advise the covering in of the present canal.

307. It would hold a greater volume of water, would it not;—while you are thinking of raising the banks of the canal 2 ft. 6 in., would it not be much better to cover it over? The only advantage in covering it would be in the prevention of pollution. You would not get any extra head, unless you remodelled the whole of the outlet works from the Prospect reservoir, and that would cost a large amount of money.

308. You think the advantages would not be worth the cost? No.

309. You think the Board would not be warranted in incurring the expenditure? I think not.

310. We were informed yesterday that the Department of Lands was supplied as regards the back part of the building by the Paddington service, and as regards the front part of the building by the Crown-street service. In the portion of the building which is served from Crown-street, there are valuable documents and papers in connection with the Department stored, and should a fire break out, it is feared that the Crown-street water would be inadequate to cope with it? That is a matter for the Government. Why not connect the front part of the building with the Paddington service at once, and have done with it.

311. But do you know that the state of affairs is such as I have described? It may be; I cannot say.

312. You would not call it a desirable state of affairs? No; it seems an anomalous arrangement that one part of the building should be supplied from a high-level service, and that another should be supplied from a low-level service.

313. Will you make a note of that and look into the matter? Yes.

314. Do you think that the 6-foot pipe, which it is proposed to lay in connection with this scheme will be adequate? Yes; ample.

315. Having regard to the probable increase in population, for how many years do you suppose the work would last? I should say it would be equal to fully forty years.

316.

316. And you think that that is ample time to make provision for and to look forward to? Yes. J. M. Smail.
317. *Mr. Roberts.*] It is intended to give the canal a thorough overhaul, with a view to the prevention of the great leakage which is alleged to take place? Yes; I might say that the present leakage is, comparatively speaking, a very small affair. 27 May, 1897.
318. Will the canal be emptied of water when the raising is being proceeded with? It will be emptied in sections, and as I have pointed out, I think it would be advisable for the Board to carry out that alteration, because we should be able to make our own arrangements for cutting off and putting on.
319. How long do you think the whole work would occupy? The canal portion of the work would have to be done very carefully. It would take from twelve to eighteen months. We would do most of the work in winter time. The alteration of the canal and the laying of the pipe could go on simultaneously.
320. You think that the whole work could be finished in twelve or eighteen months? Yes.
321. *Mr. Humphery.*] In what way is the water raised from Ryde to Chatswood? It is pumped by two Watts' engines at Ryde.
322. The water reaches Ryde by gravitation from Potts' Hill? Yes; and it is then taken to Ryde village.
323. From Ryde to Chatswood you pump to an elevation of 320 feet? Yes.
324. How is the water raised from the 320 feet to the 720 feet at Wahroonga? We have another pumping-station at Chatswood. We draw from the tank and pump to Wahroonga.
325. Therefore you pump from Ryde the whole of the supply required for Ryde village, Chatswood, Wahroonga, and all the intervening suburbs? Yes.
326. Do you find any difficulty in fully supplying the requirements of the Northern line? No. The greatest difficulty we find is in the gravitation portion. We cannot get water from Potts' Hill quickly enough.
327. You regard the scheme proposed by the Department as an improvement upon your original recommendation of a 4-foot pipe-line from Prospect to Potts' Hill? It is an improvement in this way: It gives us nearly double the water for practically the same money.
328. In every way, as far as you can judge, it will meet your requirements? Yes; it will.
329. Have you any suggestion you can make which will be an improvement to the scheme? No; I have gone very carefully into the matter. I might say that I conferred with Mr. Darley. Both of us put our heads together to get the best scheme. I believe, after full consideration, that the raising of the canal and the duplication of the 6-foot pipe will do what is wanted.
330. You can make no suggestion which will lead to economy in construction? That is a matter of detail.
331. But can you, as an engineer, make any suggestion? No. The thing is so simple that there is not much room for criticism.
332. As to the canal, will there be any difference in the cost of maintenance? Yes. As the canal is reconstructed, we shall save in the maintenance upon it.
333. Certainly, in the cost of construction there will be economy, having regard to capacity? Yes.
334. And there will be no additional annual expenditure? No; not for maintenance.
335. *Mr. Trickett.*] If you refer to the evidence given yesterday by the Superintendent of Fire Brigades, you will see that he said, amongst other things, referring to the inadequacy of water supply for fire extinction, that the mains from the different reservoirs, and the reservoirs themselves, were not large enough? Yes; I think he is quite right there. The 20,000,000 gallons reservoir at Centennial Park will wipe out all the smaller ones.
336. It is intended to cure the difficulties to which the Superintendent of Fire Brigades referred? Yes; and there will be an economy in pumping. We have often to break the pumping, meanwhile steam has to be kept up, and there is a waste of fuel and men's time. In future we shall be able to pump straight away.
337. These matters have not escaped the attention of the Board;—they are receiving attention, and will be remedied as soon as possible? Yes. On the next Loan Estimates I intend to ask for a sum of money to lay a large 36-inch main right through the city and suburbs, and also to connect the high levels of Balmain with the Centennial Park reservoir. They are now supplied from Potts' Hill.
338. *Mr. Hoskins.*] The Superintendent of Fire Brigades said he thought it would be better that a duplicate pipe-line should be laid from Prospect direct to Sydney, avoiding Potts' Hill? There is no necessity for that. When the Superintendent of Fire Brigades sees the effect of the new reservoir, to which I have referred, he will alter that opinion.

TUESDAY, 1 *JUNE*, 1897.

Present:—

THOMAS THOMSON EWING, Esq. (Chairman).

The Hon. Frederick Thomas Humphery.	Henry Clarke, Esq.
The Hon. James Hoskins.	John Lionel Fegan, Esq.
The Hon. Charles James Roberts, C.M.G.	Thomas Henry Hassall, Esq.
The Hon. William Joseph Trickett.	George Black, Esq.
The Hon. Daniel O'Connor.	Francis Augustus Wright, Esq.

Frank Farnell, Esq.

The Committee further considered the expediency of constructing a Duplicate Main from Prospect to Potts' Hill.

William Douglas Bear, Superintendent, Metropolitan Fire Brigades, sworn, and examined:—

339. *Mr. Wright.*] The Engineer to the Metropolitan Board of Water Supply and Sewerage, has addressed a letter to the Committee in reference to the deficient pressure in Macquarie-street opposite Parliament House, and also with regard to the water supply of the Lands and Survey Office in which he states that there is a dividing-valve between the high-level and the low-level service in the case of the Lands Office. He points out that this valve on being opened admits of high-level water being available for the whole building in case of fire? I am aware of that. Mr. Smail states, that there is a valve between the high and W. D. Bear. 1 June, 1897.

W. D. Bear. 1 June, 1897.

and low level services in the case of the Lands Department. The high-level service has been let into the old building, that is the building facing Bridge-street, but the main has never been connected up to the present moment with the high-level service; consequently there is no valve there, and no high-level water can be put into the low level unless the turncock turns the water on at the corner of the Hotel Metropole. There is no such valve as Mr. Smail speaks of. I have been there since I gave my evidence the other day, and I may mention that I also took the pressure at Parliament House at 7 a.m., 11 a.m., and 11 p.m. on the 31st. The pressure taken is practically what I gave you in my evidence. There is no material difference. As you are probably aware you must take the pressure in the middle of the day in summer time, when there is the greatest drawing off on the lower levels. With reference to the question of water supply generally, I may mention that when I left England, I brought out copies of the report of the Royal Commission upon the London water supply, and also copies of the report of the Royal Commission on Fire Brigades. I have laid them on the table, and the information may be of some service to your Committee.

340. The Chief Engineer of the Metropolitan Board of Water Supply and Sewerage says in the letter to which I have referred:—"In reference to the inquiry on the part of the Committee *re* deficient pressure in Macquarie-street opposite Parliament House, I wish to state that this street is at present supplied by a new 6-inch high-level main on each footpath, and a 12-inch low-level main in the roadway"? That is quite right.

341. He goes on to say:—"The high-level mains would be of use for fire purposes on points of high elevation, although a copious supply could be obtained from the low-level main for lower levels"? That is right—with the steam fire-engines.

342. He also says:—"The high-level mains are supplied from an old 12-inch main which has been down about forty years, and in its present state would not, in all probability, be equal to an 8-inch main. In March, 1897, the Board decided to lay a new 15-inch main in lieu of the old 12-inch as far as King and Macquarie streets, connecting up the 6-inch high-level mains before referred to, and a 12-inch for supply of the western parts of the city. This work was initiated without any reference from the Fire Brigade Board"? That is what I practically said in my evidence.

343. He continues:—"The order for the pipes has been issued, and work will be commenced without unnecessary delay. With regard to existing conditions, the pressure off the high level at 8·45 a.m. was 38 to 41 lb. Taking pressure at 40 lb. to the square inch would be equal to a column of water 92 feet high, which is considerably higher than the present buildings, and when new buildings are erected the new service will be equal to any fire emergency." Do you confirm the statement that "40 lb. is equal to a column of water 92 feet high"? That is about right.

344. Are you familiar with the proposal to duplicate the pipe-line between Prospect and Potts' Hill? Yes.

345. What is your opinion of the present water supply of Sydney? It is bad.

346. You do not think the present supply is adequate to the requirements of the city? I am afraid we are putting too many eggs into one basket.

347. Sydney is at present supplied from the Potts' Hill reservoir from two mains? There are two mains from Potts' Hill, but if anything were to happen to the canal at the present moment, now that the Botany water supply has been cut off—and the works were sold for a few hundred pounds, I believe—we should have no reserve at all. Supposing, for instance, that at the present moment we had the same difficulty confronting us which we had in 1895—during February, March, and April of that year—when the Potts' Hill reservoir was empty for some months while it was being repaired;—supposing such a thing were to happen now, or that an accident happened to the canal from a hurricane, or from an upheaval of earth from a slight earthquake, Sydney and its suburbs would be without water. I think, therefore, we ought not to trust to that one canal.

348. Do you know the capacity of the Potts' Hill reservoir? It is 96,000,000 gallons, I believe.

349. That would be a supply for Sydney for about four days? For about that.

350. You think the danger lies between Potts' Hill and Prospect? I am positive it does.

351. You know that the proposal of the Department is to raise the height of the canal by 2 ft. 6 in., and to duplicate the pipe-line from the pipe-head to Potts' Hill, having two 6-foot pipes instead of one? But I do not think we should trust to one canal. There may at any time be a slight earthquake, such as has happened in America dozens of times, and then if you were dependent on the canal alone, Sydney and suburbs would be altogether cut off from water.

352. But do you not think that an earthquake such as you describe, if it destroyed one canal, would be likely to destroy two? I would not have a second canal. My contention is that a 6-foot steel main should be laid from Prospect right through. It might go into the present 6-foot pipe, and supply the dam at Potts' Hill, and in time to come a 4-foot pipe might be laid on to Sydney. That, of course, would be looking ahead, when there had been considerable growth in the number of manufactories in the city. You would then be able to supply the lower levels of the city altogether irrespective of the Crown-street supply.

353. You do not approve of increasing the size of the canal? I should prefer to see an independent pipe-line. I have prepared some rough notes on the subject, which I will read to the Committee:—

Say a 6-foot steel main from Prospect, taken, say, about 10 to 12 feet below the high-water line of 195 feet, through a screening tank close to the pipe-head.

From thence to Potts' Hill reservoir having no connection with the present canal or pipes supplying Potts' Hill.

One lead of 6 feet to pass into the reservoir, with valve shut down. Another 4-foot lead into one of the present 4-foot mains now supplying Crown-street, &c., with valve shut down. Another 4-foot main to run into the city, taking a lead from this one to supply the reservoir at Petersham, which is 166 feet above high-water mark, the overflow of which could be taken into the lower mains.

The lower parts of this city, and most of the suburbs, such as Balmain, Leichhardt, Annandale, &c., would be supplied, thereby allowing the Crown-street reservoir to be used entirely as a receiving reservoir for pumping up to the higher reservoirs.

As now during the summer months the valves must be partly shut down to force the water into Petersham, thereby giving Crown-street less head than 141 feet above high-water mark.

This main itself would be a reservoir, holding between 14 and 15 million gallons of water between Prospect and the heart of the city.

If an accident occurred in the city, the valve at Potts' Hill could be opened, thereby letting the water into the reservoir there, and the Sydney main shut down, or it could be put into the present 48-inch main, besides turning down the valves in Sydney to localise a break.

If flanged joints were made at certain sections of this pipe-line, spare pipes could be kept, and the mains cleaned out occasionally instead of moving them all.

Of course there would be proper bends made for diverting the water into spare pipes above the ground.

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The 195-foot head at Prospect would give about 61 lb. on the square inch at the corner of George and King streets, which data is about 55 feet above high-water mark. A certain amount must be allowed for friction in accordance with the velocity, but this loss would not be very great with 6-foot and 4-foot pipes. W. D. Bear. 1 June, 1897.

This head would be about (say) 130 to 140 feet.

All levels below 50 feet could be supplied by this water, and as the city is bound to be a great shipping port in time a great deal more water will be required than the increase of population would require.

During the year 1895 (February, March, and April), the Potts' Hill reservoir was empty for some months. Supposing this were to happen now that the Botany supply is done away with, or an accident happened to the canal during a hurricane, or an upheaval of the land by a slight earthquake, Sydney and its suburbs would be entirely without water owing to trusting to the one canal.

All the reservoirs and pipe-lines are too small for this city and suburbs, and the fact is that we are putting too many eggs into one basket. (Per canal and Potts' Hill.)

If 21 million gallons of water are required now for less than half a million of people, with the increase of our population and the increase of our shipping, increased demand for manufacturing purposes, for hydraulic lifts, &c., and the further extension to other districts, it will not be very long until we shall be requiring 40 to 50 million gallons per day, and most of this between the hours of 8 a.m. and 6 p.m.

Fanning, the recognised authority upon the question of water supply says that you require 70 gallons per head per diem for population, outside of other requirements. I may mention that 70 American gallons would be equivalent to about 58⅓ English gallons.

354. Would that apply to any population? I will give you an instance. He quotes Albany, in New York, with a population of 90,903. For that population he estimates 70 gallons per head.

355. I see that Brooklyn, with a population of 566,000, according to Fanning, has a daily consumption of 30,674,000, and that Boston, with a population of 362,000, has a daily consumption of 35,000,000 gallons? Yes; that would be American gallons. There are 232 cubic inches in an American gallon, and 277·123 in an English gallon.

356. Upon that estimate Potts' Hill would contain practically six days' supply for Sydney? Yes; but if you now want 25,000,000 English gallons for our population of 500,000, in a few years you will require from 50,000,000 to 60,000,000 gallons.

357. Our average is 17,000,000 gallons? It does not do to calculate in the way in which you are doing, because it often happens that in some parts of the city at the present time, in summer weather, you cannot get water in the middle of the day. The greatest drawing-off is between 8 o'clock in the morning and 6 o'clock at night. They have been obliged on some occasions to put the valve down at Crown-street to force water into the Petersham reservoir.

358. You think that although 17,000,000 gallons might be sufficient for a population such as that of Sydney, you are, nevertheless, crippled for the want of water for fire extinction? I do not say that we are absolutely crippled from the want of water, but the supply we really require is 360,000 gallons per hour.

359. That would be to maintain a standard of efficiency for fire extinction? Yes; 5,380 gallons a minute, or, practically, 360,000 gallons an hour.

360. You are dealing with the question of water supply from your standpoint as Superintendent of Fire Brigades? Yes.

361. Although at present there is sufficient supply for domestic and manufacturing purposes, you think that considering the contingency of a great fire Sydney should be provided with a better supply? I am positive of it. In summer time the water never reaches settlement in the Crown-street reservoir, because it is no sooner there than it has to be pumped up to a higher level, or is run out. We never get the 141 feet in Crown-street. We do not get the pressure we ought to have.

362. What you suggest, then, is an entire duplicated service from Prospect? I think you are doing wrong in trusting to one canal for the supply of 500,000 people.

363. You think there should be a distinct water supply to the city independently of the canal? Yes; I have been along the canal in summer time, and I have seen it leaking in all directions. It has been patched up all the way along.

364. Do you think the catchment area in the Prospect reservoir is large enough? I think so; but I should prefer not to enter into that part of the question.

365. You think there is no danger of failure of supply in that direction? No. It is the manipulation of the water which is deficient.

366. You do not approve of increasing the height of the sides of the present canal;—what you would prefer to see is a duplicate pipe-line from Prospect to Potts' Hill and then to Sydney? Yes.

367. You would prefer a duplicate pipe-line from Prospect, carried, ultimately, to Sydney, with a screening-tank at the head of the pipe-line? Yes.

368. *Mr. Trickett.*] Is the opinion you have expressed based upon your own ideas, or upon what you have seen in other countries? It is based upon what I know to exist in other countries.

369. Can you tell us of any place where they have the means of supply which you suggest? I could not mention them off-hand, but you will see them stated in Fanning, who is the chief authority on water supply in the world.

370. *Chairman.*] You have produced a map? Yes. I thought you might want some of the levels. That map will give you the levels of the whole city.

371. *Mr. Fegan.*] What would be the height of the chief places? The corner of King and George streets is 55 feet above high-water mark. Parliament House is supplied from the Paddington reservoir. The Paddington reservoir is 215 feet, and Parliament House is 105·9 feet. It should get a pressure of 47·3 lb. That is the pressure it should have, but as Mr. Smail told you, it gets at 8 o'clock in the morning from 38 to 40 lb. The needle moving in that way would show you that there must be a great drawing off at that hour in the morning.

372. Would that pressure be sufficient if a fire were to occur at Parliament House? Not in the middle of the day.

373. At what hours do you get a pressure averaging from 35 to 40 lb.? Say from 11 a.m. to 4 p.m.

374. Then there would be an insufficient pressure of water to cope with a large fire at Parliament House between those hours? I do not say that there would be insufficient water, but there would not be a sufficient supply to enable the attendants at Parliament House to cope with the fire themselves. We should be able to get plenty of pressure with our steam fire-engines. Crown-street is 141 feet; but we never get the pressure out of it, because the water is no sooner in than it is out. As Parliament House is 105 feet, that would give 35 feet of head, or 15·2 lb.; so that in the event of a fire at Parliament House,

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the Crown-street water would be of no use, except for feeding steam fire-engines to generate the pressure. There used to be a dividing lock between the high level and the low level at the corner of King and George streets, but the Water and Sewerage Board are going to make the dividing lock at Hunter-street instead of King-street, so that on the other side of Hunter-street there will be a high-level service, while on the Circular Quay side there will be a low-level service. The reservoir at Paddington is 215 feet, and the corner of King and George streets being 55 feet, you get a pressure of 69 lb. to the square inch. That will be the high level. The lower level, supposing the reservoir were full, would give us 37 lb. to the square inch. Supposing the King-street lower-level water, instead of being from Crown-street was from Prospect, we should have 194 feet of head, or 61·236 lb. to the square inch. If it were possible to get the Prospect water instead of the Crown-street water, we should not want to advance any more than over 50 feet. With 50 feet we could deal with hundreds of fires with the Prospect water, and we should save a good deal of pumping. What I am afraid of is that some night when we have the Centennial Park reservoir water suddenly put into the lower levels, some of the mains will burst, and we shall then have the water running away to waste instead of being used for fire extinction. The map before you is a map of the Water and Sewerage Board which I have had for some years. The large squares on the map show you the fire stations, and the circular marks show you the alarms. The small figures show you the data of all the streets.

375. *Mr. Wright.*] What is the height of the intake at Prospect above sea level, and what fall is given to the pipe between that and Sydney? I cannot give you that information. I have asked for it, but have not yet been able to obtain it.

376. *Mr. Fegan.*] When you were before the Committee giving evidence in reference to the proposed Parliamentary buildings you stated that the Lands Office was supplied from two different services—from the Paddington service, and from the Crown-street service;—you said that the back portion of the office was supplied with the high-level water, while the portion in which valuable documents were kept was supplied with the Crown-street water;—Mr. Smail told us that the services could be coupled? So they can.

377. How long would it take to couple them;—Mr. Smail said it could be done in a few minutes? Mr. Smail is under the impression that they are both coupled up, whereas they are not. The wrought-iron pipes are laid into the buildings, but they have not yet been coupled up. The high-level water could be put into the low level by a turncock near the Metropole Hotel. The valve could be opened there, but it would take a quarter of an hour to do it.

378. And a good deal of damage would be done in the meantime? Tremendous damage might be done in the meantime. I believe the work is under way now. I made a report on the subject a few weeks back, and I believe the work is to be carried out. I desire to hand in a comparative statement showing the proportion of fires to the square mile in London and Sydney and other information which may be of value to the Committee:—

	London.	Sydney.
Fires during 1896 (Fire Brigade area)	3,616	291
Area covered by Fire Brigade, square miles	121	196
Proportion of fires to square mile	29·88	1·5
Population	5,633,808	437,720
Proportion of fires per head of population	·00064	·00066

NOTE.—The number of fires is in each case taken from the Annual Reports for the year 1896.
The population as given of London is that included in the City and Metropolitan Police area, which differs from that covered by the London Fire Brigade. The figures, as referring to the population are therefore only approximate.

379. *Mr. Roberts.*] I understand you to say that some of the mains are not as large as they should be? They are not nearly as large as they should be.

380. Could you give us some more detailed information upon that point? We have a tremendous number of 3-inch mains down. In my estimation it is almost a waste of money to put down 3-inch mains. The Water and Sewerage Board are putting none down at the present time, excepting where they are actually obliged to do so, on account of cost. In sparsely-populated districts the relative value between a 3-inch and a 4-inch main is as 9 is to 16. The mains become corroded and bunged up with the peaty water; so that after the lapse of time a 3-inch main becomes worth only a 2-inch main. Then some of our larger mains, which should be reservoirs in themselves, are also too small. You are not looking far enough ahead when you put down 4-inch mains.

381. What would be the minimum size you would allow? 4-inch. I would not allow anything less than 4-inch to go down with water which is not filtered.

382. What would be the life of a 4-inch main? I could not say; it would depend a great deal upon the water. The lime in many waters affects the pipes. I should think that if they were properly cleaned out they would last from fifty to sixty years. Some of the wooden pipes in London have lasted 200 years.

383. Are the mains in Sydney and its suburbs cleaned out as often as you think they should be? No; I see they are just going to start cleaning the Woolloomooloo service now. They have been cleaning out the Macdonaldtown pipes.

384. How often should the main pipes be cleaned out or inspected? They should be cleaned out with a steel wire or chain once in four or five years. A good deal depends on the velocity. The Busby's bore water is very peaty, and used to block the mains more quickly than did the ordinary water we received from Prospect. The Botany water was splendid water, and does not involve so much pipe-cleaning as does the Busby's bore water.

385. Have you at an outbreak of fire at any time found the supply of water limited owing to the corrosion of the pipes? Yes, dozens of times.

386. Can you speak of any fire in particular? We had one the other night over at Leichhardt Hill. No doubt the main is a little bit small there, and it is partially bunged up. We have had the same thing happen in Macdonaldtown, in Balmain, and in other parts of the city hundreds of times.

387. You say that the mains ought to be cleaned out once in five years? They ought to be gauged. It is not difficult to run a gauging through.

388. How often are they cleaned? About when I complain, I think.

389. Is there any standing regulation on the subject? No.

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390. Do you think it desirable that there should be? I maintain that every pipe should be gauged occasionally to see if it requires cleaning out. It is easily done by turning the water off, and floating a line down, and afterwards putting a wire through. It saves breaking the pipes up so often.
391. *Mr. Black.*] You said just now that we had too many eggs in one basket, and that you thought we ought to duplicate the canal from Prospect to convey the water to Sydney, as the present canal might be interfered with by an earthquake? Or might get damaged in some other way.
392. How great a distance do you suppose there would be between the two canals? I would not have a second canal; I would have a 6-foot steel pipe.
393. That would not be free from interference by an earthquake? There would be a greater chance of its escaping interference. You have only to interfere with the pitching of a canal and it is done for.
394. But if your argument applies to one canal, would it not apply equally to two canals—that is to say, the convulsion of nature which upset the one would probably upset the other equally? I do not advocate a second canal; but even if you had a second you would not be bound to have them close together.
395. Would it not be difficult to have them at any great distance apart? I would have a pipe-line, and I think you would find that it would be much less than 21 miles from Sydney.
396. That might involve expensive resumptions and other contingencies? There is that to be considered. I estimate that £150,000 would lay a pipe from Prospect to Potts' Hill.
397. Do you not think that if your argument holds good there should be a second means of supply connected with some other river, seeing that the Nepean might dry up, or that its course might be turned by an earthquake? No; I do not think there is any necessity for that. What I say is that you are proceeding by dribs and drabs, whereas by reasonable expenditure we might prepare ourselves for twenty years hence. You are proposing now to raise the canal a few feet, but it is questionable whether the foundations will be able to stand the extra 2 feet of head.
398. Do you not think the earthquake to which you have referred is rather a remote possibility? There is not only an earthquake to be considered, but suppose your channel is full of water, a hurricane would very quickly take all the water out of it.
399. For how far? As far as the windage of the hurricane would allow. If a hurricane swept over the open channel it would drive the water over the banks, or it might carry the banks of the channel away. Such a thing has happened in America hundreds of times.
400. Do you think we have sufficient supply to keep us going until the channel could be repaired? You could not have the channel repaired properly, because it is never empty. Of course by inserting pipes you could empty the canal at any time and repair it.
401. But you say that all the water might be blown out of the channel. The question is whether, under such circumstances, we should not have sufficient reserve to keep us going until the flow was resumed? Of course there is from four to five days' supply at Potts' Hill; but what I wish to impress upon you is that the Botany supply is now of no use. They are washing sheepskins with the water.
402. I am afraid your prognostications of evil would involve an expenditure this Committee would not be justified in recommending? I am not a scientific man, although I know a little about hydraulics and hydrostatics. I still think that in circumstances such as I have described there is danger of Sydney being cut off from her water supply.
403. I am afraid we can provide only against ordinary contingencies—hurricanes and earthquakes would, I think, scarcely come within the scope of this inquiry? Suppose that everything is carried out as regards the canal—you are then going to have at Potts' Hill only 174 feet of head. As Mr. Smail said, it only flows in and flows out again. If you go below 170 feet of head at Potts' Hill you are not able to supply Petersham, and if you cannot keep the Petersham reservoir full you cannot then supply Balmain, Leichhardt, Annandale, and other districts.
404. What is your idea in regard to some of the buildings of an extraordinary altitude which are now being constructed in the city? If they were built under a proper Building Act there would be no harm in them.
405. Is it not possible to construct buildings of such an altitude that you would be unable to obtain sufficient pressure to have them under control in case of fire? That is so at this moment.
406. Do you not think that persons who construct buildings of that character under the circumstances practically place themselves outside the pale of citizenship? Yes; but there is nothing to prevent them from putting up such a structure alongside your own warehouse.
407. In the first place an extraordinarily high building cannot be afforded the protection which can be afforded an ordinary building? No.
408. In the next place, it is a menace and danger to the buildings surrounding it? It is.
409. Do you not think that a Building Act is necessary to restrict the erection of these unsightly and dangerous buildings to such a tremendous height? I have done all I can to get a Building Act passed. I have copies of the Building Acts of London, Manchester, Glasgow, and Edinburgh, and I can get no action whatever taken in the matter.
410. Do you know the maximum height allowed for buildings in the City of London? No maximum height has been provided up to the present time.
411. In what city is there a maximum height provided? I do not think there is any. In some places they have been trying to get the Napoleonic Code—that is to say, supposing a street were of a certain width, the buildings in it should be only of a certain height. The code, however, has not yet been brought into force anywhere.
412. You mean that the narrower the street the lower the building should be? Yes; but there is a great difficulty to overcome, because they can get off the back street, get into the middle of the block, and build what they like. They have tried to bring the code into force in Chicago, but it has never been a success. The Chicago Building Act is supposed to be one of the best. Our Building Act is of no use whatever.
413. You think, however, that it is necessary that something should be done to restrict the heights of buildings in a city? I am positive it is.
414. In the interests of the city, and in the interests of the inmates of the building? Yes; there should be a proper law, such as exists in any ordinary city or town; but human life does not seem to be studied at all in Sydney in any way.
415. I see that lately on the Continent a number of lives have been lost in churches through overcrowding;—is there any provision which compels those who own or keep places of amusement to provide

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sufficient exit in case of fire, and supposing such a provision to exist, is there anything which would make it apply to church buildings? No Act at all can touch them. We can hardly deal with the theatres.
416. So far as you know the Sydney churches, are they well provided with exits? No; very badly provided. The worst instance is a certain house of worship in York-street.
417. To what height can you now throw water in the city? To about 200 feet from a steam fire-engine.
418. But in connection with a plug, how high? It all depends; we have so many supplies.
419. Take Wynyard-square? On one side of Wynyard-square we are able to throw water a good 60 feet. That is on the upper side. On the lower side we can throw it from 30 to 40 feet.
420. What is the height of the buildings in Wynyard-square? Chipman's building is from 90 to 100 feet.
421. Then unless you had your steam fire-engines there you could do nothing in the case of a fire? You can do nothing in the case of a very high building unless you get up the staircase; and if the building be badly constructed it is questionable whether the men's lives should be risked to save the building.
422. *Mr. Hoskins.*] I understood you to say that you had been along the canal from Prospect to Potts' Hill? Some time ago.
423. Have you ridden the whole distance? Not the whole distance, but I have done one part at one time, and another part at another.
424. You said that you found the canal leaking very badly? Two or three years ago it was leaking very badly, in my estimation.
425. Do you know whether there has been any improvement—whether the leakage has been stopped? I see so from the reports.
426. I gather from your evidence that you would prefer that any additional supply of water to Sydney should be conveyed by means of a pipe rather than by increasing the height of the canal? Yes; the velocity from Prospect to Potts' Hill would be proportionately greater than in a channel.
427. The leakage from a pipe-line would be less than from a canal? There should be none at all from a good pipe-line.
428. You seem to think that a better pressure of water could be kept up between Prospect and Potts' Hill by a pipe-line than if the water were conveyed through a canal—you think there would be less waste and less loss of pressure? Yes; a great deal less.
429. I presume you are aware that the City of London is supplied with water brought by open cutting from New River? That is only one of the water supplies of the metropolis.
430. It is the supply for the City of London? The City of London is only about a mile square.
431. Have you been along the New River Canal? Yes.
432. Is it not a fact that that canal is not like the canal between Prospect and Potts' Hill—that is, cut on the side of a ridge, with one side made up by an embankment—but that it is cut in solid ground all the way;—is not that the case? Yes; most of it is.
433. Do you not think that having regard to our long spells of hot weather and our hot seasons the banks of a canal conveying water, which might be made up by an embankment, would have a tendency to leak if great care were not exercised in puddling? Yes; the heat would crack the puddling.
434. Mr. Smail said that it would not only crack the puddling, but also the cement? I think he is quite right.
435. Would you not avoid all that by having a pipe-line? That, of course, is one of the strong arguments in its favour.
436. You think that in the case of a canal the cracks in the sides, produced by the extreme heat and the dry weather, must cause a considerable leakage? Certainly.
437. Do you not think that the gain brought about by the absence of leakage, even though the pipe may cost more than increasing the height of the canal, would ultimately lead to a larger and more profitable return to the Water and Sewerage Board? They would get twice the return; there would be a great saving in labour alone. You would not require men to be watching the canal closely in time of storm.
438. Do you know how large a proportion of the line from Prospect to Potts' Hill is open canal? About 4½ miles.
439, I suppose you know that the engineer of the Water and Sewerage Board originally recommended that the additional supply should be conveyed to Potts' Hill by a 4-foot pipe? Yes; but the Department has recommended a 6-foot pipe.
440. You have no hesitation in saying that if the water be taken from a certain level in the one case by a pipe-line, and in the other by a canal, the pipe-line would give a higher pressure than the canal? Not only that, but you might let the canal supply the reservoir during the night, and the pipe-line during the daytime. You would then be able to keep the 174 feet of head. During last summer there was never 174 feet.
441. What has there been? It has ranged from 170 to 171. Occasionally, last year, they had to shut down the valve at Crown-street to force the water to Petersham. It is 166 feet, so that you have only a slight difference between Potts' Hill and Petersham.
442. You were asked a question by Mr. Fegan as to the supply of low-level water to the old portion of the Lands Office building, and the supply of high-level water to the new portion of the buildings, it being possible to turn the high pressure into the low pressure: Mr. Smail, when questioned upon that point, said, I think, that that would apply to most of the buildings in Sydney;—that is to say, that although they might be supplied with a low-service water, the high-service water could be turned on in a few minutes? In the case of the Lands Office buildings the high-pressure water can be turned on, as I have pointed out already, but it cannot be done inside the building because the high-level water in the new portion of the building is not connected with the old main. It sometimes happens in the case of fires that you have the high-level water on one side of you and low-level water on the other side, and if you open the valve in such a case you would lose all the pressure from one side—that is to say, you would get increased pressure on the one side at the expense of the other. Your lower-level water would be improved at the expense of the high level. In such a case we generally use the steam fire-engines, and generate the pressure with the low-level water. That is one of the difficulties against which we have to contend.
443. If the additional supply of water proposed from Prospect to Potts' Hill were effected by the laying of a pipe-line, rather than by the raising of the canal, do you, or do you not, think that you would have high-pressure water for every building in Sydney? No. As I pointed out before, taking the corner of

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Pitt and George streets to be 55 feet above high-water mark, and the Prospect water supply, supposing the dam to be full, to be 194 feet above high-water mark, you would have at King-street a pressure of 60 lb. If you supplied all George-street below King-street with that water supply you would get 60 lb. pressure. That would be all the pressure you would want. You would get a better head of water. What the Water and Sewerage Board propose is to give the Centennial Park reservoir a certain pitch or zone line (say) 50 feet above high-water mark. All below that would be supplied with Crown-street water, as it is at the present moment. If you could afford to run a 4-foot pipe from Potts' Hill from the additional pipe which I suggest from Prospect, you would be able to put a good supply into all the mains round the city and wharfs. All below the 50 feet would then be supplied from the Prospect dam direct, independently of Crown-street. You could allow the water to run into the Crown-street reservoir for the purpose of pumping to other levels.

444. There would be many advantages, you think, in an additional line of pipe from Prospect? Yes; besides that there would be this advantge: If anything happened to the pipe-line, the water could be put into Potts' Hill, and if you did not want it at Potts' Hill, you could put it into one of the 4-foot pipes laid to supply Sydney. There could be a junction from the main to supply one of the 4-foot pipes.

445. Instead of a scheme partly pipe-line and partly canal, you would have a pipe-line all the way;—you think the Government would be justified in incurring the extra expenditure, in view of the public advantage which would accrue, even although it came to £30,000 or £40,000 more? Even if it cost £60,000 more it would be the better plan. I estimate that you could lay a 6-foot pipe from Prospect to Potts' Hill for £150,000.

446. *Mr. Humphery.*] We are told that by raising the sides of the canal, and having a 6-foot pipe from the end of the canal to Pott's Hill, about 47,000,000 gallons can daily be delivered into Potts' Hill reservoir;—would not less than half the 47,000,000 gallons keep the Potts' Hill reservoir up to the 174 feet? Then you would only have a moderate thing in the way of supply.

447. What is the total consumption in twenty-four hours? That is not the way to look at the matter. In the middle of the day the consumption is at the rate of 27,000,000 gallons in so many hours—in, say, eight hours. That would be in summer-time.

448. If you can put 40,000,000 gallons into Potts' Hill reservoir per diem, and you are drawing off only 27,000,000 gallons, would not the supply be ample? We have been told that we are going to get all sorts of results, but we have not obtained them yet. For instance, we have not obtained what Mr. Moriarty said we should get.

449. Upon the assumption that with a duplicate pipe from the end of the canal to Potts' Hill, if necessary over 40,000,000 gallons can daily be brought into the Pott's Hill reservoir, would not that supply be ample for all purposes? At present it would; but we are continually extending the water supply to different suburbs which are asking for water. The city will also become a much greater shipping and manufacturing centre than it is at the present time, and I estimate that we shall want from 80,000,000 to 90,000,000 gallons a day. There is nothing to prevent your laying down a 6-foot steel main from Prospect to Potts' Hill. You need not extend the pipe to the city at present if you cannot afford it. A 6-foot pipe to Potts' Hill would be enough for all present purposes, and for another ten years to come. In the course of that ten years you might extend the pipe further on with a view to the supply of the lower points of the city. It would mean a saving of hundreds of thousands of pounds in the way of fire, because, after all, a fire is a national loss.

450. If we are told that by taking a duplicate 6-foot pipe from the end of the canal the quantity delivered into Potts' Hill reservoir would be greater than if the pipe were taken from Prospect, is that, in your opinion, correct? I presume it is correct. I must accept the Department's figures.

451. Then, if that be correct, where are the advantages which you are endeavouring to impress upon us would accrue from having the pipe? The pipe-line does not require the looking after which the canal would require.

452. I am referring now to the quantity;—you say that the pipe-line all the way from Prospect to Potts' Hill will convey a larger quantity of water to Potts' Hill at a higher pressure; we are told the contrary by the Department? It is easily calculated. You have only to calculate the extra volume.

453. But why could not the same quantity be delivered from the end of the canal as from the Prospect reservoir? Under my proposal you would have a duplicate scheme. You would have a 6-foot pipe away from the canal, and you would have the canal as well. The pipe-head supplying Potts' Hill is only 6 feet. You can put what water you like into the canal, but you can only squeeze it through the 6-foot pipe existing at the present moment, whereas with a pipe-line from Prospect, such as I suggest, you would not only have a channel and the 6-foot pipe supplying Potts' Hill, but you would have an independent 6-foot pipe supplying the same reservoir.

454. Have you seen the point where the present pipe-line connects with the canal? Yes.

455. By increasing the pipe-head stream would you not get as much water through your pipe as if a pipe were laid direct from Prospect? No; there would be the atmosphere at the pipe-head to be considered. It would mean 14·7.

456. Have you read Mr. Darley's evidence as to the quantity to be delivered? Yes.

457. Do you agree with that evidence? I should not like to go into figures. You can make the channel what size you like, but you cannot do more than fill the 6-foot pipe.

458. *Mr. Wright.*] What you would propose is two 6-foot pipes instead of one? Yes; but there is the loss of head to be considered. Your head only commences at the pipe-head.

459. *Mr. Humphery.*] You must depend wholly upon the level in the Potts' Hill reservoir? Now.

460. And in the future? No. I say that we could depend upon Prospect for the best part of the supply if we liked.

461. And you think the balance reservoir at Potts' Hill is unnecessary? I do not say that.

462. I cannot understand why, in your opinion, we should have a direct pipe from Prospect to Sydney instead of intercepting the water at Potts' Hill? Merely for the sake of the pressure, and the necessity of always keeping the Petersham reservoir full.

463. What would there be in the future in the Potts' Hill level to prevent Petersham from receiving a fair and ample supply? I believe that as the drawing-off increases in time to come it will be necessary to do something more. Within, say, ten years it may be necessary.

464. You think that the proposal before us would be only a temporary provision, and for a very short period? Yes; Sydney is bound to be a large manufacturing and shipping centre in time to come. You must not go by population entirely.

465.

W. D. Bear. 1 June, 1897.

465. You recognise that the present provision for water supply will be practically doubled by the scheme before us? Yes.

466. And that, in your opinion, would still be wholly insufficient? Yes, because we require double the quantity of water we are receiving at the present moment. In ten years time we should require 50,000,000 or 60,000,000 gallons a day instead of 17,000,000 gallons. In the summer months our consumption has risen to 21,000,000 gallons a day, and if you take the supply between 9 o'clock in the morning and 4 o'clock in the afternoon it ranges from 25,000,000 to 27,000,000 gallons a day. I have had made a rough estimate of the cost of the steel piping. I estimate that 9½ miles of 6-foot pipes from Prospect to Potts' Hill, at £13,000 per mile, will come to £133,500.

467. *Chairman.*] Is that the cost of the pipes in position? They could be put in position for that. Then I estimate 12¼ miles of 4-foot piping to Sydney at £9,000 per mile, or £110,250. Of course if the supply were put up to tender it would come to much less than that.

468. *Mr. Humphery.*] Mr. Darley, in his evidence, said that the proposed 6-foot pipe-line from Prospect to Potts' Hill would deliver, approximately, 40,000,000 gallons a day, and that under the present scheme, including the canal raising, 47,000,000 gallons a day would be delivered, or 7,000,000 more than will be delivered by the other scheme. Having been informed of the effect of this evidence, are you prepared to modify the opinion you have expressed? Not in the least. Mr. Darley takes high-water level, but when it is blowing hard he will not keep his channel full. The wind can flop water out of the channel, but it cannot flop water out of a pipe.

469. *Mr. Hoskins.*] Your preference for the pipe-line is based upon your experience in these matters? Yes.

470. *Mr. O'Connor.*] Could not the Botany supply be brought into use again? It should not have been done away with, in my estimation. I saw from the evidence that it was proposed to do away with the Paddington and Woollahra reservoirs. It occurred to me that the Botany supply might be pumped up partly to the Paddington reservoir, and partly to the Waverley reservoir, making use of them for flushing and watering the streets, instead of taking the water for that purpose from the main supply. I am quite of Mr. Smail's opinion that at the present time, when we are crying out for an additional supply, there is a great deal of water being wasted. As a matter of fact the Botany water supply ought not to have been done away with until the scheme before the Committee had been brought forward.

THURSDAY, 3 *JUNE*, 1897.

Present:—

THOMAS THOMSON EWING, Esq. (Chairman).

The Hon. Frederick Thomas Humphery.	Henry Clarke, Esq.
The Hon. James Hoskins.	John Lionel Fegan, Esq.
The Hon. Charles James Roberts, C.M.G.	Thomas Henry Hassall, Esq.
The Hon. William Joseph Trickett.	George Black, Esq.
The Hon. Daniel O'Connor.	Francis Augustus Wright, Esq.

Frank Farnell, Esq.

The Committee further considered the expediency of constructing a Duplicate Main from Prospect to Potts' Hill.

Henry Richard Carleton, M. Inst. C.E., Principal Assistant Engineer, Harbours and Rivers Branch, Department of Public Works, sworn, and examined:—

H. R. Carleton, M.I.C.E. 3 June, 1897.

471. *Chairman.*] The respective cost of a pipe-line and canal from Prospect to Potts' Hill has already been dealt with pretty fully, but it has been contended by Mr. Bear that it would be possible by taking a pipe from Prospect direct to have your head from Prospect rather than from the elevation at Potts' Hill;—will you explain exactly how that would work out—what, for instance, is the height of Prospect? 195 feet above high water when full.

472–3. What is the height of Potts' Hill reservoir? It is proposed to keep the water-level at 174 feet.

474. What is the height of the Crown-street reservoir? 141 feet is the top water-level.

475. Water is pumped to Petersham from Crown-street? No; Petersham is supplied by gravitation.

476. You have lost 54 feet of head between Prospect and Crown-street? That is the fall.

477. Taking into consideration the volume of water to be supplied, and the size of the pipe, what would be a reasonable amount to lose in friction coming the distance of 24 miles? I do not know whether you ought to look at the matter in that way.

478. In order to get water from Prospect for a distance of 24 miles, that is to Crown-street, there must be some fall? Yes; if the fall were less, and you wanted to bring the same quantity of water, you would have to increase the diameter of the pipe; if the fall were greater you would have to diminish the diameter of the pipe.

479. What I want to arrive at is how much you have lost in your fall? There is no unnecessary fall. The pipe is calculated for that particular fall. If the fall were less the pipe would be larger; if it were greater the pipe would be smaller.

480. The height of Prospect being 54 feet above Crown-street, would it be necessary to have a pipe larger than 6-feet diameter to bring the necessary supply in? I have not made that calculation; but I may mention that the scheme before the Committee will bring more water into Potts' Hill than would a 6-foot pipe direct from Prospect.

481. Supposing water could be delivered in Sydney on a level with Prospect, the total head you would have would be 194 feet? Yes.

482. Then cannot you tell us what unnecessary fall you have? There is no unnecessary fall.

483. Supposing the height of Prospect, instead of being 194 feet, fell to 170 feet, you would still be delivering pretty much the same quantity of water? We should according to our scheme, but not if there were a pipe direct from Prospect to Potts' Hill.

484. Is there any difference in friction as between a canal and a pipe-line? It is dependent on velocity, and the velocity would be much less in the canal.

H. R. Carleton, M.I.C.E.
3 June, 1897.

485. Therefore a pipe would run slower on the same grade than would a canal? It would not run slower; it would deliver a smaller quantity.
486. Take a 6-foot canal and a 6-foot pipe on the same grade, and of the same area, which would carry the more water? The friction in the canal would be greater than in a smooth pipe.
487. Therefore the pipe would carry more? Yes.
488. But if the sides of the canal were concreted or smooth, would there be any great difference? They would both carry about the same.
489. The height of Crown-street is 141 feet;—what is the height of the Centennial Park reservoir? 245 feet.
490. Will you give us the height of your other distributing reservoirs? Paddington is 214 feet; Woollahra, 282; Waverley, 360; Centennial Park, 245; Petersham 166.
491. What is the next lowest to Petersham? Paddington.
492. Therefore in every case, with the exception of Petersham and Crown-street, you have created an artificial head which is higher than Prospect? Yes.
493. And Mr. Bear's contention would be of no value at all unless in the case of the areas supplied direct from Crown-street or Petersham? If the object is to obtain additional pressure, it could be better obtained by connection with the Centennial Park reservoir than by direct connection with Prospect.
494. Mr. Bear's contention is limited, then, to those areas which are supplied direct from Crown-street and Petersham, both of them being at a less elevation than Prospect? Yes.
495. All the other reservoirs having artificial heads above Prospect, Mr. Bear's contention would have no bearing whatever upon them? That is so.
496. Therefore, 194 feet being the elevation of Prospect, and the Centennial Park reservoir being 245 feet, and the others varying up to 360 feet, if you wanted a good head you had better seek for it at the Centennial Park reservoir, seeing that it gives you an elevation of 50 odd feet above Prospect? Yes.
497. That makes the case clear except in regard to the two areas which are supplied from Petersham and Crown-street? Yes.
498. And even in respect to those areas, it would be better to find a higher head at a nearer point? I think so, decidedly.
499. How far is the Centennial Park reservoir from Crown-street? I cannot give you the exact distance at this moment, but I should say between 1 and 2 miles.
500. How far would it be from Petersham? Between 4 and 5 miles, I should think.
501. Since, in one instance, at a distance of less than 2 miles, and in the other instance at a distance of, say, 4 miles, you have 19,000,000 gallons of water, which is abundant for emergency purposes, it would be cheaper and easier to go there for an additional head than to go to Prospect, 24 miles away, for it? Yes, and safer.
502. That brings us to the point you suggested just now;—supposing you determined upon the Centennial Park reservoir putting on this high pressure, how would you arrange for it? I believe it is possible to make that connection at present, but it would be better for you to examine Mr. Smail upon that point, because he understands the whole reticulation of the city. If you want to obtain Prospect pressure you must cut off Crown-street. You would have to bring the water through a by-pass.
503. Would there be any difficulty with regard to the pipes standing the additional pressure? That would be a matter for Mr. Smail to answer, I think, not myself. I believe the pipes have been put to a proper test. I do not think you would get the 195-foot head. If you set apart the water altogether for fire purposes it would not be necessary to screen it. If you screen it for domestic purposes, there would be a certain amount of head lost. Therefore, you cannot have the Prospect head. There would be a certain amount of head lost through your having to screen the water. Again, the assumption is that Prospect is at top water-level, that is at 195 feet. But if that were the case, what would be the use of having any storage there.
504. With the knowledge of the supply of water necessary to be delivered in Sydney, at what elevation, supposing you had a reservoir at that elevation, could you deliver Prospect water? At Crown-street.
505. *Mr. Wright.*] Mr. Bear contends that if you had a 6-foot pipe direct from Prospect to Sydney, you could deliver the same quantity of water which you propose to deliver at a much higher level;—you say that that cannot be done? I do.
506. *Mr. Hoskins.*] What would be the difference in leakage as between a canal and a 6-foot pipe? I could not tell you the exact quantity; but it would hardly be worth taking into account.
507. *Mr. Black.*] What would be the depth of water in a 6-foot pipe at the point of entrance, supposing you had such a pipe as Mr. Bear speaks of? The pipe would be completely filled.
508. At the point of emergence, would it be also full? Yes, if it is under pressure.
509. I thought there would be a lessened depth in some circumstances right through? You would lose your pressure if the pipe were not completely full.
510. Would the water require to be pumped into the pipes to maintain the pressure? No. The pipe is taken from the reservoir below the surface of the water, and that keeps it completely full.
511. *Mr. Fegan.*] Does the question of evaporation come in at all in a comparison between a pipe and an open cutting? There would be some evaporation in a canal, of course, but the quantity is insignificant compared with the loss by evaporation from the surface of the reservoir.
512. *Mr. Hoskins.*] Would the water conveyed by piping, supposing it were taken from the same place as the water taken by a canal, keep at a higher level at the point of delivery than would the water conveyed by canal;—what I mean is that you lose more, as regards level, in conveying water by canal than if you convey it by pipe? In the case of the Prospect canal these is scarcely any loss at all. There is only a drop of 2 feet in the whole length of the canal.
513. But would not the water taken by the canal flow at a smaller velocity than the water taken through a 6-foot pipe? With less velocity, but in a greater volume.
514. Having the greater velocity in the pipe-line, would you not get a higher pressure? No; the pressure has nothing to do with velocity. Pressure is accounted for by the difference of elevation between the two ends.
515. *Mr. Fegan.*] But there must be a greater force where you have a greater velocity, must there not? You have a small quantity of water travelling at a greater velocity, or a large body of water travelling slowly. The volume is the velocity multiplied by the area.

516.

H. R. Carleton, M.I.C.E.

3 June, 1897.

516. *Mr. Black.*] The water delivered from the reservoir is practically stationary before it comes into any use, so that the velocity can have nothing to do with the pressure as a means of assisting the firemen? The velocity has nothing to do with the pressure. Pressure is represented by the elevation of the surface of the water above the place at which you are drawing it off.

517. *Mr. Trickett.*] In regard to the question asked by Mr. Hoskins, the question of pressure cannot come in, because the water is only to be delivered at Potts' Hill reservoir. It is not as if the water were to be delivered right into Sydney. The question of a pipe-line, or an open canal, does not come in, because we are now only connecting the Potts' Hill reservoir, and are not bringing the water into Sydney? We should only have the Potts' Hill pressure still; but we have not the Potts' Hill pressure in Sydney. We have only the pressure of the reservoir from which each particular place is supplied. In the case of Crown-street, for example, we have 141 feet, and in the case of Woollahra 280 feet, and so on. The pressure in these cases is altogether independent of the elevation at Potts' Hill.

518. *Mr. Hoskins.*] Supposing there were plenty of water in the Prospect reservoir, if the water were conveyed from Prospect to Potts' Hill by pipe-line instead of by a scheme partly pipe-line and partly canal, there would be a continuously larger volume of water kept up at Potts' Hill? No; it would have been less during the recent drought.

519. Why? Because you would not have had sufficient head in the pipe-line to convey the quantity of water through to Potts' Hill.

520. Mr. Smail originally proposed a pipe-line in place of the proposed duplication? Yes, I believe so.

521. You do not know why he gave way? No; but I believe the constructing authority was changed.

522. *Mr. Trickett.*] A fear has been expressed by some members of the Committee that the canal may be a very uncertain structure;—can a canal or aqueduct be so constructed that there will be a very slight leakage, and very little danger of any damage resulting to it? I believe so. I believe it could be so constructed that the leakage would be practically nil.

523. Have you had much experience in water supply construction? Yes. I have been employed in all kinds of work in the Department now for some seventeen or eighteen years.

524. And you are pretty well read up in regard to water supply? Yes.

525. Mr. Bear seemed to think that an open channel was undesirable on account of its liability to destruction by an earthquake or tornado, or something of that kind? I think a canal would be quite as stable a structure as would a pipe-line to resist an earthquake shock, and I am sure that it would have a far greater life than would a pipe.

526. *Mr. Hoskins.*] But do you think a canal would be as effective as a pipe in retaining the water from leakage;—supposing the existing canal were raised 2 feet, do you think it would be as effective in retaining water in all kinds of weather, and especially during the dry weather we experience in summer time, as would a pipe-line? I think so, especially with the repairs which Mr. Darley proposes to effect.

527. *Mr. Humphery.*] I should be glad if you would explain the method of calculation by which it is shown in the departmental evidence that a larger quantity of water would be delivered by the duplication of a 6-foot pipe from the end of the canal than would be delivered by a 6-foot pipe direct from Prospect to Potts' Hill, covering the whole length? The discharge in the canal when the sides are raised 2 feet would be approximately 54,000,000 gallons per diem. The discharge of the 6-foot pipes from the pipe-head basin into Potts' Hill at the 174-foot level would be about 47,000,000 gallons per diem. The discharge through a 6-foot pipe direct from Prospect to Potts' Hill to 174-foot level would be, if the Prospect reservoir were full, about 42,000,000 gallons; but if the Prospect reservoir had fallen to the level at which it stood during the recent drought the discharge would be only 33,000,000 gallons.

528. What is the present discharge from the 6-foot pipe from the end of the canal to Potts' Hill? I believe it is some 18,000,000 or 20,000,000 gallons per diem.

529. Will you explain how it will happen that by duplicating the 6-foot pipe-line you will get a discharge of 47,000,000 gallons? Because we raise the canal at the upper end of the pipe-line 2 feet, and there will be greater pressure; a greater quantity of water would be forced through the pipes.

530. That is the way in which you explain that by duplicating the pipe-line you would have a discharge of 47,000,000 gallons per diem, as opposed to a discharge of 42,000,000 gallons per diem if you had a pipe direct from Prospect to Potts' Hill? That is so.

PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS.

Duplicate Main from Prospect to Potts' Hill.

APPENDIX.

A.

[To Evidence of J. M. Smail.]

ALLEGED DEFICIENT WATER PRESSURE.

Metropolitan Board of Water and Sewerage,
Engineer's Department, 28 May, 1897.

Dear Sir,

In reference to inquiry on the part of the Committee *re* deficient pressure in Macquarie-street, opposite Parliament House, I wish to state that this street is at present supplied by a new 6-inch high-level main on each footpath, and a 12-inch low-level main in roadway.

The high-level mains would be of use for fire purposes on points of high elevation, although a copious supply could be obtained from the low-level main for lower levels.

The high-level mains are supplied from an old 12-inch main which has been down about forty years, and in its present state would not in all probability be equal to an 8-inch main.

In March, 1897, the Board decided to lay a new 15-inch main in lieu of the old 12-inch as far as King and Macquarie streets, connecting up the 6-inch high-level mains before referred to, and a 12-inch for supply of the western parts of the city; this work was initiated without any reference from the Fire Brigade Board. The order for the pipes has been issued, and work will be commenced without unnecessary delay.

With regard to existing conditions the pressure off the high-level at 8·45 a.m., was 38 to 41 lb.—taking pressure at 40 lb. to the square inch would be equal to a column of water 92 feet high, which is considerably higher than present buildings, and when new buildings are erected the new service will be equal to any fire emergency.

With regard to the water supply at Lands and Survey Office being off two different services—low and high-level—I find on inquiry that the older or front portion is supplied off the low-level, and the rear or newer portion off the high-level service. There is, however, a dividing valve between the two services, which, on opening, admits of high-level water being available for the whole building in case of fire; this arrangement was made to avoid inconvenience of leakage from valves in the old building when connected to high-level service. It will be seen, therefore, that with the opening of one valve the whole service can be supplied with high-pressure water.

I wish to further point out that the city turncocks are in direct communication with the fire brigades, and all outlying turncocks are connected by telephone, so that on the outbreak of a fire they are on the spot to manipulate the valves so as to concentrate the pressure at the place of fire.

The Board does all in its power to improve the service, not only of the city, but suburbs, in view of the large interests at stake in case of fire, and any reasonable representation to them is always carefully considered.

Yours, &c.,
J. M. SMAIL,
Chief Engineer.

The Secretary, Parliamentary Standing Committee on Public Works.

[Two plans.]

Sydney: William Applegate Gullick, Government Printer.—1897.

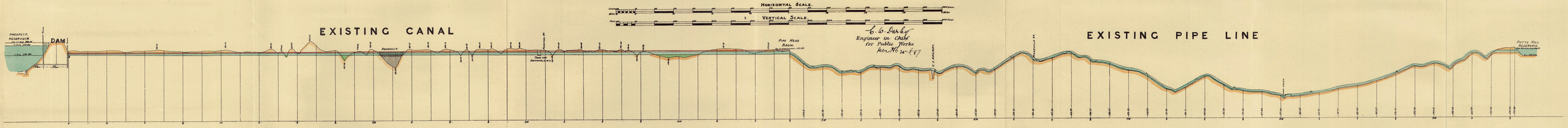
SYDNEY WATER SUPPLY

PLAN SHEWING

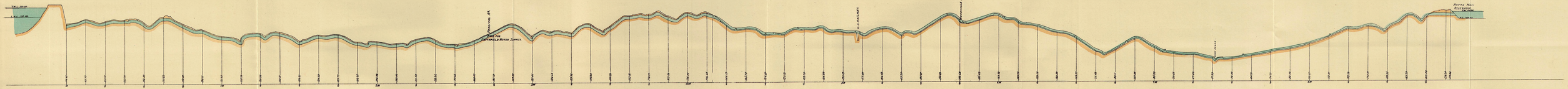
PROPOSED IMPROVEMENTS BETWEEN PROSPECT & POTTS HILL



LONGITUDINAL SECTIONS

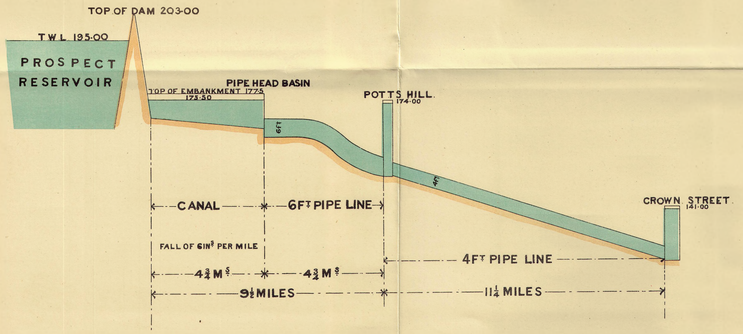


G. G. Darley
Engineer in Chief
for Public Works
Jan. 26th 1897



DIAGRAM

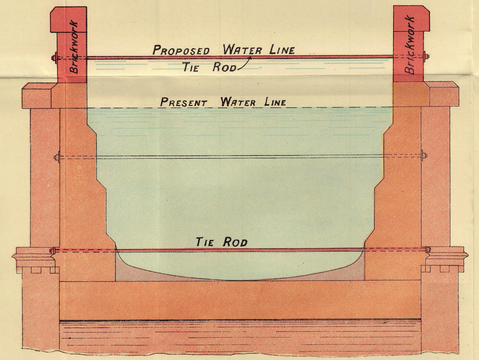
SHEWING EXISTING ARRANGEMENTS

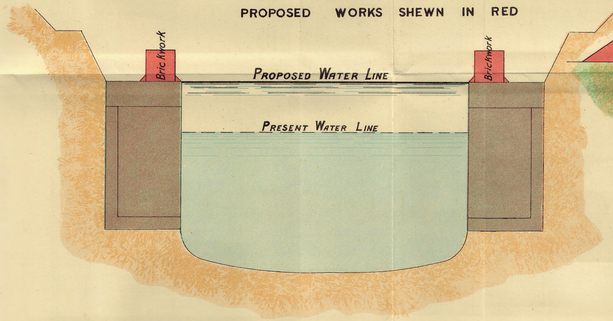


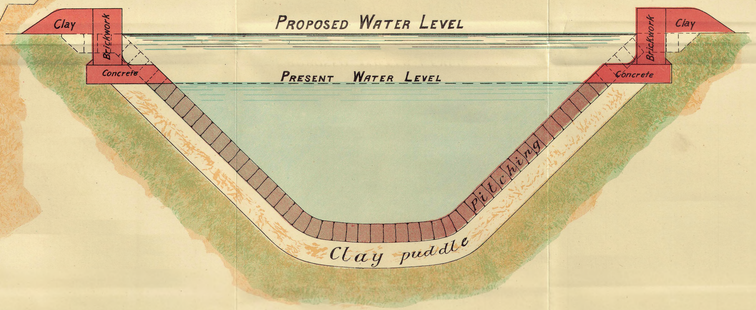
TYPE SECTIONS OF CANAL

SCALE.

PROPOSED WORKS SHEWN IN RED







1897.

LEGISLATIVE ASSEMBLY.

NEW SOUTH WALES.

REPORT

OF THE

ROYAL COMMISSION

OF INQUIRY INTO THE MANAGEMENT OF

THE HUNTER DISTRICT WATER SUPPLY AND SEWERAGE BOARD;

TOGETHER WITH

MINUTES OF PROCEEDINGS, EVIDENCE,

AND APPENDICES.

Printed under No. 24 Report from Printing Committee, 2 December, 1897.

SYDNEY: WILLIAM APPLEGATE GULLICK, GOVERNMENT PRINTER.

1897.

*279—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—

JOSEPH BARLING, Esquire, Chairman of the Public Service Board, and one of Our Justices of the Peace of Our Colony of New South Wales, Associate of the Institution of Civil Engineers;

GEORGE ALEXANDER WILSON, Esquire, a Member of the Public Service Board, and one of Our Justices of the Peace of Our said Colony; and

JAMES POWELL, Esquire, Deputy Member of the Public Service Board, and one of Our Justices of the Peace of Our said Colony,—

Greeting:—

KNOW ye, That We, reposing great trust and confidence in your ability, zeal, industry, discretion, and integrity, do, by these presents, authorise and appoint you, or any two of you, as hereinafter mentioned, to make a diligent and full inquiry into the management of the Hunter District Water Supply and Sewerage Board, and to report whether, and, if so, by what means, that Department can be placed upon a more efficient and economical basis: And We do, by these presents, grant to you, or any two 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 Chief Secretary, under your or any two of your hands and seals, what you shall find touching the premises: And We hereby command the said Hunter District Water Supply and Sewerage Board, and all persons employed by them, and 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 JOSEPH BARLING, Esquire, 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 said Colony of New South Wales to be hereunto affixed.

Witness Our Right Trusty and Well-beloved Cousin, HENRY ROBERT, VISCOUNT HAMPDEN, 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-second day of May, in the year of Our Lord one thousand eight hundred and ninety-seven, and in the sixtieth year of Our Reign.

(L.S.) HAMPDEN.

By His Excellency's Command,
JAMES N. BRUNKER.

Entered on Record by me, in REGISTER OF PATENTS No. 18, page 427, this twenty-sixth day of May, one thousand eight hundred and ninety-seven.

For the Colonial Secretary and Registrar of Records,
CRITCHETT WALKER,
Principal Under Secretary.

ROYAL COMMISSION OF INQUIRY INTO THE MANAGEMENT OF THE HUNTER DISTRICT WATER SUPPLY AND SEWERAGE BOARD.

WHEREAS it is necessary to extend the time within which the Commissioners are to make their report in the above matter: Now, therefore, I do hereby, with the advice of the Executive Council, extend the time within which the said Commissioners are to make such report for a period of three months,—to take effect from the 22nd instant.

Given under my hand, at Government House, Sydney, this tenth day of August, one thousand eight hundred and ninety-seven.

By Deputation from His Excellency,
FRED. M. DARLEY,
Lieutenant-Governor.

By His Excellency's Command,
JAMES N. BRUNKER.

ROYAL COMMISSION OF INQUIRY INTO THE MANAGEMENT OF THE HUNTER DISTRICT WATER SUPPLY AND SEWERAGE BOARD.

MINUTES OF PROCEEDINGS.

21 Aug., 1897. THE first meeting of the Royal Commission of Inquiry into the management of the Hunter District Water Supply and Sewerage Board was held at the offices of that Board, Newcastle, at 10·10 a.m., on Saturday, 21st August, 1897.

Present :—Mr. Joseph Barling, J.P., President, and Mr. James Powell, J.P.

The President announced that Mr. A. F. Basset Hull had been appointed Secretary to the Commission.

The President called upon the Secretary to read the Commission under which they were to act, together with the instrument extending the time within which the Commissioners are to make their report.

The Secretary read the Commission appointing and authorising the Commissioners to make a diligent and full inquiry into the management of the Hunter District Water Supply and Sewerage Board, and to report whether, and, if so, by what means, that Department can be placed upon a more efficient and economical basis. The Commission was dated the 22nd May, 1897. The instrument extending the time within which the Commissioners are to make their report in the above matter to the 22nd November, 1897, was dated 10th August, 1897.

The following witnesses were sworn and examined :—

Henry Deane Walsh, President of the Hunter District Water Supply and Sewerage Board, and

Alfred Ernest Fry, Secretary and Accountant to the Hunter District Water Supply and Sewerage Board.

The Commissioners then inspected the offices of the Board, and subsequently visited the Walka pumping station, near West Maitland, and the offices of the Board at West Maitland.

The Commission, at 5 p.m., adjourned *sine die*.

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20 Oct., 1897 The second meeting of the Commission was held at the offices of the Public Service Board, Sydney, at 10 a.m. on Wednesday, 20th October, 1897.

Present :—Mr. Joseph Barling, President, and Messrs. George Alexander Wilson and James Powell.

Joseph Davis, Engineer-in-Chief for Sewerage Construction, Public Works Department, was sworn and examined.

The Commission, at 11 a.m., adjourned *sine die*.

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5 Nov., 1897. The third meeting of the Commission was held at the offices of the Hunter District Water Supply and Sewerage Board, Newcastle, at 9·45 a.m. on Friday, 5th November, 1897.

Present :—Mr. Joseph Barling, President, and Mr. James Powell.

Henry Deane Walsh, President, and Alfred Ernest Fry, Secretary, of the Hunter District Water Supply and Sewerage Board were further examined.

The following witnesses were sworn and examined :—

Archibald Gardiner, Vice-President of the Hunter District Water Supply and Sewerage Board.

Joseph William Birkenhead, Municipal Member of the said Board, representing East Maitland, West Maitland, and Morpeth.

Joseph Brown Barclay, Municipal Member of the said Board, representing the suburban municipalities.

John Ewing, Official Member of the said Board ; and

Joshua Binnington Henson, Engineer to the said Board.

With the consent of the Commissioners the evidence given on the 21st August, 1897, by Henry Deane Walsh and Alfred Ernest Fry, was amended in certain particulars.

The Commission, at 9 p.m., adjourned *sine die*.

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18 Nov., 1897. The fourth meeting of the Commission was held at the offices of the Public Service Board, Sydney at 3 p.m. on Thursday, 18th November, 1897.

Present :—Mr. Joseph Barling, President, and Messrs. G. A. Wilson and James Powell.

The minutes of the three previous meetings were read and confirmed.

Walter Liberty Vernon, Government Architect, was sworn and examined.

The Commissioners then proceeded to consider their report.

The Commission, at 4·45 p.m., adjourned until Monday, 22nd November.

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22 Nov., 1897. The fifth and final meeting of the Commission was held at the offices of the Public Service Board, Sydney, at 4 p.m. on Monday, 22nd November, 1897.

Present :—Mr. Joseph Barling, President, and Messrs. G. A. Wilson and James Powell.

The minutes of the previous meeting were read and confirmed.

Alfred Ernest Fry, Secretary to the Hunter District Water Supply and Sewerage Board, was further examined.

The Commissioners then proceeded to further consider their report.

The report was drawn up, finally approved, and ordered to be transmitted to the Honorable the Chief Secretary.

The minutes of the meeting having been read and confirmed, the President declared the Commission closed.

ROYAL COMMISSION OF INQUIRY INTO THE HUNTER DISTRICT WATER SUPPLY AND SEWERAGE BOARD.

REPORT.

To His Excellency the Right Honorable Henry Robert, Viscount Hampden, Governor and Commander-in-Chief of the Colony of New South Wales and its Dependencies.

MAY IT PLEASE YOUR EXCELLENCY,—

We, the Members of the Royal Commission appointed by your Excellency on the 22nd May, 1897, to make a diligent and full inquiry into the management of the Hunter District Water Supply and Sewerage Board, and to report whether, and if so, by what means, that Department can be placed upon a more efficient and economical basis, have the honor to submit the following Report :—

Owing to our attention being peremptorily demanded by several other urgent matters, we were unable to commence our inquiry until the period defined by your Excellency's Commission had almost expired, and it therefore became necessary to request an extension of the time granted within which to make our report, and your Excellency was pleased, on the 10th of August, to grant an extension to the 22nd November, 1897.

Our inquiry commenced on the 21st August, 1897. Five meetings have been held, and nine witnesses examined. Several visits have been made by us, together or separately, to the offices of the Board at Newcastle, and we have also visited the branch office at West Maitland and the Walka pumping station, with the object of acquainting ourselves, as far as practicable, with the working of the Department and the system of water supply under its control. We have much pleasure in acknowledging the willing assistance afforded to us in our investigations by the President and Members of the Board, as well as by the Secretary and the principal officers of the staff.

ORIGIN AND OPERATIONS OF THE BOARD.

The following history of the origin and description of the works controlled by the Board is extracted from the Report of the Public Works Department for 1896 :—

The Board of Water Supply and Sewerage for the District of the Lower Hunter was established in March, 1892, under the Act 55 Vic. No. 27. The Board took over the control of the water supply on the 1st July, 1892.

The supply of water for the Hunter District Water-works is taken from the Hunter River at a point about a mile and a half up stream from Belmore Bridge, West Maitland. All the water used is pumped. At the pumping station are a settling tank of 1,390,500 gallons capacity, which receives the water pumped from the river ; four filter-beds, 100 x 100 ft. each ; a clear-water tank of 589,500 gallons capacity ; and a storage reservoir of 172,408,100 gallons available capacity. The latter has been formed by constructing an earthen embankment with puddle core across an old lagoon. It contains a reserve supply of clear water which is resorted to when the river water is turbid, and is replenished by rainfall on its catchment area of 200 acres, and by water pumped up from the river. Water is pumped into the settling tank, from which it descends to the filter-bed ; the filtered water is collected in the clear-water tanks.

The

The pumping plant consists of three independent Woolf compound beam pumping engines of about 150-horse power each. Each engine works two main pumps of the bucket and plunger type, one on each side of the beam centre. Two engines are designed to force water to the summit reservoirs; the third to raise water from the river to the storage reservoir, as required The boiler-house contains five 50-horse power Lancashire boilers, two of which ordinarily supply sufficient steam for the engines.

The filtered water is pumped from the clear-water tank into two summit reservoirs—one at East Maitland and one at Buttai, which is on the top of a range about 5½ miles distant from the pumps. East Maitland reservoir is supplied through a 10-inch rising main, and has a capacity of 463,430 gallons; it commands East Maitland, West Maitland, Morpeth, and neighbouring places. Buttai reservoir is supplied through a 15-inch rising main, and has a capacity of 1,051,010 gallons. The district commanded comprises the following places: —

City of Newcastle.	Waratah.	Lambton.
Carrington.	Merewether.	Wallsend.
Wickham.	Adamstown.	Plattsburg.
Hamilton.	New Lambton.	Minmi.

There are six district reservoirs which are supplied by gravitation from Buttai reservoir, and receive the water for distribution; their location and respective capacities are as follows:—

Minmi	62,209 gallons.		Hamilton ...	402,909 gallons.	
Wallsend ...	452,472	,,	Newcastle ...	523,613	,,
Lambton... ...	402,610	,,	Obelisk Hill ...	137,125	,,

The gravitation main from Buttai reservoir to Newcastle is 15 inches diameter. On the hill at Newcastle there is a high-level tank, which has a capicity of 20,000; it is supplied with water by a small duplex pumping engine placed on the roof of Newcastle reservoir.

The works, as described above, were constructed before the Hunter District Water Supply and Sewerage Board took control on the 1st July, 1892. At that date the mileage of reticulation water-mains laid in the Maitland District was 30 miles 1,599 yards; and in the Newcastle District, 73 miles 1,603 yards—together making a total of 105 miles 1,442 yards. The reticulation of the City of Newcastle was carried out by the Municipal Council; with this exception the water-works were constructed by the Public Works Department.

At the inception of the Board, the number of assessments for water rates was 10,965, representing an approximate population of 54,825 persons contiguous to the water-mains; the total number of houses actually connected to the mains was 3,018; the estimated number of inhabitants supplied being 15,090. The total population in Maitland and Newcastle districts, according to the 1891 census, was 61,000; many of these, however, resided in houses beyond the reach of the water-mains.

The general management of the whole works, except the Newcastle reticulation, which was in the care of the City Council, was conducted by officers of the Harbours and Rivers Branch of the Public Works Department in conjunction with their other duties, and on the transfer of the works to the Board, officers were appointed to take over the water-works duties.

Under the 4th section of the Hunter District Water Supply and Sewerage Act of 1892, the Minister took over the Newcastle reticulation, the cost of which, amounting to £13,744, forms part of the capital debt of the Board.

From the date upon which the Board took control (1st July, 1892), up to the 30th September, 1897, new water-mains have been laid to the extent of 29 miles 675 yards; the houses connected to the mains number 4,034, estimated to contain 20,170 inhabitants; the respective totals at the commencement being thus increased to 135 miles 375 yards water-main, 7,052 houses connected, and 35,260 persons supplied. In addition to this the Department of Public Works has constructed a duplicate suction main from the river to Walka pumping station, and a duplicate rising main from Walka to Buttai, at a cost of about £25,000.

The following table shows the total water pumped into the mains, and coal used at the Walka pumping station, during each full period of twelve months since the Board took control:—

	Water pumped.	Coal used.
Period ending 30 June, 1893	164,616,850 gal.	1,009 tons.
,, ,, 1894	152,849,650 ,,	1,055 ,,
,, ,, 1895	189,084,003 ,,	1,268½ ,,
,, ,, 1896	222,062,466 ,,	1,466 ,,
,, ,, 1897	266,979,523 ,,	1,650½ ,,

Constitution and Duties of the Board.

The Board consists of seven members, three of whom are appointed by the Governor, and designated "Official Members," one being appointed President. The other four are elected by Municipal Councils, and are designated "Municipal Members." The Municipal Members are chosen as follows:—One is elected by the Municipal Council of the City of Newcastle, one by the Councils of East and West Maitland and Morpeth, and two by the Councils of the Boroughs and Municipal Districts in the immediate vicinity of Newcastle.

The

The Members of the Board hold office for four years. The President receives a salary of £100 per annum, and the other Members are entitled to receive a sum not exceeding £100 per annum each, which is paid in the form of a fee of £2 for each meeting of the Board at which they are respectively present. The annual cost of the Board in salaries and fees, therefore, may reach the sum of £700 per annum. The amount expended during the year ending 30th June, 1897, was £648, and the total cost since its inception in July, 1892, up to the 30th June, 1897, has amounted to the sum of £4,012.

A meeting of the Board is held once a week, and lasts, on the average, about an hour and three-quarters. The work performed includes correspondence, passing accounts, and other kindred matters, and appears to include much of the character of detail work which could be performed by officers of the staff.

Excess of Cost of Works over the Original Estimate.

The estimate upon which the works were originally undertaken was that of Mr. Clark, who, in his report dated 8th October, 1877, estimated that the works would cost £170,000 to provide for an estimated population of 35,000. The actual cost of the works up to the date when they were taken over by the Board, as shown in another portion of this report, amounted to £390,634, and very considerable dissatisfaction has been expressed in the matter of the difference between the original estimate and the actual cost.

In the first place, it is to be observed that the population now to be supplied with water is nearly double that upon which Mr. Clark based his estimate, the estimated population on 31st December, 1896, being 65,000. It has further been very clearly pointed out that most serious errors crept into Mr. Clark's estimate; for these errors the Department, upon which the task of carrying out the works devolved, cannot be held responsible.

In support of this view, it is only necessary to refer to the evidence given before the Select Committee on the Hunter District Water Supply and Sewerage Works on the 20th March, 1895. The then Under Secretary for Public Works, in the course of his evidence, produced and read the following minute of the Engineer-in-Chief for Harbours and Rivers (Mr. Darley) :—

The Walka reservoir dam was estimated to cost £7,801, and for three filter-beds, &c., £15,128, in all £22,929 ; but actually cost, complete, £65,058. In Mr. Clark's report it is given as follows :—Storage reservoir, containing 75,000 cubic yards, complete, with puddle wall, pitching surface of slopes, inlet, outlet, and waste weir, £7,801, or only 2s. 1d. per cubic yard on the bare quantity of filling. A most glaring mistake was obviously made here in both the quantities and prices. Mr. Clark allowed for no foundation to the embankment, which had to cross a lagoon with some 6 feet of soft mud overlaying sound bottom. I have compared a comparative section, which shows the embankment as drawn by Mr. Clark, and as carried out. This shows that coffer-dams had to be constructed in the first instance, to lay the site dry, and that an average depth of 6 feet of soft mud had then to be removed over the whole base of embankment at the centre. Mr. Clark estimated the cubic capacity of the embankment at 75,000 cubic yards, and, although his lines as to height and width were closely followed, the actual quantity of earth-puddle and stone required to make it up amounted to 177,494 cubic yards, or nearly two and a half times as much.

The inclusive price of 2s. 1d., set down to cover earth-puddle, pitching, inlet and outlet weir, &c., was wholly insufficient—the work could not be done in India, where men are paid 5d. per day, for this sum.

There was good competition for the contract, yet the prices of the lowest contractor were : For earth-work, 2s. 8d. per cubic yard ; puddle, 6s. 3d. and 6s. 6d. per cubic yard, according to depth ; stone pitching on slopes, 27s. per cubic yard ; excavating for seat of embankment, 3s. per cubic yard ; cost of coffer-dams, the necessity for which was wholly overlooked by Mr. Clark, £3,534.

Only three filter-beds were originally proposed ; four were constructed as absolutely necessary.

The service reservoirs were estimated to cost £10,879, but actually cost £35,664. The same that has been said about low prices for the embankment equally applies here, so far as one can judge. The reservoirs have, however, been made of larger capacity, to the extent of 1,000,000 gallons, or a total increase of one-third.

Mr. Clark put down for land, fencing, compensation, and houses for establishment, £5,128. The actual cost was £36,837, the land alone costing £31,558.

With regard to the engines, Mr. Clark proposed three rotative horizontal engines with horizontal pumps. Seeing the height which it was necessary to keep these engines over summer level—42 feet—it would have been impossible to adopt the horizontal type of pump, and I cannot understand how this fact was overlooked when proposing to adopt horizontal pumps, unless it was intended to place the engines and pumps below flood-level ; but this is open to too serious objections to be adopted on such an important water supply. The class of engines adopted were vertical beam engines of the most improved form, and are calculated to run a very long time at a low cost for maintenance. They are made of much larger capacity than originally proposed, and fortunately so, seeing how largely the population of the district has increased.

With regard to pipes and piping, Mr. Clark estimated for the trunk main from Maitland to Newcastle and branches to reservoirs only, and put it down at £94,657. This cost of this portion of the work was not exceeded, but no reticulation whatever was provided for.

The fact that a most serious error was then made, we believe, is now fully recognised. We took special pains to ascertain the views of the members of the Board upon this point. The Vice-President gave it as his opinion that no extravagant expenditure had been incurred, that the works were necessary, and the cost could not be considered excessive; but for eight years the works were not producing a proper revenue, during which period the interest on the amount expended was being capitalized, thus adding to the total cost.

Mr. Barclay, Municipal Member of the Board, in his evidence says :—

> The first estimate was absurd. I am not prepared to dispute the cost of the works, but the people were misled; they should have been informed by the Government, and then the scheme would not have attained such magnitude. The great cause of the dissatisfaction here is that the people are compelled to pay, and do not all use the water.

With regard to the complaint that the discrepancy was not made known to the ratepayers at the time, your Commissioners do not think that it is necessary to go into this aspect of the question, because it is abundantly evident that the Hunter district could not have subsisted without a water supply, and it is only necessary to read the accounts of the great distress existing when the population was not half as large as it is at present to substantiate the truth of this statement.

In his evidence given before the Select Committee previously referred to, Mr. Darley says (p. 8) :—

> During the years 1875, 1876, and 1877 there was a great dearth of water generally in country towns. In the mining districts the people were almost famishing for want of water. The residents of the townships of Wallsend, Lambton, and Minmi were depending on such water as they could get from the tank of the locomotive on each trip it made to the colliery to take away a coal train. The drivers used to fill the tanks, and the population turned out with buckets and cans. The drivers were authorised to give the women such water as they could spare from the tanks, and many a time I have seen fifty or sixty women alongside the locomotive, and a great many had to go away disappointed, without any water. The people in the township of Wallsend, to my knowledge, were almost absolutely dependent on what water could be spared from the tank of the locomotive engine on each trip to the colliery.

Capital Debt of the Board.

The capital debt for which the Board was liable on the 30th June, 1897, is estimated at £516,772, made up as follows :—

Permanent works to 30th June, 1892		£126,285
Renewable works „ „		264,349
		£390,634
Capitalized interest „ „	£91,478	
Less revenue received	39,240	
		52,238
Estimated debt at 30th June, 1892		£442,872
Additions since :—		
Works carried out by Board	£22,200	
New duplicate suction and rising mains	25,000	
Deficiency on the five years' working since the inception of the Board (capitalized under the amending Act) say ...	26,700	
		73,900
		£516,772

The amount required to meet obligations under the Act of 1892, for the year ending 30th June, 1897, is shown to be as follows :—

Interest at 3½ per cent. on £516,772	£18,087
Management expenses	4,383
Working expenses	4,211
Maintenance (actual expenditure only)	409
	£27,090

The revenue for the year ending 30th June, 1897, based on the levying of the maximum rate of 1s. in the £, amounted to £22,518, thus showing a deficiency of £4,572, which would have been still further increased if, instead of actual expenditure on maintenance, proper instalments had been paid to a sinking fund for the repair and reconstruction of renewable works,—a principle fully dealt with by the amending Act.

Under the Act of 1892 the rating powers were extremely defective. In consequence of a judgment given by the Privy Council, on an appeal from the decision of the Supreme Court of New South Wales in the case of the Hunter District Water Supply and Sewerage Board *v.* the Wallsend Coal Company (Limited), the

the Board were not allowed to levy upon property situated more than 60 yards from any main. The effect of this decision was to entail a considerable loss of anticipated revenue. To remedy this an amending Act has been passed within the last week, under which power is given to levy a rate on all property situated within 440 yards of any water-pipe. This extension of the ratable area will give a substantial increase to the revenue.

The provision in the Act of 1892 for the redemption of the cost of permanent works in 100 years has been abolished by the amending Act, which now provides that a sinking fund shall be established for the purpose of maintaining those portions of the works which may be termed renewable. This fund is not established for the purpose of extinguishing the capital debt, but to form a reserve fund from which the cost of all renewals and repairs will be met, thus keeping the works in a state of permanent efficiency. We think that this is a sound principle, and fairly meets the necessities of the case. The Board propose to establish the sinking fund on a life basis of sixty years for the renewable works, but the instalments in respect of the original works will be based on a term of forty-eight years, twelve years' life having practically expired during the time the works were under the control of the Government.

We obtained from the Secretary of the Board an estimate of the revenue likely to be obtained for the year ending 30th June, 1898, under the increased powers granted by the amending Act, and also of the estimated expenditure for the same period. The revenue is estimated at £25,340, and the expenditure at £29,019, thus showing a deficiency of £3,679.

From this it will be seen that even under the new arrangement the revenue will be insufficient to provide for interest on capital debt, management, and working expenses, which together amount to £26,587, excluding the possibility of providing for the establishment of a sinking fund. The Members of the Board therefore hope that the Government will make such a remission of the capital debt as will admit of the scheme being placed on a sound financial basis, so that the obligations of the amending Act may be met by the levying of a 1s. rate.

In order to accomplish this it has been pointed out to us by the Board that it will be necessary to write off the sum of £105,114, or 20·34 per cent. of the capital debt.

This principle has been adopted in regard to debts in connection with water-works in country towns, and amounts ranging from 2·5 per cent. to 64·81 per cent. have been written off the capital debt of such works.

The Secretary to the Board pointed out that this principle was laid down in a statement made by the then Under Secretary for Works to the Select Committee previously referred to, and Mr. Fry brought under the attention of your Commissioners the following statements made by that officer in reply to the question, "Do you not think the Government should forego half the amount of the excess expenditure over Mr. Clark's estimate?"

I do not think they should, because the balance would have to be found by the whole of the Colony for a work in which the bulk of the people have no interest whatever. But supposing that it were found that a rate of 1s. in the £ would not pay, then any expense beyond, the Government would of necessity have to bear; and that is exactly what has occurred in country towns. The principle the Department laid down in dealing with country towns is, that we should fix their debts at such an amount as would enable them to meet their obligations thereon by levying a rate of 1s. in the £. All country towns are paying 1s. in the £. The municipalities in the Hunter District are doing no more than that. They are practically on the same footing as the country towns.

The Members of the Hunter District Board therefore think that they have a good claim upon the Government for similar treatment.

We ascertained that when a deputation, consisting of the Members of the Hunter District Water Supply and Sewerage Board, waited on the Minister for Works on the 26th August, 1897, Mr. Secretary Young promised the members of that deputation that if it were found that the amending Bill did not give sufficient additional revenue, he would be disposed to treat them as fairly and as generously as he had treated any municipality in the country. The President of the Board has, however, pointed out that before they can commence making an assessment under the amending Act, it will be necessary to fix the amount of capital debt, as they must be in possession of definite data with regard to the amount of capital debt before they can strike a rate. Mr.

Mr. Walsh quoted the following section of the new Act in support of his contention :—

Sec. 36. (I) As soon as practicable after the commencement of this Act, the Minister shall cause statements to be prepared and furnished to the Board showing the respective amounts expended up to the thirtieth day of June, one thousand eight hundred and ninety-seven, on all works constructed by or vested in the Board—

(*a*) in the purchase or acquisition of land and on permanent or other works which do not require maintenance or reconstruction (hereinafter called "permanent works") ;

(*b*) on works which require maintenance or reconstruction (hereinafter called "renewable works") ;

with interest from the respective days of the expenditure to the thirtieth day of June, one thousand eight hundred and ninety-seven, at the rate of three and a half per centum per annum.

(II) On receipt of the said statements the Board may report to the Minister making such recommendations as may be thought fit.

(III) The Minister shall consider the said report, and shall finally determine the respective amounts, and the classification of the expenditure, and after deducting from the total amount thereof the difference between the revenue and expenditure of the Board for the same period determined as hereinafter provided shall notify the same in the *Gazette*, and in one or more local newspapers circulating in some water or sewerage district.

(IV) Provided that the Governor may make such partial remission of or deductions from the amounts expended as he may think just under any special circumstances.

It seems clear from these statements, to which apparently no exception can be taken, that it will be necessary to write down the capital debt by the amount mentioned, viz., £105,114. If, however, our recommendations are adopted, the savings, as hereinafter shown, will amount to £724 per annum. This will reduce the amount required to be written off to £84,429.

The question presents itself as to whether the great progress which must be made by the Hunter District in the future, will not result in a few years in so increasing the revenue of the Board as to enable the whole charges on the debt to be easily met. The Hunter District probably stands in a position unique in its powers of expansion, on account of its inexhaustible mineral wealth. This state of affairs can hardly be said to hold good in other places which have only pastoral and agricultural interests to support them. However valuable these may be, they are not capable of such expansion as coal-mining. To this view, however, the various witnesses have opposed the argument that the expansion of revenue owing the increased population of the district will be fully counterbalanced by the additional expenditure necessary to meet their expanding wants. They urge that, in a short time, a duplicate main will be required to supply the growing population in the district Buttai to Newcastle, which may be estimated to cost £90,000, and they further point out that a period of twelve years was lost, owing to the omission of the Government to provide the legislation necessary to permit of the water-works being administered to the fullest advantage. The consequences of this omission, they hold, should not be charged to the ratepayers of the Hunter District. They took over the works when twelve years of their life had already passed, and during which period nothing like the revenue due had been obtained, the difference being added to the capital cost of the works.

Your Commissioners, after careful consideration of the whole circumstances, think that is beyond their province to recommend this remission; but merely state the facts of the case, and suggest that it is desirable that the Government should arrive at a determination as early as possible.

Reorganisation of the Board.

We directed our attention very particularly to the question as to what reduction, if any, could be made in the expenses of the Board itself.

The Hunter District Board consists of the same number as the present Metropolitan Board, viz., seven members. In the case of the Metropolitan District, Sydney proper elects four, and the municipalities elect two members. The interests of Sydney and suburbs are almost identical, while in the case of the Hunter District widely differing interests exist. In Newcastle, the mercantile interests preponderate; the municipalities surrounding Newcastle represent the mining interest, while the Maitlands and Morpeth represent the agricultural interest. Hence it is more difficult to reconcile the councils to the principle of limited representation. It has been

been strongly urged by the Members of the Board that while such municipalities or groups of municipalities have their own representatives on the Board, they feel satisfied that their separate interests are sufficiently safeguarded; and that if such representation were to be narrowed down the result would undoubtedly be to cause a feeling of dissatisfaction and unrest.

We see no valid reason for disturbing existing arrangements with regard to the office of President, which is held by Mr. Walsh in addition to his position as District Engineer of the Public Works Department. While we deemed it necessary in the interests of proper management to recommend that the office of President of the Metropolitan Board should be filled by an officer who could devote his undivided energies to the administration of his Department, a similar recommendation is not considered requisite in the case of the Hunter District Board. The capital administered by the Metropolitan Board amounts to no less a sum than £6,262,670; whereas the capital of the Hunter District Board is less than one-twelfth of that amount.

We have already adverted to the somewhat different circumstances which obtain as regards the Metropolitan and Hunter District Boards respectively, inasmuch as the interests are of a more diverse character in the latter case. It is clear, however, that, except as a matter of sentiment, so large a Board is quite unnecessary. Your Commissioners think that three members would be ample, viz., two Municipal representatives, and one, the President, nominated by the Government, and to remain a permanent official, subject to the usual condition as to good behaviour. Objection has been taken that the balance of the Board would be disturbed by such reduction. Your Commissioners, however, consider that nothing of the kind would take place. The present arrangement gives a balance of one against the Minister, and the suggested rearrangement gives a similar balance. The Minister, however, under the Act of 1892, holds a very strong position, and which is not disturbed by the amending Act, section 32 of the former Act providing that,—

> The Minister may disallow any act, matter, or thing done or commenced by the Board (not being a contract lawfully entered into by such Board for the execution of any work authorised by this Act).

Under section 36, by-laws must be approved by the Governor, and laid before Parliament, and shall not have any force or effect until published in the *Gazette*, and the salaries of the Board and staff can only be paid after sanction by Parliament, which means that the Minister will in any case hold the key of the whole situation. This he undoubtedly should do, in view of the fact that the Government is responsible for the whole of the debt.

This matter of reduction in the number of representatives your Commissioners pressed very closely upon both the municipal and official members of the Board. The Vice-President was averse from any reduction, either in the number of representatives, or in the fees paid for their services, and Mr. Birkenhead, one of the municipal members, was of opinion that if any reduction were to be made it should be in the fees rather than in the number of representatives. Mr. Barclay, another of the municipal members, expressed the opinion that the fees could be reduced to one guinea for each attendance, and the work of the Board could be performed at meetings held fortnightly, instead of weekly, as at present. Mr. Ewing, one of the official members, also considered that the fees might be reduced, but deprecated any reduction in the number of representatives. The President considered that, apart from the question of representation, the work of the Board could be efficiently carried out by three members—the President and two municipal members—the latter being remunerated at the rate of £75 per annum each. He also considered that the Board should only meet when necessary.

It is evident, therefore, that the testimony of the Board preponderates in the direction of reduction in the expenditure. If the sentiment of the people is really as strong as represented, we do not desire to run counter to that feeling, but do strongly recommend a reduction of the expenditure in connection with the Board. We would rather see a smaller number with a remuneration of £75 per annum than a larger number with a less remuneration, but if the larger number is insisted upon, and conceded, we are of opinion that the work of the Board should be performed at meetings held once a fortnight, and recommend the adoption of that course, and that the remuneration of the members, excepting the President, be fixed at £1 per sitting. The expenses in this case would be reduced from £700 to £256 per annum. THE

THE STAFF.

So far as the rather limited time at our disposal permitted, we carefully examined the work of the officers of the Department, and received great assistance in our investigations from the members of the board and the principal officers of the staff.

We were aware that very strong comments have been made in the district on what has been designated the extravagant scale upon which the staff has been constructed. Some countenance has been lent to this view of the case by the statement that to obtain a revenue of £22,500, no less a sum than £8,600 has been required; in other words, that 38·22 per cent. of the earnings, has been required to produce that revenue. This view of the case was shared by several of the present members of the Board prior to their election. One member, Mr. Barclay, was at one time very emphatic in his condemnation of this state of affairs. He says:—

> One great point the public are very anxious about is with regard to the number employed by the Board on the staff.
>
> There is a great impression outside that we are overmanned. I might say at once that for years I myself held that impression, but since I became a member of the Board I have altered that opinion considerably, because, so far as I have been able to judge, I see that everyone is fully employed.

Other members expressed somewhat similar views, but it is instructive to know that on their becoming members these views have been altogether abandoned, or very considerably modified. The President is very clear and emphatic in his view of the case. He points out that the real cost of the management is not £8,600, but £4,380, or 19·46 per cent. of the revenue, and that the balance, or 18·76 per cent. represents the working expenses, or, in other words, the cost of bringing the water to the taps, and your Commissioners are bound to admit that this aspect of the case is the correct one.

The question still remained, however, as to whether the expenses of management could not be appreciably reduced, and in order to test this question we spent as much time as was at our disposal in examining the work of a number of the staff officers.

One fact stands out very prominently, and that is that the junior members are paid very small salaries. For instance, the cashier at the head office receives £90 per annum. As £20,000 to £22,000 pass through his hands in the course of the year, it will probably be conceded that the remuneration is inadequate to the duties and responsibilities of the position. The cashier at the Maitland branch receives £65 per annum, and there are five other junior officers receiving from £52 to £60 per annum. These officers have all been from four to five years in the Department, and it must be admitted that, if they are fully employed, their salaries are very small.

Your Commissioners carefully considered whether it were possible to effect a reduction in the number of the staff, accompanied by a redistribution of the duties, and an increase of certain salaries. Into this aspect of the case they went very fully, and pressed the point on the President and Secretary, as well as on several members of the Board. The unanimous testimony, however, was that the staff could not be safely reduced, and in support of this contention they quoted the reports of the Treasury Inspectors who from time to time examined their books. These gentlemen pointed out that even an addition to the staff was required in order to carry out what they considered an efficient system of check.

Your Commissioners, after carefully examining into the question, are compelled to admit the soundness of these arguments. They were particularly impressed with the intelligent manner in which the Secretary, Mr. Fry, carries out his duties, and, agreeing with that officer, have come to the conclusion that the office is not overmanned.

In their report upon the Metropolitan Board your Commissioners said:—

> It may be asked whether so large a staff is really required. . . . . As compared with other establishments which conduct operations on an equal or even larger scale, the staff seems unusually large. It must, however, be taken into account that the work of the Board involves an immense amount of detail, arising partly from the requirements of the Acts. . . . The rates and accounts range from a few shillings up to many pounds, the smaller amounts, of course, largely preponderating, but the same process must be gone through with them as with the larger.

The same remarks hold good, even to a greater degree, in the case of the Hunter District Board.

We requested the President to furnish a schedule, showing what he would consider a fair adjustment of the staff salaries. This Mr. Walsh has done, and the schedule will be found amongst the appendices to this report. [*Vide Appendix J.*] We recommend that the salaries and allowances of the staff be revised and fixed in accordance with this schedule. The net savings resulting will amount to £130.

With regard to the principal reduction in salary shown—that of the chief clerk, Mr. O'Connor,—your Commissioners have reluctantly come to the conclusion that £200 per annum is sufficient remuneration for the duties that officer has to perform; at the same time they have to place on record that he has carried out his work in a satisfactory manner.

Control of Staff.

During the course of our inquiry, several of the members of the Board drew attention to the unanimous desire on the part of the staff to be placed under the control of the Public Service Board. The principal officers, on behalf of the others, also submitted the matter for our consideration. They point out that at present their scope is entirely limited to the Hunter District Board; that they are not "officers" within the meaning of the Public Service Act, and that the Public Service is closed to them. Your Commissioners have no desire to express an opinion on the subject, but merely draw attention to the request made.

Erection of New Offices.

With regard to further economy, when pressed on the subject, the President admitted that a saving could be effected by resumption of the present offices, or the erection of a new building. In the former case, he estimated that a saving of at least £50 per annum could be effected, while if new offices were erected on an available Government site, the saving would amount to £200 per annum.

Your Commissioners are not prepared to recommend the resumption of the present offices, but having taken the evidence of the Government Architect on the subject, recommend that a piece of Government land in the vicinity of the Custom House be selected as a most suitable site for the erection of new offices. This land at present produces no return to the Government, and the interest at $3\frac{1}{2}$ per cent. on £4,000, the estimated cost of the new buildings, and annual cost of repairs at $1\frac{1}{2}$ per cent., would together only amount to £200, as against £350 now paid for the rent of the present offices.

Sewerage.

It appears from the evidence of Mr. Davis that nothing has been done in regard to the sewerage of Newcastle, beyond the submission of two or three schemes, which, being unaccompanied by full surveys, will require thorough revision before they can be put into tangible shape. A detail survey has been made of West Maitland, and a scheme is now in preparation. Application has been made for the consideration of East Maitland in conjunction with this scheme, but a detail survey was considered unnecessary at the present stage. We were informed that it will be some months before any definite scheme can be formulated.

In the neighbourhood of Newcastle certain storm-water channels have been constructed at a cost of £39,434, and a further sum of £13,762 will be required for their completion. The work will be transferred to the Hunter District Board as soon as they have legislative power to levy a rate. At present they have no such power, and it appears that, in 1895, the Minister definitely promised that the operation of the betterment principle should be suspended for at least ten years, after which period, if the circumstances of the district would justify the imposition of the small extra tax which the application of that principle would involve, he considered it should be done.

With reference to the sewerage question, therefore, your Commissioners have no recommendations to make.

Details of Savings.

If our recommendations are adopted, the annual amounts saved will be as follows :—

	£
On Board fees	444
On Staff salaries, &c.	130
On rent of premises...	150
Total	£724

Summary of Recommendations.

In conclusion, we beg to sum up the recommendations made in this Report as follows :—

1. That the remuneration of the members of the Board be :—
   President, £100 per annum.
   Six members, each, £1 per sitting.
2. That the meetings of the Board be held fortnightly instead of weekly as at present.
3. That the salaries and allowances of the staff be revised and fixed in accordance with the Schedule submitted by the President of the Board. [*Vide Appendix J.*]
4. That a sum of £4,000 be placed upon the Estimates as soon as possible to provide for the erection of new offices for the Board in the shape of a wing to the Custom House, Newcastle, as shown in the plan annexed. [*Vide Appendix U.*]

We have the honor to be,

Your Excellency's most obedient Servants,

J. BARLING, (L.S.)
President.
G. A. WILSON. (L.S.)
JAMES POWELL. (L.S.)

A. F. Basset Hull,
Secretary.

Board's Offices, 50 Young-street,
Sydney, 22nd November, 1897.

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ROYAL COMMISSION OF INQUIRY INTO THE MANAGEMENT OF THE HUNTER DISTRICT WATER SUPPLY AND SEWERAGE BOARD.

MINUTES OF EVIDENCE.

SATURDAY, 21 *AUGUST*, 1897.

[*At the Hunter District Water Supply and Sewerage Board Offices, Newcastle.*]

Present:—
JOSEPH BARLING, Esq., President; and
JAMES POWELL, Esq.

Henry Deane Walsh, B.A., B.A.I., M. Inst. C.E., President of the Hunter District Water Supply and Sewerage Board, sworn, and examined:—

H. D. Walsh. 21 Aug., 1897.

1. *President.*] You are President of the Board? Yes. I have held that position for fourteen months. I succeeded Mr. Alexander Brown.
2. We have come to ask you to supply us with certain returns, and it is then our intention to come back and conclude the inquiry;—you will find here a list of the returns we require, which I shall be glad if you will cause to be furnished? I will have it attended to. [*Vide Appendices* A.–H].
3. Is there anything you would like to say? I might say that I have written a long minute in connection with increases to some of the junior officers. We have been here now as a Board for some time, and these clerks originally came in as cadets at about £25 per year. They have now had five years' service, and the increases have been very small. Some rose to £38, and some to £52, and we think they are entitled to a little more than they are getting. I have brought this matter before my Board on two or three occasions. The general opinion outside amongst the ratepayers is that the officers of the Board are overpaid, and no action our Board could take would remove that opinion, and therefore we hail with great satisfaction the fact that you have come up to put matters at rest.
4. From your knowledge of the requirements of your Department here, are you over-manned or fully-manned? I do not think we are over-manned. We have a very difficult Act to work. There are 12,000 notices to get out every half-year, and in a district like this people are very slow in paying, and that necessitates more notices and final notices. Another feature which involves a lot of clerical work is the "Deferred-payment System," whereby any ratepayer can arrange to have water laid on to his premises on a basis of quarterly instalments of 2s. 6d., or less.
5. You have 12,000 ratepayers? Yes; 12,000 rate-notices, and second and third notices as well.
6. So that your 12,000 will possibly go up to 17,000? Yes.
7. With reference to this deferred-payment system, is it largely availed of? Yes.
8. About how many? I can get the exact figures out for you. Then there is the meter-hire, too, which I will also get. The great majority of our ratepayers here are very small landholders, and instead of collecting £100 in four or five sums we have to collect it in fifty or sixty, which means a very much larger amount of work for the revenue we receive than would be the case with the Metropolitan Board.
9. Would it assist you if the law were altered so as to enable you to issue notices only once a year, with power to pay half-yearly? We would then have to have a large staff to get the notices out all at once, and probably in some parts of the year the work would be slack. The staff are now fully employed for the whole year, but if we threw the whole of the work into three or four months it would mean extra work for the time, and then slack work.
10. Can you remember what percentage was paid on capital? Three and a half per cent.
11. Does it now pay 3½ per cent? Our estimated revenue pays fully that, but we have not been able to get it all in.
12. Does your capital produce a return of 3½ per cent.? Hardly.
13. What would be the actual percentage of expenditure to the revenue? The percentage for collection and everything has been about 16 to 18 per cent. [*Vide Appendix* I.]
14. After making allowances for the collection of revenue and the working of the Department, is the net result 3½ per cent.? Hardly.
15. Would it produce over 3 per cent.? I think so under the new Act.
16. It does not yet; if it did, it would very nearly pay for itself? Yes.
17. How many members are there on the Board? Seven; four elected, and three nominated.
18. Do you think it necessary to have such a large Board? Apart from the question of representation, I think we could do with less.
19. How often do you attend? Once a week.
20. What is the annual cost? The members get £2 per sitting, not to exceed £100 per year.
21. How often do you sit, more than fifty times a year? Not very much more.
22. Is there sufficient business to occupy seven gentlemen once a week? I do not think there is.
23. What is the nature of your business? Correspondence, accounts, &c.; something similar to municipal council meetings.

H. D. Walsh. 21 Aug., 1897.

24. How long do your meetings last? About an hour and three-quarters.
25. What is the total cost of your Board? £700 per year.
26. Any travelling expenses? The Maitland members get their railway tickets.
27. The sum you mention includes your salary? Yes.
28. Are you paid by fees? No. By salary. £100 a year.
29. Do you see any advantage in having a large Board like you have? No; so far as the work of the Department is concerned, I think three members would do, and let them meet only when necessary.
30. After all, the ratepayers have to pay this expense. It is one element in keeping up the cost of the water supply to the ratepayers, viz., the very large Board that has been brought into existence to administer the Act. Your opinion is that it could be very much more economically managed with three members, to be summoned when required;—would they then be required to attend more than once a month? Yes. I think for a short time once a week, and we could then arrange to meet again when necessary.
31. Would you advocate a salary being paid them? Yes.
32. What would be a fair amount of remuneration for the members;—would £75 per year do for each of the three? The responsibilities and duties of position of President are worth more than that.
33. I do not refer to the President now, but to the other members, for I presume you meant two members beside the President? Yes; I think £75 per year for the two non-official members would be sufficient, and let the Board then meet at any time that can be arranged.
34. With regard to the staff;—you say you are not overmanned? Yes; we are not.
35. What is the annual cost of your staff? We have twenty-two on the professional and clerical staff, and the salaries amount to £3,444. [*Vide Appendix* H.]
36. That is inclusive of the £700 for the Board? Yes. The amount paid to the mechanical staff includes the value of their cottages and coal and water, which we allow. This amounts to £2,999 14s. This includes the engineer-in-charge at Walka, turncocks, &c.
37. So that the expenses come to £3,444 for the office staff, £2,999 14s., or call it £3,000, for the mechanical staff, or, roughly speaking, £6,500 per annum;—do you think that a fair proportion of expenditure? I think you will find the mechanical staff is worked as economically as possible. We have a very large water district, and every drop of water has to be pumped.
38. The expensive part of the establishment is the Board then? Yes. I think there might be a reduction in that without doing so much damage to the Department.
39. Would it do any damage at all, do you think? I think it can be worked as well.
40. Would it not be an improvement? Yes.
41. Would anyone suffer? I do not think so.
42. It could be worked with £250, as against £700, as now? Yes.
43. Is there anyone on the staff getting more than he ought to get, do you think? With the exception of the chief clerk, I do not think so.
44. Do you think then that he is overpaid? Yes; although I wish to say that he has carried out his duties satisfactorily.
45. Could you do without a chief clerk? I am not prepared to say that. When I took office I looked into the duties of each officer, and on examining the chief clerk's work I found that his duties were of a responsible nature. I should hesitate to abolish the position.
46. What salary do you think should be paid for the position of chief clerk? Taking the relative responsibilities of the higher officers and the salaries paid them, I think a fair salary for the position would be £200 per annum.
47. Some of the juniors are underpaid? Yes.
48. How many? There is Brooks, Newton, Watson, and Birkenhead. They entered the office at £25 a year, I think. We have two less officers now than when we commenced. One junior left us, and we did not appoint another one to take his place, and our revenue book-keeper resigned.
49. What are the salaries of the juniors—£52? Yes.
50. What do you think they should have? I have here a copy of a minute which I wrote to the Board on the subject, and, as it embraces pretty well everything, I will, with your permission, read it. (Papers H.D.W.S. and S. Bd., 97–58, of 1st March, 1897):—

"In submitting the secretary's minute of the 27th ultimo for the consideration of the Board, I have thought it well to go somewhat fully into the previous correspondence, in order that the members might be in a position to have the fullest information relative to the action taken by the Board from its inception.

"The first minute by the secretary in connection with the adjustment of salaries was received by the President on July 7th, 1893 (a year after the Board was constituted). This minute gave a detailed account of the duties of the staff, and recommended increases, to the total amount of £321, to fourteen officers. The Honorable Alexander Brown (the then President), in his minute on that paper, stated that he was—

'opposed to any increases of salaries just now, and the consideration of the subject may be postponed in the present depressed condition of affairs.'

And further on he states:—

'The juniors and one or two others who are poorly paid are deserving of consideration, which I am prepared to give at the right time.'

Subsequently the remuneration to the three cadets was increased from £26 to £38 per annum.

"On the 3rd July, 1894, the secretary again reported on the matter, and the President, in minuting the papers for the Board, stated that—

'Personally it would give me pleasure to adopt the secretary's recommendation *in globo*, but, as the depression is still over the land, I cannot recommend any increase to officers whose salaries are £150 per annum or over. I, however, recommend the Board to adopt a modification of the Secretary's suggestion with regard to salaries under £150.'

The Board, after much consideration, decided to increase the salaries of the cadets to £52 per annum, leaving the other increases to stand over until the advent of better times.

"The question of increases of salaries to the clerical staff was again brought forward on the 29th April, 1896. In the Secretary's minute to the President he stated that—

'In conformity with your wishes, I have confined my recommendations to officers receiving less than £150 per annum.'

"The

H. D. Walsh. 21 Aug., 1897.

"The increases then recommended amounted to £162, to twelve officers. The President, in submitting this report to the Board, concluded his minute thus—

'The sole reason why the recommendations have not been adopted has been the depressed condition of business, and the hope that the cloud might lift, so as to enable us to do what we must recognise as our duty, namely, to honestly deal with the labours of the Board's servants, and remunerate them in proportion to the duties they are called upon to discharge. The subordinates were engaged originally on very low salaries, and their remuneration fixed on a scale not at all commensurate with the work required of them. I have gone carefully over the various papers which have been submitted from time to time, and which, on perusal, speak for themselves, and I recommend for the consideration of the Board the increases as shown in the Secretary's minute of 29th instant.'

"The above opinion, given by a gentleman of such ability and well known commercial experience as that of the Honorable Alexander Brown, was backed up by most favourable reports on the work of the staff by the Examiners of Public Accounts, from which the following are extracts":—

"Mr. G. Brodie, in his report of 16th October, 1894, concludes his remarks on the efficient system of check, &c., thus:—

'The books of accounts as a whole have been excellently kept, and in few offices outside the metropolitan district have I observed a greater degree of care.'

"Mr. P. Williams, senior Inspector of Public Accounts, concludes his examination report in these terms—

'The systematic routine, the perfect discipline, and the great amount of work performed with regularity and promptitude by a comparatively small but efficient and industrious staff, reflects the highest credit on the Board's secretary and officers.'

"The Board, after careful consideration, unanimously adopted the President's recommendation, and the papers were forwarded to the Under Secretary for approval, but the Honorable the Minister for Works considered that the matter might well be left for the incoming Board to deal with."

"The secretary, in his minute, which is now placed before the Board for consideration, explains the reason why I have not asked the Board to deal with this matter at an earlier date. The total amount of increases now recommended by the secretary is £192 to thirteen officers, and the increases are practically the same as those approved by the former Board."

"The more intimate knowledge of the large amount of work to be done, and the efficient way it is carried out, which, as President, I necessarily now possess, confirms me in the opinion that I acted rightly when, as a member of the Board, I voted in favour of these increases last April. I feel sure that every member of the Board recognises the fact that the salaries now received by the officers recommended for increases are not commensurate with the work they perform."

"At the same time I know there is a strong impression, founded, I am convinced, upon unreliable information on, and the want of knowledge of, the amount of work necessary to carry out the provisions of the Act, amongst a large section of the community, that the Board's staff is overmanned and overpaid, and this impression will remain until some independent body makes an investigation into the working of the Department."

"I am of opinion that it would be more satisfactory to the Board, to the officers, and to the public, if such an investigation could be brought about at an early date."

"I therefore recommend, for the consideration of the Board, the advisableness of requesting the Honorable the Minister for Works to appoint a Royal Commission, similar to that now sitting in connection with the Metropolitan Board of Water Supply and Sewerage and the Marine Board."

"I feel confident that the result of such a Commission would be favourable to the officers, and would do away for all time with the impression that the Board employed a more expensive staff than was necessary to carry out the work entrusted to them."

H. D. WALSH,
President, 1/3/97.

To the Board.

This Minute was adopted by the Board, and it was sent on for the consideration of the Minister on the 3rd March, 1897.

51. You think that the Board can be reduced? Yes.

52. You think then that you could reduce the salary of the chief clerk and carry on the work of the Board just as efficiently with some small increases to the junior officers? Yes, but I may point out that the increases submitted to the Board were confined to officers whose salaries were less than £150 per annum.

53. With the exception of the junior officers you refer to you think the rest of the staff are not underpaid? There are some officers getting £125 whom I think are not sufficiently paid. I have thought so all along. Increases were recommended for them at the time the increases for the juniors were submitted to the Board, but nothing was done in either case as I have already explained.

54. Are there any officers now receiving £150 per annum or over whom you think entitled to any increase? I think there are two officers, viz., Mr. Nash and Mr. Cooke, and I should like the Commission to look into their cases. Mr. Nash is a very efficient officer, and Mr. Cooke has, since his appointment, been allotted the duties of chief cashier and revenue book-keeper in addition to his other duties as expenditure book-keeper, but his salary has not yet been revised. This change was made on the resignation of the chief cashier, and has effected a saving. Mr. Cooke is also a very good officer.

55. The ratepayers now pay £400 per annum for their representation on the Board? Yes, but there is a great deal of sentiment with them about having their representatives on the Board.

56. Are they keen on that point? I do not think too much so.

57. Do you think they would rather do away with a large Board and save the money? Yes.

58. Are there any other ways in which savings might be made? It is just a question whether the officers who live in the Board's quarters should not be treated in the matter of rent as the Public Service Board are treating public officers. They are paid well.

59. What deductions should be made? We are charging some of the hands at Walka 8s. per week, but I do not think the cottages are worth that. About 5s. a week would be a fair thing. I think we have twelve cottages altogether.

60. About 5s. a week, then? Yes; I think according to the present rate that 8s. is too high. Between 5s. and 6s. a week would be fair.

61.

H. D. Walsh. 21 Aug., 1897.

61. Would £1 per month do? Yes; I think so. We allow them coal and water, and find it a saving to do so.
62. Then £12 per annum should be deducted from their salaries? Yes. This would then place those living in the Board's cottages on the same footing as their other employees who have to pay rent outside.
63. This will increase the savings? Yes.
64. And that can be done without any hardship? Yes.
65. Any other way savings might be effected? I know of no other. Everything is worked as economically as possible now.
66. How much is the rate? One shilling in the pound.
67. Is that a high rate? Yes. People cry out about it.
68. Are you aware how it compares with water rates paid in other cities of the world? Some are higher, but I think the average is lower.
69. What would the average be (say) in America? About 8d. or 9d., I should say.
70. Will you find this out? Yes. The fourteen or fifteen municipalities in this district having combined should be on a better footing than any one town.
71. They are separated by intervening distances though? Yes, but there is a long gap between from Waratah to Maitland.
72. Are all of your officers efficient? Yes, they are all good officers; we have no bad ones.
73. I am very glad to hear that; it is most satisfactory; do you think the Department is unfairly loaded with expenditure in any way? Yes; with the large amount of interest that accrued between the time the works were finished and taken over by the Board. As an officer of the Harbours and Rivers Department, I carried on the work for eight years, just getting in what I could. I managed to get in between £4,000 and £5,000 a year, but had no power to force people to pay. We got no rates from the Government Departments during that time.
74. How many years was that? Eight.
75. Can you give us a return showing what should be the deduction on your capital debt? I have just got some papers back from the Minister consenting to receive the Board as a deputation to go into this very subject. Under the new Act the Minister can make a fair deduction, and we have asked him to receive a deputation, and he will meet us on Thursday next.
76. We will leave the matter over then until the Minister has dealt with it. Is there anything else we should be made acquainted with; we shall have some more questions to ask you when we get the returns called for? I know of nothing else.
77. *Mr. Powell.*] Do you offer any advantage for prompt payments of rates? No. It has been tried in Sydney, and so far as I know not found to help the poorer people.
78. It still continues though? Yes. Five per cent. I think they allow.
79. Rich people take advantage of your deferred-payment system I suppose? No. The Board block them, as the work to be done must not exceed £5.
80. Have you as President a casting vote? Yes.
81. Would there be any objection generally to a reduction in the number of the elected members of the Board? I hardly think so.
82. Do you think it would be satisfactory if you had two elected members and the President? Yes. If the President had certain extra powers given him.
83. If we had two elected members and the President it might be that there would be a dead-lock, and the Government would suffer? We have never had anything like that. The Government are in a minority now—four municipal members against three Government.
84. If you had only two elected members under the new system, the President would represent the Government? Yes.
85. There will then be two against two, your vote and your casting vote? Yes; but I do not think that there would be much to fear on that account. My five years' experience shows that the municipal members have not attempted to push anything that is unreasonable.
86. It is necessary to provide for every contingency though? The Minister has the power of veto, and the President should have his double vote as at present.
87. The work of the Board is mostly of a detailed character, which might be performed by the officers? Yes, a good deal of it.
88. Do you still think that weekly meetings will be necessary? No, not always; though it might be necessary for a time.
89. One of your ledger-keepers (McCue) has forage allowance, I see? No. That is a mistake. The Maitland District Inspector (Nash) is the only officer who gets a forage allowance. He is a very good man, and has to combine the various duties of the branch at Maitland; work which is done in the head office by the different departments.
90. He is the only one who receives forage then, for, according to the Blue Book, it is against M'Cue's name? That is an error.
91. *President.*] With regard to the alteration of the representation, would the proportion not be practically the same, that is two to one as three to four? Yes. We sit now more as a Board of a building society does, and conduct things in a conversational manner. We do not enter in the minute book who proposed or seconded any resolution, but simply say it was "resolved"; but if any member wishes to have his name recorded as dissenting, it is done.

Alfred Ernest Fry, Secretary and Accountant to the Hunter District Water Supply and Sewerage Board, sworn, and examined:—

A. E. Fry. 21 Aug., 1897.

92. *President.*] You are secretary and accountant to the Board, Mr. Fry? Yes.
93. Is there anything you can suggest to us by which the expense of the staff can be reduced? There is only the matter of revision of salaries, and what the President has said about charging rents for the cottages of the caretakers. Whether we could effect any saving by resuming the present offices or not would be a matter for calculation.
94. Do you think you can do without a chief clerk? The chief clerk has responsible duties to carry out—amongst others the departmental checks on the cashiers and rates ledger-keeper. His duties will be furnished with those of the other officers, and from it you will be able to see what he has to do.

A. E. Fry. 21 Aug., 1897.

I already occupy the position of accountant in conjunction with that of secretary. I am responsible for the efficiency of the system of checking which the chief clerk carries out, though I could not undertake to do the actual checking work personally. I should require assistance.
95. Could the present chief clerk be done without? I could not say without going into the matter carefully, whether by a re-arrangement of the duties of the staff of the Accounts Branch his checking duties could be provided for without weakening the efficiency of the checks. I could not undertake this work myself in addition to my other duties.
96. Do you receive any cash? No.
97. Would it weaken any of the checks in the office if the services of the chief clerk are dispensed with? I cannot say without first considering the matter carefully.
98. You have nothing to do with the cash? I am responsible for the whole of the cash and books of account of the Board. The chief clerk has to do the checking work in connection with the cash and the rates ledgers.
99. It would be poor economy to do away with the chief clerk if a less efficient check was the result? Yes.
100. Have you any suggestions to make? There is the matter of the reduction of the capital debt.
101. The Minister will see to that. We have decided to hold that question over until the Board have seen the Minister. What rent do you pay? £350 a year. The lease runs out in 1898. There were originally sixteen rooms in the building, but four rooms in the front have been made into two large ones, thus reducing the rooms to fourteen.
102. Supposing you were to give up this place, would there be room in the Custom-house? No; not so far as my knowledge goes. I do not think we would be able to accommodate our staff there.
103. How many officers have you? Twenty-two.
104. Do you not find this place too large for you? No; but three of the rooms are not occupied at present.
105. Is it not possible to get less expensive premises? I think not; not suitable offices.
106. Is there not an old court-house here? Yes; but it has been given over to the military authorities.
107. Could you not be housed, and save the expense of rent to ratepayers altogether if you were put in some Government building? That question was raised at the time of the renewal of the lease by the Minister, and the late President wrote a minute about it.
108. I remember that question myself quite well—that is not the point I am asking now. I am raising the question as to whether in the Government offices in Newcastle accommodation could not be found for you, and so save rent expenses altogether? If we had gone into the old court-house we would have had to pay rent.
109. I think some small sum would have been charged you, but very much less than what you are paying now. Can such accommodation as I have suggested be found? Not to my knowledge.
110. *Mr. Powell.*] How much money passes through the cashier's hands in the course of a year? £20,000 to £22,000.
111. What is the cashier's salary? £90 per annum.
112. What security does he give? He is guaranteed at £200.
113. Have you an auditor in the office? The books of accounts are audited by the Treasury inspectors.
114. How often do you bank? Every day, and check every day too. The departmental checks are as stringent as possible, and have been approved by the Treasury officers.
115. *President.*] We will make inquiries with reference to room in Government buildings here? At the time the Select Committee was sitting the question was raised about having our offices out Newcastle West more. The Government have some land there, and they asked me at the time whether it would be a suitable site. I replied that I thought it would. The land referred to is near the Technical College building.
116. How do you collect the revenue in the district—send round for it? No; we send out cashiers on specified days to the various Council Chambers, where it is paid over.

WEDNESDAY, 20 *OCTOBER*, 1897.

[*At the Offices of the Public Service Board, Sydney.*]

Present:—

JOSEPH BARLING, Esq., J.P., President.
GEORGE ALEXANDER WILSON, Esq., J.P.
JAMES POWELL, Esq., J.P.

Joseph Davis, M. Inst. C.E., Engineer-in-Chief for Sewerage Construction, Public Works Department, sworn, and examined:—

J. Davis. 20 Oct., 1897.

117. *President.*] As Engineer-in-Chief for Sewerage Construction you have had a good deal to do with the schemes for the sewerage of Newcastle? Yes.
118. We shall be much obliged if you would give us the history, as near as you can, of the steps that have been taken to bring the project up to the present date? Nothing has been done in regard to the sewerage of Newcastle, except that two or three schemes were proposed without full surveys, so that it will be necessary to thoroughly revise these before they can be put into a tangible shape. A survey authorised by the Minister for Works is being made of Newcastle and district, with a view of a proper scheme being formulated. This is in hand, and is nearly finished, so that the scheme will be ready in the course of a few months.
119. What districts would that embrace? Newcastle and its immediate surroundings as far as Waratah.
120. Would it take in the Maitlands? Maitland is a separate scheme. Approval was given to prepare a scheme first of all for West Maitland. A detail survey of West Maitland was made, and a scheme is now being prepared for that. Some six months or nine months ago application was received that East Maitland might be considered in conjunction with West Maitland, and the Minister thought that, if a few levels were taken so that a scheme could be devised, a detailed survey was unnecessary at the present stage.

J. Davis. 20 Oct., 1897.

121. You think that East Maitland can be brought into the scheme which is provided for West Maitland? Yes.
122. And if such a scheme is carried out it would come under the jurisdiction of the Hunter District Water Supply and Sewerage Board? Yes, because the sewerage district that has to be gazetted under the Act comprises East and West Maitland. That district was gazetted about six months ago. Not that we had any work to transfer to the Board at that time, but, carrying out these surveys, we had to put survey marks in, and it was thought that, as a difficulty arose as to the maintenance of these marks, and we were not making the survey under any particular Act, it was therefore necessary, in order to give us certain legal rights that the Act afforded us, to gazette a sewerage district, and so bring the whole of the district under the Hunter District Water Supply and Sewerage Act.
123. I think estimates have been prepared as to the cost of the sewerage system for Newcastle? An estimate was prepared, but it was a very rough, and a very, very high one, and out of the question altogether; and in my judgment it was far too big a thing to be thought of at the present time for Newcastle.
124. Then, for the purpose of our inquiry, all the previous estimates may be put on one side? I think, in regard to the sewerage scheme proper, certainly.
125. It is not worth while going into these schemes at all? No, I think not.
126. And it will be four or five months before you are able to formulate a scheme on proper lines? Yes.
127. Based on surveys which are now being made? Yes.
128. And that will be ready four or five months hence? Yes.
129. So that we shall not have any data at our disposal to enable us to form any opinion whatever as to the feasibility of any scheme? Not for the sewerage proper. We have carried out works for giving relief from storm-water, of which I will be able to give particulars.
130. That is what I was going to ask. Certain storm-water sewers have been carried out in Newcastle and the neighbourhood? Yes.
131. Will you tell us how that stands? The first one I would refer to is Cottage Creek; that is on the boundary of Newcastle. Briefly, the history of the case is this: In March, 1890, an estimate was prepared by the Public Works Department for a storm-water channel, extending from the Great Northern railway to the Australian Agricultural Company's railway, the amount of which was £19,500, and tenders were invited on that proposal. Tenders were received on the 30th April, 1890, the lowest being £22,060, and that being so, it necessitated the work going before the Public Works Committee. The Committee took the works into consideration, and finally proposed that instead of a covered channel being constructed, an open channel would meet all requirements, which was estimated to cost £13,000. A good deal of correspondence took place between the Newcastle people and the Department in the years 1893, 1894, and 1895, and it was thought that even the £13,000 was considerably more than should be spent on the short length of channel in question. At the beginning of 1895, in consequence of the very serious nuisance that arose from the insanitary condition of the creek, I was asked to revise the whole thing, with a view of reducing the cost, and I afterwards, with the revised estimates, saw the Water and Sewerage Board, at their request. I estimated that the work could be done for the length that was originally proposed for £4,700, and the Board approved. The Minister accordingly invited tenders. When the working plans were prepared, the work was carried out on the proposal approved by the Board, at a cost of £3,180. That is really the whole of the money that has been spent on the Cottage Creek up to date—£3,180 19s. 10d. Since then there has been a small branch asked for, running along the Great Northern railway, and the Minister approved of that being constructed. Tenders have been received, and the work is just about to be put in hand. The cost is to be £332 10s., so that these two sums comprise the whole of the money that is likely to be spent on the Cottage Creek works.
132. Who is to pay the interest on this? The work will be transferred to the Hunter District Board in the same way as the storm-water sewers were transferred to the Metropolitan Board as soon as they have legislative power to collect a rate. At present they have none for a storm-water channel.
133. Is that included in the new Bill that is before the House? No, it seems it is not. The Bill only deals with the question of water. Mr. Alexander Brown, who has the Bill in hand for the Government, was spoken to about this, and it seems that he said that he had only to deal with the water question, and no provision is made for the sewerage at present.
134. The idea of the Department was that provision should be made, I presume, so that a rate would be levied, as is done in Sydney? That was the intention, and it was embodied in the Minister's decision at the time he directed the work to be put in hand. It was intended that the passing of the Act should be anticipated.
135. In Sydney a special Act has been passed permitting rates to be levied in connection with storm-water sewers? Yes.
136. And the same idea was intended at Newcastle, and that the storm-water sewers should merge in the sewerage debt? Yes; it was intended that the Cottage Creek storm-water channel should carry away the effluent from the filtration works.
137. That will not be offensive? No.
138. Are there not some other storm-water sewers that have been carried out? Yes; the pasturage reserve storm-water channel drains a very large tract of country. Money has been voted for that from time to time to the extent of £39,200, of which sum £25,997 12s. 6d. has been spent to date, and a balance of £13,202 7s. 6d. remains, which will be spent on the works.
139. Where is the drainage into? Into Styx Creek and then into Throsby Creek, which flows into the harbour.
140. That district is outside the boundaries of Newcastle? Of Newcastle proper, but within the sewerage district, and therefore within the jurisdiction of the Hunter District Water Supply and Sewerage Board.
141. Then if a Bill were passed such as you describe the Hunter District Board would be able to levy sewerage rates on this expenditure? They would certainly have the power; but the Minister has promised that no such rate is to be levied, unless the district should be very much more prosperous than it is at the present time, for a period of ten years.
142. Does the Minister mean that he will give the rates for that period of ten years? For a period of ten years he is to levy no rates.
143. Has that been passed by the Public Works Committee? No.

144. It has just gone piecemeal? Yes. First of all the main channel was authorised, to cost £12,000, and afterwards it became necessary to do some straightening and correcting of Throsby and Styx Creeks, and a sum of money was voted for that. Then the other municipalities such as Lambton, New Lambton, and Hamilton agitated, and said, "This main channel will not give us the relief that it otherwise would if branch channels were constructed," and eventually sums of money were voted to construct the several branches, so that in that way it has grown from £12,000 to £39,000. J. Davis. 20 Oct., 1897.

145. Do not the Government recognize that they have some responsibility in connection with the Pasturage Reserve sewer; has it not improved the Government estate there? Decidedly.

146. So that they would get a considerable return in the shape of the increased value of the public land which will be eventually open for sale? That is so, and not only that, but the people who purchased from the Government allege that a certain promise was made to them at the time they purchased that drainage facilities would be given, but it appears there is no such promise on record. At the same time they allege that it was so.

147. Then the Minister, recognising some such position as that, has remitted the rates for ten years? Yes.

148. What is the total expenditure to date on that? £25,997 12s. 6d.

149. And a further sum will be required of? £13,202 7s. 6d.

150. Will you give us a little sketch plan showing that and also the Cottage Creek? Yes. [*Vide Appendix* S.]

151. I think that is all you have to say on that? Yes. Then there is the Plattsburg and Wallsend channel. That has been under the consideration of the Department for years. Originally the lower part of these towns was built on a flat, with no drainage facilities, and matters were made very much worse by the construction of the Co-operative Co.'s railway across the flat, which had a tendency to keep back the storm-waters in time of flood. The Government was approached from time to time, and finally money was voted to carry out drainage works for these two municipalities. The Minister visited Wallsend and Plattsburg in March of 1895, and I have a minute here that he wrote after his return. A deputation waited upon him at the Great Northern railway, and the notes that were then taken he signed on his return. I will just read an extract from them, as it gives the Minister's view when he sanctioned the works being carried out:—"The Minister, in reply, said that he recognised this as a work that should be carried out, and although this was a somewhat different case to that of the Newcastle Pasturage Reserve, as he understood the drain would pass through private instead of public property, he felt, from what had been reported to him and from what he knew, it would be impossible to apply the betterment principle to this work at the present time. What he proposed to do was to carry out the work and suspend the operation of the betterment principle for at least ten years. He wished them to understand he would not do this if the people interested were in a more prosperous condition, but, under the existing circumstances, he intended to strain a point and relieve the people of the small extra tax which the application of the betterment principle would impose for the period mentioned, after which, if the circumstances of the country would justify the imposition of that charge, he considered this should be done."

152. What is the cost of those works? The cost to date is £10,256 1s. 7d.

153. What further sum will be required? There is a bridge to be constructed under the Co-operative Co.'s railway which will cost about £560, and that will complete the work and absorb the whole of the vote.

154. And that is all you propose doing? Yes.

155. It practically stands on the same footing as the Pasturage Reserve channel? Yes.

156. Is there anything else? No.

157. Is there any other information that you can give us and which you think will be of use to us? I do not think so. The sewerage scheme for Newcastle when it is prepared will be submitted to the Hunter District Board for an expression of opinion, and they will be asked to state whether they are in a position to have the whole or any part of it carried out.

158. Still, pending the receipt of the survey and your report, it is not possible to come to any definite idea about the subject now? No.

159. Will you kindly include the Plattsburg and Wallsend drain in the sketch plan you are to give us? Yes. [*Vide Appendix* T.]

160. *Mr. Powell.*] You might please include in that the works completed, works in progress, and works proposed? Yes.

FRIDAY, 5 NOVEMBER, 1897.

[*At the Offices of the Hunter District Water Supply and Sewerage Board, Newcastle.*]

Present:—
JOSEPH BARLING Esq., J.P., PRESIDENT; and
JAMES POWELL, Esq., J.P.

Henry Deane Walsh further examined:—

161. *President.*] Have you considered the question of what alterations should be made in the salaries? Yes; the return now before me fairly covers my ideas. H. D. Walsh. 5 Nov., 1897.

162. Will you kindly give us your views as to the advisableness of vacating your present office buildings, or resuming them with the object of decreasing your expenses for office rent? I do not think we could obtain

H. D. Walsh. 5 Nov., 1897.

obtain offices as suitable as our present ones at a very much lower rental. There are offices in Newcastle without nearly the accommodation we have here which cost more for rent. For instance, the Australian Joint Stock Bank, at the corner of Hunter and Watt streets, is set down at an assessed rental value of £468; the Bank of New Zealand pays £352, the Bank of Australasia pays £520, Messrs. J. and A. Brown £454, Messrs. Dalgety & Co. (Ltd.), £412; so that all those seem to be more expensive offices than the Board's, and without as suitable accommodation as we have here.

163. Do you think that if you resumed your present offices it would come cheaper? Yes, I think so. I think we might be able to get the present buildings for £5,000, and at 4 per cent. that would only be £200 per annum, and we are now paying £350. We would, though, of course, have to put a small sinking fund aside for repairs. We might say 2 per cent for the sinking fund, which would mean £100 a year, and (say) 3½ per cent. for the other money. This would mean 5½ per cent. altogether, or £300 a year, and we now pay £350.

164. So that you would save at least £50 a year? Yes, at least, but I think we could save over £50, because possibly the building could be got for less than £5,000.

165. Perhaps if you built on Government land here you could save still further? Yes.

166. Can any buildings be added to the present Custom House? I do not think so; not very well.

167. There is, I see, a very good corner belonging to the Custom House property occupied by a very indifferent cottage? I do not consider the Custom House as convenient a site for everyone as the present offices.

168. Everyone goes to the wharf, and it is on the tramline;—it seems to me to be quite as convenient? ———

169. *Mr. Powell.*] Has there been much money laid out on your offices? No; not very much; nothing out of the way.

170. *President.*] What superficial space have you here, and how much do you think you will want to occupy? I cannot at present say, but I will look it up.

171. Please let us know what space you want, and we will ask the Government Architect (Mr. Vernon) to give evidence.

172. *Mr. Powell.*] Who is the owner of your present offices? Mr. A. A. Dangar. I think he would part with them for a fair sum.

173. What would he consider a fair sum? I cannot say exactly.

174. *President.*] It is always a difficult thing, Mr. Walsh, to recommend the resumption of properties? Perhaps it might be much better to come to some arrangement with Mr. Dangar than to resume.

175. It is always better to put up offices of your own though if it can be managed? Yes.

176. *Mr. Powell.*] A place like the Custom House is capable of being enlarged at any time? Yes; there is a lot of land there.

177. *President.*] Does your rent of £350 a year include taxes? As a Government building, we do not pay taxes.

178. If a new building were to cost you £3,000, that would only be about £120 for interest, and £30 a year should be sufficient for repairs;—this would mean a saving of £200 a year altogether? Yes; at that rate it would.

179. Of your own personal knowledge, are all of your officers on the Board fully employed, and are they absolutely required? Yes, they are.

180. *Witness:* I would like to bring under the notice of the Commission Part IV of the Amending Bill, dealing with statements of expenditure and accounts. It is clause 36, and reads as follows:—

> ~~33.~~ 36. (I) As soon as practicable after the commencement of this Act, the Minister shall cause statements to be prepared and furnished to the Board showing the respective amounts expended up to the thirtieth day of June, one thousand eight hundred and ninety-~~six~~, **seven**, on all works constructed by or vested in the Board—
>
> (*a*) in the purchase or acquisition of land and on permanent or other works which do not require maintenance or reconstruction (hereinafter called "permanent works");
>
> (*b*) on works which require maintenance or reconstruction (hereinafter called "renewable works");
>
> with interest from the respective days of the expenditure to the thirtieth day of June, one thousand eight hundred and ninety-~~six~~ **seven**, at the rate of three and a half per centum per annum.
>
> (II) On receipt of the said statements the Board may report to the Minister making such recommendations as may be thought fit.
>
> (III) The Minister shall consider the said report, and shall finally determine the respective amounts and the classification of the expenditure, and **after deducting from the total amount thereof the difference between the revenue and expenditure of the Board for the same period determined as hereinafter provided shall** notify the same in the *Gazette* and ~~the local newspaper~~ **in one or more local newspapers circulating in some water or sewerage district.**
>
> (IV) Provided that the Governor may make such partial remission of or deductions from the amounts expended as he may think just under any special circumstances.

It will be seen by this that it will be at once necessary to fix the capital debt, for once it is done it will be official, and until it is done we cannot issue our rate notices. I shall be very glad, therefore, if the Commission will consider this matter, with a view of recommending the amount which should be fixed upon as the capital debt. *The President:* Very well.

181. *Witness:* Another matter I would like to refer to is that of our officers being placed under the provisions of the Public Service Act. It is the general wish of the staff that this should be so, in order that they may be in a position to gain promotion in other portions of the Public Service. [*Vide Appendix* P.]

182. *President.*] Would that have the approval of the elected members of the Board? Yes. All the elected members are strongly in favour of the course suggested. The Board generally recognises the fact that the officers are entitled to promotion if at all possible, and in this Department there is not prospect of their rising.

183. *Mr. Powell.*] They are blocked.

184. *President.*] That is very apparent.

185. What is the amount of outstanding rates—say to the 30th June last? £7,225 6s. 7d. This will be further explained by the following statement:— H. D. Walsh. 5 Nov., 1897.

Particulars of Arrears at 30th June, 1897.

	£	s.	d.
Water rates	5,275	10	9
New assessments	30	18	7
New mains	9	7	3
Live stock	4	15	0
Gardens	5	15	0
Sundry water supply	8	10	0
Meter-testing Fees	0	3	6
Meter hire	4	9	0
Meters only	455	0	11
Meters in excess	1,397	17	6
Shipping	16	15	2
Waratah Council	16	3	11
	£7,225	6	7

Water Rates.

Year ending 30th June, 1893	100	5	9
,, ,, 1894	158	11	5
,, ,, 1895	286	7	4
,, ,, 1896	712	9	0
,, ,, 1897	4,017	17	3
	£5,275	10	9

186. It has been urged, and I must admit it is rather a startling statement, that it costs your Board £9,000 to collect a revenue of £22,000;—have you anything to say in that view of the case? I can say that the expense of collecting the revenue only amounted to 19·46 per cent. for the year ending June, 1897, the working expenses—that is practically the manufacture of the water—amounted to 18·70 per cent., and maintenance 1·86 per cent, so that these items must be deducted from the £9,000. The actual expenses of management only came to 19 per cent., the other being made up in the expense of bringing the water to the taps.

187. *Mr. Powell.*] We may consider the express desire of the officers of the Board to be placed under the charge of the Public Service Board. It is a high compliment to us, and one which, whether they are successful or not, they will have no cause to regret making.

188. *President.*] I quite agree. If they are placed under the Public Service Board it will benefit them in the future.

Alfred Ernest Fry further examined:—

189. *President.*] What is the capital debt of the Board? The estimated capital debt to the 30th June, 1897, under the new Bill will be £516,772. A. E. Fry. 5 Nov., 1897.

190. How is that made up? It is made up as follows:—Permanent Works, £111,227; renewable works, £279,407; capitalized interest to the 30th June, 1892, on the permanent and renewable works, £91,478, less the revenue received to the 30th June, 1892, £39,240, leaving a balance of £52,238, which gives a total debt to 30th June, 1892, of £442,872.

191. That is interest on the works less the revenue received prior to the works being taken over by the Board? Yes. Works carried out by the Board since 30th June, 1892, £22,200; new duplicate rising and suction mains, £25,000; estimated deficiency on the five years' working to the 30th June, 1897, £26,700, capitalized under the amending Bill, which gives a total estimated debt at the 30th June, 1897, of £516,772.

192. At what rate do you reckon interest? Three and a half per cent.

193. Under the provisions of the new Bill what revenue do you expect to receive? The average revenue during the last five years, including all rates, meter accounts, special fees, &c., was £21,540, and the estimated additional revenue under the new Bill will be £3,800.

194. What will the estimated total revenue be? £25,340 for the year ending 30th June, 1898.

195. Now as to your expenses? The estimated expenditure for the year ending 30th June, 1898, will be as follows:—Interest on the capital debt of £516,772 at 3½ per cent., £18,085; annual instalments to the sinking fund for the reconstruction of renewable works of an estimated capital value of £279,407, on a life basis of forty-eight years (*i.e.* sixty years, of which twelve have elapsed), £2,320; annual instalments for the new works carried out by the Board on the full sixty years basis, £240; expenses of management (average), £4,460; working expenses (average), £4,040, making a total annual expenditure of £29,145, which will leave a deficiency for the year of £3,805.

196. What capital sum will be required to be written off to extinguish the deficiency? £108,714.

197. Is that the sum you are asking the Minister to write off? Yes.

198. You have asked for a larger reduction, have you not? Yes; a request was made to the Minister by a deputation from the Board that the capital debt should be reduced by £120,857, but this amount was arrived at in consequence of the classification of the storage reservoir, filter beds and tanks at Walka as renewable works. I think, on reconsideration, that, as you point out, they might fairly be regarded as permanent works, for which no annual instalment to the sinking fund for reconstruction need be provided. Taking their cost as £50,000, the item for the annual instalment to the sinking fund would, in consequence, be reduced by £425 per annum, which, capitalized at 3½ per cent., gives £12,143. The £120,857 reduced by this amount, gives the £108,714, previously mentioned.

199. You are not asking for a reduction in the amount to give you a lower rating than 1s. in the £? No.

200. What are the country towns paying? One shilling in the £.

201. On what basis was the reduction made in the debts of the country towns? In reply to that question I do not think I can do better than to quote the evidence of Mr. Barling, as Under Secretary for Public Works, before the Select Committee of the Legislative Assembly, on the 30th April, 1895:—

413. *Mr. Gillies.*] Do you not think the Government should forego half the amount of the excess expenditure over Mr. Clark's estimate; I do not think they should, because the balance would have to be found by the whole of the Colony for a work in which the bulk of the people have no interest whatever. But supposing that it were found that a rate of 1s. in the £ would not pay, then any expense beyond, the Government would of necessity have to bear; and that is exactly what

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has occurred in country towns. The principle the Department laid down in dealing with country towns is, that we should fix their debts at such an amount as would enable them to meet their obligations thereon by levying a rate of 1s. in the £. All country towns are paying 1s. in the £. The municipalities in the Hunter District are doing no more than that. They are practically on the same footing as the country towns.

202. I understand, then, that your Board will be satisfied if the Government were to write down the debt sufficiently to enable a shilling rate to pay all expenses? My Board at one time hoped that a reduction of the capital debt would have been made which, with the additional revenue to be derived under the new Bill, would have admitted of a rate of 9d. in the £ being struck, but in view of the very large amount which the Minister would have to be asked to remit in order to enable the Board to pay their way on a shilling rate they decided not to press for any greater reduction.

203. They then will be satisfied with the capital debt being reduced so that a rate of 1s. in the £ will provide sufficient revenue to pay all expenses, and the amount required to do this will be £108,714? Yes.

204. Has your Board taken into account the very reasonable expectation which may be formed of the great advancement of this district, so that in a few years time the debt, if not written down, will be a very light one indeed? My Board have not overlooked the contingency referred to, but are strongly of the opinion that any increase which may arise from the circumstances mentioned will not be more than sufficient to provide for the interest on the capital cost and maintenance of the new works which will have to be constructed to meet the increased requirements of the district. I might refer to the probable early duplication of the gravitation main from Buttai to Newcastle. The suction main from the river to Walka and the rising main from Walka to Buttai have already been duplicated, and the duplication of the gravitation main is a work which the extension of the district will necessitate at no very distant date. The existing gravitation main cost about £90,000.

205. Is it a fact that a considerable body of ratepayers get no benefit from the waterworks, and yet have to pay rates? Yes; there are a large number of persons who pay rates whose premises are not connected, and who, therefore, receive no direct benefit, although, of course, they are benefited indirectly.

206. If they all took the water which they would be entitled to by the rates, would the present works be sufficient to supply them? The present works would be sufficient, with the exception that, I believe, that the gravitation main from Buttai, supplying the Newcastle and suburban reservoirs, would have to be duplicated.

207. Is it likely that the people who do not now take the water will do so at some future time? That I can hardly say, though no doubt many of them will. I beg to hand in a statement showing the number of properties rated at 30th September last, 11,752; the number connected with the mains, 6,909; and of the remainder only 564 represent vacant lands rated, which will not require to be connected to the mains. The house properties not connected, numbering no less than 4,279, might desire at any time to connect, and the Board would then have to be prepared to supply them. [*Vide Appendix* M.]

208. I presume you urge that feature as one reason why it is not likely that an increase of the population will enable you the more easily to pay your debt, because a lot of the properties you will have to supply will not bring in any additional revenue? Yes; that is so.

209. Have you taken fully into consideration the great possibilities of this district with regard to an increase in the population against the much smaller possibilities of the country towns? Yes; but I think that any increase of the revenue which might be expected from the growth of the population will carry with it a corresponding increase in expenditure, both for the construction of new works and the working expenses generally.

210. Will not new works bring in their own revenue? Yes; but the only surplus, as it were, that the Department would have on the lines indicated would be the margin of profit over and above the cost of supplying new consumers.

211. Would not that margin of profit, as against the cost of extensions, be very much greater than the margin of profit on the work as a whole? I do not think so, because we are now extending mains wherever we find that they will pay 5 per cent. on the capital outlay, which leaves but a very small margin of profit over and above the interest on the cost of the extension and working expenses in connection with same, *i.e.*, the cost of suppling the water, repairs, &c.

212. You do not, then, think that it will become easier in the future to pay interest on the capital debt than it is now? I do not know.

213. You think, then, that the capital debt will increase proportionately to the population, leaving a deficiency as now? Yes.

214. When we were last here we asked about cities in other parts of the world with respect to the rating they paid for water? Yes; and I now hand in a return which I have had prepared. [*Vide Appendices* K *and* L.]

215. In comparing the rates paid elsewhere, is 1s. in the £ an excessive rate? No; it would not be so according to the return that I have. I find that for houses up to £100 annual value there are a number of important cities paying at the rate of 1s. in the £, others slightly less, and others again slightly more.

216. So, then, your return shows, comparing the rate paid here with those paid in other countries, that 1s. in the £ is not an unreasonable rate? Yes.

217. Is it a fact that your scheme is a pumping one? Yes, wholly so.

218. Pumping schemes are more expensive than others, are they not? Yes.

219. Under those circumstances, then, one might naturally expect that the highest rates would be charged here? Yes, quite so.

220. Considerable complaints have come under our notice, as to the excessive cost of your works; it has, in fact, been said that the people have to a certain extent been deceived, as they were informed, in accordance with Mr. Clark's estimate, that the cost would be £170,000, but, as a matter of fact, they have now cost over £500,000;—can you remember what population Mr. Clark's scheme was estimated to supply? 30,000, I believe.

221. What does it actually supply now? 60,000.

222. Mr. Clark's estimate might be doubled then? Yes.

223. That would be £340,000;—so that there would be no reason to complain of the estimate having doubled itself, as the population which it was intended to supply had doubled;—you have looked into this question, I think? Yes.

224. From your examination of the whole subject, do you think that the complaints of the people with respect to the cost of the works are based on sound grounds? I have carefully read the evidence given

before

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before the Select Committee of the Legislative Assembly, and more particularly that of the Engineer-in-Chief (Mr. Darley), and the then Under Secretary for Public Works (Mr. Barling), and am convinced that the dissatisfaction which was so strongly expressed when the Board was instituted in connection with the capital debt arose from the very great difference between the estimate given by Mr. Clark and the actual cost of the works as carried out by the Government. I feel certain that the evidence of the witnesses referred to has, in a great measure, explained the actual expenditure to the satisfaction of the district; but the people, I believe, are still of the opinion that the Government should remit the heavy item of capitalized interest. If, however, the reduction of the debt by the £108,714 be made, this complain will be entirely removed. I have taken extracts of the evidence referred to, which I beg to hand in.

225. You stated in your last evidence that you could not express an opinion as to the possibility of abolishing the office of Chief Clerk until you had time to fully consider the matter;—are you now in a position to answer my question? Yes; since last examined I have very carefully considered whether it would be possible to re-arrange the officers' duties with a view of abolishing the present office of Chief Clerk, and have come to the conclusion that this could not be done without weakening the present checks on the cash and the ledger-keeping which have proved very effective, and which are the more necessary as I am not able to devote myself personally to them, owing to my having the responsibilities of the office of Secretary as well as that of Accountant to the Board. The present Chief Clerk has furnished a list of his duties, from which you will observe that the checking of the work in connection with the cashier's and rates ledger keeper's duties is entrusted to him. This work is most important. The Treasury Inspectors have approved of the system of departmental check which I have instituted, and which it is the Chief Clerk's duty to scrupulously carry out. His work has been very carefully and conscientiously done, and has been commended by the Inspectors of the Treasury. The Chief Clerk has other duties of an important nature to carry out which require experience, and he is also the officer who takes up my duties when I am away from the office or absent on leave. I do not think that the office of Chief Clerk should be abolished for the reasons given.

226. Are you of the opinion that the services of the present Chief Clerk are worth the amount now paid, which is, I see, £300 per annum? I should prefer not to express an opinion on this matter.

227. If your Board had to fill the position now, would you expect to have to pay £300 per annum? No.

228. At what salary, then, would you expect to get a suitable man for that position? £200 per annum.

229. *Witness.*] I now desire to make some representations to the Commission as to the desirableness of placing the staff of the Department under the Public Service Board. I think that if this were done the officers would have a greater scope; and I do not think that the members of the Board, so far as I can gather, would in the slightest degree regard it as any infringement of their rights or privileges under the Act. In support of this I desire to refer to the circumstances which led up to the appointment of the present Commission. The municipal representatives of the Board were strongly of the opinion than an impartial and independent investigation by the members of the Public Service Board, acting as a Royal Commission, would give satisfaction to the general public, and their minds would be set at rest as to the expensiveness or otherwise of the present staff. With regard to the extra scope which would be afforded I should like to point out that there are a number of junior clerks on the staff who cannot hope to rise in the Board's service, owing to its limited sphere; but if the staff were under the Public Service Board they might, if deserving, get transferred to other branches of the Service. Another matter to which I desire to refer is the saving which I believe could be effected by the resumption of the offices at present occupied by the Board, or the erection of suitable offices by the Government. Taking the case for the resumption of our present offices in illustration, I think they could be acquired at, say, £4,500. The interest on this amount, and a reasonable sum for maintenance—say, 4 per cent.—would give an annual charge of £180, as against £350 paid at present. I may add, too, that the Board, under their present lease, have to keep the inside and outside of the offices in proper repair.

230. *President.*] Can you tell me what proportion the Government and the railways pay to the revenue received? For the year ending 30th June last the amount received from the Government institutions was £3,029 17s. 9d.

231. What was the total revenue from all sources for the same period? £22,510 10s. 1d.

232. So the Government furnish about one-seventh? Yes.

Archibald Gardiner, Vice-President and Municipal Member of the Hunter District Water Supply and Sewerage Board, sworn, and examined:—

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233. *President.*] You are, I believe, a Municipal Member of the Board, and also its Vice-President? Yes.

234. How long have you held office? I was one of the original members elected at the inception of the Board in 1892, and at the expiry of my term in 1895 I was re-elected.

235. What portion of the district do you represent? With Mr. Barclay I represent the mining townships, or the suburbs of Newcastle.

236. You, of course, have heard of the object of our visit? Yes.

237. Very well, then, we shall be very glad to give you a free hand in order that you might place before us any information which you think will be of use in connection with this inquiry? One of the points I gleaned from your (Royal Commission's) report on the Metropolitan Board of Water Supply and Sewerage was a recommended reduction in the number of the Members of the Board. Now here we look upon this as destroying a principal of local government. In the amending Bill at present before Parliament, the various clauses were considered by the whole of the Municipal Councils sitting in conference, and whatever may be the report of this Royal Commission, we were all agreed that the number of representatives on the Board should not be altered, and that is the opinion of the whole of the municipal members.

238. Pardon me, Mr. Gardiner, but you must not take it for granted that we are going to recommend the same here as we did in Sydney. But, I suppose, you are only taking it as an assumption? Yes.

239. We are, of course, very glad and willing to hear you discuss that point, but, as I said before, you must not take it for granted that we are going to do the same here as was done in Sydney? I have thought the matter over, and this was one of the points I thought I would like to lay before you.

240. Quite so. Do not think that I interposed to stop you, as we are only too glad to hear anything you may have to say.

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241. *Mr. Powell.*] The conditions may be very different in Sydney.
242. *President.*] Yes; because we recommended a certain course with regard to the metropolitan area, it is not to say that we shall do the same here. The circumstances may be very different indeed.
243. *Witness.*] There are practically three divisions here in our district, viz., Newcastle, mining townships, and the Maitland district. Newcastle, I might explain, is the city proper, which has one representative on the Board. The mining townships are the municipalities or suburbs surrounding Newcastle, consisting of Carrington, Wickham, Hamilton, Merewether, Adamstown, Waratah, New Lambton, Lambton, Wallsend, and Plattsburg, and have two representatives, whilst the Maitland district consists of West and East Maitland and Morpeth, and has one representative. Each of the municipal members represents about 2,500 ratepayers, as nearly as possible. If the electorates as they now stand are interfered with in any way do not think that the various interests would be conserved in the manner they are at present. For instance, the mining townships have ninety-nine votes, Maitland thirty, and twelve in Newcastle, and if the present system were done away with neither Maitland nor Newcastle might be able to get that representation on the Board which they might desire. We have sometimes very important subjects to consider here—matters which materially bear on the health of a very large population, and I consider that if the number on the Board were reduced to three it would place these important matters into one or two hands. We think that by having what might be called the larger number of representatives it will be of great importance in the economical working of the Board.
244. The additional experience you mean? Yes; additional experience brought to bear on the different matters that come up for consideration from time to time.
245. Yes, but you might extend that argument, and have the room full? Of course, I would be against that, but I might point out that on the Melbourne Board of Works there are 114 members, but they really do the work with seven. The 114 meet once a month, but a committee of seven virtually do all the work—that is to say, that the smaller number acts as an executive body to carry out the work of the larger number. In connection with several private companies here with which I am associated, I find it a very common thing for them to have from five to seven directors, and they think that this is the most economical way to work, because, although the numbers may seem large, the additional experience fully pays for any outgoings in the way of fees. I think that the fee of £2 per sitting at present paid to the members of this Board is a fair one. I know that in some people's eyes not only the fees, but the sittings and the number of the members should be reduced, but in my opinion the importance of the many matters which come before the Board warrant its existence in its present state, and, from an engineering point of view alone, I consider the money is well spent. We have a matter now which we are dealing with, a most important matter, and for this one question alone to be satisfactorily dealt with is well worth all the fees we might be paid during the whole year. I was very anxious that you gentlemen should come here and hold an independent inquiry, as no doubt there was a feeling amongst the outside public that our staff was not only overmanned, but also overpaid, but it is quite unnecessary for me to say that that opinion was an erroneous one. It is necessary to have the minimum number of officers to carry out the work of the Department, and we find from reports of the Auditor-General that we are not overmanned, in fact, his reports imply that we should have at least three more on the staff. But we have set our faces against this until such time as better times may come to the district. I really cannot see that any reduction can be made in the present staff. There are a number of young men who joined the Board's service as cadets who should have advances in their salaries, and we were willing to give it to them, but it was thought that possibly the whole matter should be referred to you gentlemen. For instance, there is one young man at Maitland getting something like £60 a year, and we ask him to receive a large sum of money in the shape of rates every month, and if, unfortunately, anything were to happen I am certain we should be severely censured through the Press for paying such a small salary for such a position of trust. The same thing applies at the head office too. Nevertheless, by a strict system of check everything has gone along all right. The Treasury Inspectors have from time to time complimented our Secretary for the manner in which the work of the Department has been performed.
246. *Mr. Powell.*] How are you elected, and what steps are taken to secure election? All the aldermen in the district have a vote. I represent what is known as the mining townships.
247. You are really returned by the municipalities? Yes.
248. Are those municipalities supposed to be mining districts. Yes. We call them mining districts.
249. There are two members returned for those towns? Yes.
250. Yourself and Mr. Barclay? Yes.
251. The Municipality of Newcastle is represented by Mr. Webb, and West Maitland, East Maitland, and Morpeth by Mr. Birkenhead—that is to say, there are two members for the mining townships, one for Newcastle, and one for Maitland district? Yes.
252. Do you not regard Newcastle as a mining district? Well, it is more of a commercial centre.
253. Still, as everything in Newcastle depends upon the mining industry, you cannot very well touch one without the other? Yes.
254. So that mining really has three members to agriculture's one? Well, if you put it in that way, I really cannot altogether regard the city of Newcastle as a mining interest. Take the City Council for instance, the aldermen are all commercial men, and a great deal of business is done by Newcastle up the line.
255. Accepting your view of it then, we can safely say that the mining districts are represented on the Board by two votes? Yes.
256. Are you a member of any Municipal Council? Yes.
257. Are the candidates restricted to aldermen? No. When I was originally elected I was not an aldermen. All the others were aldermen though.
258. Supposing there is no disposition to reduce any of the members of the Board, does it not appear to you that as the mining districts are represented by two members, they are over-represented as compared with Newcastle and Maitland? No; I cannot say that I do. There are about 12,000 ratepayers, so that the representation is about equal at present.
259. Taking the value of the properties, how would that apply? I have never gone into the matter from that standpoint.
260. As payers of water-rates, how would it apply;—would there be more in Newcastle or more anywhere else?

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else? No; I think there would be a pretty equal representation. Though the district I represent, I think, has a greater revenue than the others, as we have several large consumers there. There is the sulphide works, for instance.

261. The management and working expenses of the Board are set down in 1897 as £9,000 a year, against a revenue of £22,518;—does not that seem to you rather a big expenditure? We were done out of £16,000 owing to the bad wording of our Act through a decision of the Privy Council.

262. It is desirable to reduce the expenditure, especially all non-productive expenditure, in view of this heavy charge, is it not? Yes, from a commercial point of view; but, at the same time, I do not think you ever saw anything worked so economically as this Board. At its initiation we saved hundreds and hundreds of pounds.

263. Do you think you are dealing with the Board on commercial principles? Yes; but there is a miniumum in all concerns. Take a private company, for instance. We have lots of them here that are not paying dividends; but I hold that it is then that the experience of the directors is most needed.

264. I do not think you would have paid a dividend on your Board had it been a private concern? No; we are saddled with capitalized interest, which should never have been.

265. You have spoken of salaries; don't you think the Board should determine itself the salaries of its own officers? Yes; personally I think so, and I was in favour of that course; but others were not of that opinion, and that is the reason why we asked that the whole matter should go before the Commission.

266. I do not think that the Public Service Board, acting as a Royal Commission, will shrink from any duties imposed upon it;—you did once make certain recommendations, I believe? Yes; I think it was in 1896, before the old Board went out; but the Minister thought it was necessary that the new Board should deal with the matter. This would have been done but for some trouble in the election of my colleague, Mr. Barclay, as after his return, owing to some Supreme Court proceedings, he was ousted; and it was fully six months before he was again elected and took his seat. During his absence the Board postponed the matter of salaries.

267. For what period are you elected? Four years.

268. It is quite amongst possibilities that you might get a Board returned here consisting of gentlemen without any experience of the particular business required of them? Quite possible. The class of public who should be on the Board, in my opinion, are professional men and contractors, because many of the questions we have to deal with are questions of a purely engineering character, and for that reason I do not think the fees should be reduced, as there will then be gentlemen come here who will know nothing whatever of the subjects with which they will have to deal.

269. You think then that with high fees you will get a better class of men? Yes.

270. If the fees are reduced you think that there will be a rush for the positions on the Board? Yes; for the better class of candidates will not then come forward.

271. Candidates, I suppose, are generally selected for the liking that the people have for them, rather than any general fitness? I can hardly say that. I have had two terms here. There is no doubt that there is a good number of others put up. There were sixteen candidates against me at the last election.

272. Have you had many changes in the constitution of the Board? No. On the last change the Government representatives went out and two fresh ones were appointed in their places, and two fresh municipal representatives came in.

273. *President.*] You are then in favour of increasing the salaries of some of the lower-paid officers? I am.

274. You think that the Department is not overmanned? It is certainly not overmanned, and, furthermore, the Treasury Inspectors desire that the Assessor's Department should be worked entirely apart from the other branches. We have been utilising some of his officers for other purposes.

275. You mean, I suppose, that there should be a line of cleavage for the purpose of check? Yes.

276. I am glad to hear you say that you are not overmanned. Now, with regard to the representatives—if these representatives were reduced in number the diverse interests which you say exist would, I take it, still be represented; for in what way would the Maitland interests differ from those of Newcastle in the matter of water supply;—take a ratepayer of Maitland, and one of Newcastle, now in what way do their interests differ? There is an agricultural class in Maitland, and the ways are different there generally.

277. An agriculturist requires water for his house and land, in what way will his interests be different from those existing elsewhere. I want you to kindly look closely into this question. Of course, I could well understand it supposing, for instance, there was a certain distribution of money. Maitland might say we want £500, and Newcastle might say we want it spent here, but I cannot exactly see for the moment how interests in this matter of water supply can differ. It could not, for example, be contended that Newcastle would want the water-rate reduced, and Maitland would desire it increased? Under our new Bill 440 yards will be the Board's rating-powers, and this, whilst not affecting Newcastle except in some of the colliery properties, will press heavily on a number of farmers and others in the Maitland district. The Maitland people did not want this 440 yards at all—they are against it. We have had it under discussion at our Board, and the representatives from Maitland were against it. The 440 yards does not interfere much in the Newcastle district if you take out the colliery properties, but it will interfere very largely in Maitland.

278. That argument seems very fair? I recollect another case in Maitland where a man had a number of cows, and kept a little bit of a dairy, and he wanted the water laid on. Now we have a rule that unless we get 5 per cent. on the cost of the reticulation we will not extend a main, but this man was very hard up for water, and, as he was supplying the public with milk, wanted clean water for his cows, so in order to help him, for the health of the people, the Board made a concession by extending a $1\frac{1}{2}$-inch main instead of the usual 3-inch, and the minute that was known we were asked to do the same for some scores of others, in the mining districts, where the same necessity does not exist. If we commenced to put down as a general rule anything but 3-inch mains it would cause us to get into a great muddle. There are a number of similar cases in Maitland through the number of the small dairy-farms there. The minute we granted this one Maitland concession, they wanted similar privileges down here, and we really could not do it.

279. They wanted the same privilege here in the mining districts, and your Maitland representatives should have given way then. Your argument will not apply. You gave certain concessions to Maitland people, and directly that was known a number apply for the same thing here, and that you refuse. That

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does not make any diverse interests between Maitland and Newcastle, as you would all be at one in that action. Your Maitland representatives and yourselves would be at one there. Your first illustration about the 440 yards was a good one, but not so, I think, the second one. I may tell you again that we have not come to any determination in the matter of the number of representatives on the Board. The circumstances of Sydney and here, perhaps, are quite different. Do you think that the ratepayers as a whole are ready to find the money for the expenses of representation on the Board. Are they prepared to say, "We will give this £400 a year so that we can have four representatives, rather than we will pay £150 for (say) two representatives." Do you think that they would rather do so. I want you to speak now for the ratepayers generally? They do not want any reduction of the members.

280. You can assure the Commission that the sentiment of the ratepayers is to keep up the number of members on the Board? Yes; they carried it at a conference of aldermen.

281. You think that the ratepayers would sustain you in that view? I believe they would.

282. I ask you that in your representative capacity as an alderman. Are the ratepayers prepared to give £400 a year to keep up four municipal representatives, or would they rather have only two and pay £150? I think they would prefer the four.

283. Is there any doubt about it? I do not think so.

284. Will you be prepared to answer this for the ratepayers: That they will be prepared to pay an increased rate for the purpose of keeping four representatives on the Board? That is a very strong form to put it in.

285. That is the form we want it in though? Without any hesitation I can say that they prefer being represented as now. They are strongly in favour of the present representation, but as to the money matters, that is another thing.

286. That is the exact point, though. It is between £400 and £150. Do you think that the ratepayers will say: "We are quite prepared to put our hands in our pockets, and pay a higher rate for the purpose of keeping up our representatives"? I think they would rather do that than lose their representation.

287. All this will be published, and I want to hold you to your statements? This extra expense you refer to certainly puts the matter in a little different light.

288. You are perfectly certain then that the ratepayers want to keep up the representatives, but you are in a little doubt as to whether they would be prepared to pay £400 per annum for the privilege? Yes.

289. Whilst they want to be represented you think that there may be a little doubt as to whether they are prepared to pay for it? There might be some little doubt on that head.

290. If it went to a vote of the ratepayers, it would be doubtful? Yes.

291. As far as your knowledge goes, you think that if a vote could be taken on that point, the ratepayers would say: "We are prepared to keep our number of representatives, even though we have to pay £400 a year as against £150? Yes; I think so.

292. They would be quite willing to pay £100 a year for each, and not consider it too much? I think they are willing to pay that amount.

293. Good men are no doubt always worth their money, but do not aldermen now do as much work as members of this Board, and yet are paid nothing for it? This is a different kind of work. The labours in connection with a municipality and the labours of this Board are vastly different.

294. You know that the Railway Department has only three Commissioners? Do you know what capital they have to manage? Over thirty millions, I think.

295. Three is considered sufficient to manage that. What is your capital? Say half a million.

296. Do you think that to manage capital of only half a million it is necessary to have seven gentlemen, then? I do not exactly say that. It is not, in my opinion, a proper comparison.

297. Where is the flaw in the comparison? A great deal of work on the railways is done by a Board under a Board, if I may so express it. I have not the slightest doubt that there are several Boards on the railways. I had a great deal to do with the Indian railways. It is not the Commissioners altogether, but the heads of the different departments that do all the work.

298. Is it not the same with you here;—does not your Secretary, your engineer, and your assessor form a kind of a Board here and advise you; your Secretary has in a manner the same authority as the Secretary to the Railway Commissioners, and your engineer the same authority as the Engineer for Railways? No. We keep that in our own hands. It all passes through our President here.

299, But all passes through each of the Commissioners in the Railways;—your engineer recommends that certain mains should be laid, or that certain mains should be renewed, do you think it necessary as a Board to go and examine those mains for yourselves? No.

300. So you really have an under Board here? I think you are losing sight of this fact that here we are really part of a local government scheme, and where there is tax-paying there should be representation. To reduce this Board would be to reduce it in an unequal manner, because the constitution of the three districts is of such a kind that if the Board were altered they would not be properly represented.

301. Is that not sentiment to a very large extent? Possibly; but we are governed by sentiment.

302. There are seven representatives in the Metropolitan Board of Water Supply and Sewerage;—do you know their capital? About one million and a half.

303. It is over six millions;—seven gentlemen are sufficient to manage that capital, and you think that it is necessary to have an equal number here to manage only one-twelfth of it? There is a certain minimum you must have in order to carry out anything. There are a number of public companies here with a capital of only £20,000, still they have five directors to manage its concerns.

304. What are they paid? One guinea a sitting.

305. How many sittings in a year? I cannot say.

306. You think that the people here, who are really the ones to be consulted after all, would rather put their hands in their pockets, and pay £400 a year in order to have the Board represented as it now is, than £150 a year with less members? Yes.

307. There has been a great deal said about the enormous cost of the works, as compared with the estimate as given by Mr. Clark. I think Mr. Clark's first estimate was £170,000, to supply a population of 30,000. As a matter of fact, the scheme now supplies a population of something like 60,000, so that it would not be unfair to double the original estimate, but you have really got a capital debt of £528,000;—now, do you think that there has been any unnecessary expenditure incurred;—you are an engineer,

and

A. Gardiner. 5 Nov., 1897.

and your opinion in this respect will be a professional one;—do you think that there has been an unnecessary expenditure of money? On the whole, no. For eight years the works were not producing any revenue. They (the Government) should have arranged otherwise, and not have charged us with the capitalized interest all that time, thus adding to the cost.

308. For eight years then the Government neglected to pass a Bill to compel rates to be paid, and then they charged you interest all the time, and capitalized it at the end;—you do not complain of the works themselves costing too much? No; I personally do not consider they were excessive if the capitalized interest be deducted.

309. You think you voice the opinion of the ratepayers that they are not calling out about the cost of the works? Not now. They are over that.

310. Mr. Clark's original estimate for the storage reservoir at Walka was £4,000 to £5,000, and it cost about £50,000;—is that reservoir necessary, and do you think that £50,000 is its proper cost? It is necessary, and I do not think it is altogether an excessive cost, £50,000.

311. Mr. Clark was greatly out in his estimate, was he not;—also greatly out in his estimate as to the value of land? Yes; the land resumptions are not settled yet.

312. The Government had to pay more than Mr. Clark's estimate for the land? Yes.

313. This was no doubt due to the fact that land values greatly increased from the time Mr. Clark estimated and the carrying out of the works. You think a fair explanation has been given as to the capital cost of the works? Yes; but that is one reason why I maintain that we should not reduce the numbers of the Board. There is such a great tendency amongst Government officials to spend money extravagantly, they having such large ideas. Look at the Cottage Creek scheme. It was something like £22,000 to £23,000 the Government estimated it at, and it did not cost nearly that sum; in fact, it only cost about £5,000, and the credit is due to a member of this Board.

314. If the number were reduced to three members the balance of voting power would still be with the municipalities, just the same as it is now? I do not think that the municipalities would have the same weight if it came down to three members.

315. As a matter of fact, two-thirds is a higher fraction than four-sevenths;—so that looking at it from a proportional point of view you would have a higher representation than with the four members? I think that the Government officials should be kept down in their work.

316. Yes, but if the Board consists of three, the balance will be just as great against the Government as it is now, if not greater? I am prepared to admit for the sake of argument that two-thirds is a greater fraction than four-sevenths, yet for practical purposes it has not the fulness that four-sevenths would have. Your argument is quite sound, still I think that the larger number is the better.

317. As a representative of this great district, your opinion is that no extravagant expenditure has gone on in connection with the water-works, and your only objection is the adding of the accrued interest? Yes.

Joseph William Birkenhead, Esq., Municipal Member of the Hunter District Water Supply and Sewerage Board, sworn, and examined:—

J. W. Birkenhead. 5 Nov., 1897.

318. *President.*] You are one of the municipal members of the Board? Yes.

319. How long have you held that position? Three and a half years.

320. Are you a professional man? No.

321. You, of course, know the object of our visit, and we shall be very glad to hear anything you desire to say? I do not know that I have very much to say, but there is one matter to which I might at the outset refer—that is, I do not think it will be in the interest of the ratepayers to pursue the same course as you have done with the Sydney Board with respect to a reduction in the number of the members. Of course——

322. As I explained to Mr. Gardiner, the previous witness, you must not for a moment think that because we have recommended that a certain course should be adopted in Sydney, it is to say that we are necessarily going to do the same here.

323. If such were done, representation would be entirely lost by a great number of people who are now paying for the water, and the parts of the district which I specially represent would, under the new conditions, be entirely disfranchised. There are 2,650 properties in Newcastle, 5,987 in the suburbs, and West Maitland, East Maitland, and Morpeth is represented by 2,522 rated properties, so that if there are only to be two municipal members elected in the future it is not at all likely that the Maitland district would get its fair share of representation.

324. What about the expenses of the office, the efficiency of the clerks, &c.? I do not think that the office is overmanned.

325. Do you think that the officers are overpaid, underpaid, or what? I think in some cases the salaries would bear an increase. The juniors should certainly be increased.

326. *Mr. Powell.*] It has been said that there are three distinct interests represented on the Board;—what is there that is antagonistic in those interests? I do not know that there is anything exactly antagonistic in the interests of the different districts, but the people are naturally very jealous of their right to be represented. The Maitland people will naturally say that there has been a considerable amount of money expended in their district for water; the main works are in their midst, and they think that they should be represented on the Board.

327. All now being represented on the Board is there anything as between these places now? Nothing that I can point to; but it might occur.

328. They are all represented now? Yes.

329. If any alteration were made in the number on the Board they would still be represented? Not to the same extent, in my opinion. The Maitland ratepayers would be in the minority.

330. There may, of course, be some change in the number of representatives? If you reduce the numbers on the Board how can you get representation for a place like the Maitland district, where they will only have a small number of votes against the other parts.

331. All the people are represented now? Yes; there is nothing antagonistic now, but there might be in the future.

332. They are all represented now, and it only comes to a question as to how many representatives are required? Then the people I represent will be out-voted.

333. There are now four municipal members, but if there were only two required every elector would have his vote then as now, would he not? Yes.

J. W. Birkenhead. 5 Nov., 1897.

334. Representation would not be interfered with, but only the number of representatives? Yes.
335. How many candidates were there when you were elected? Two.
336. Very few. I hear there were sixteen candidates somewhere else. Look at the cost of the Board, which shows that it cost £9,000 to collect £22,000;—is that not a large sum? Yes; but the work is large and varied. If, no doubt, a way can be seen to reduce expenses, it will be done.
337. You are not in favour of a reduction of the members' fees? If I were asked the question as to which I would think it the most desirable to reduce—the fees or the number in the members—I would say, reduce the fees.
338. It takes seven gentlemen to manage this business? Yes.
339. It requires only seven to manage the Sydney supply, and that is too many in the opinions of some? There has been a very large sum of money spent here in connection with the waterworks. The Gas Company in West Maitland has a capital of only £28,000, and the shareholders think that it is necessary to have five directors.
340. Do you think you could get through the business of this Board by meeting once a fortnight? Yes; but perhaps not on all occasions.
341. The business is of a routine character, is it not? There is a great deal to do.
342. It all might really be dealt with by the President and the Board's officers? Do you mean upon all occasions?
343. No? The formal business could.
344. Have you taken any steps as a Board to obtain any increase in your officers' salaries? Recommendations were made some months ago, and were sent down by the President.
345. Was anything done? It was suggested that the matter should be left over until after the visit of the Royal Commission.
346. Do you not think that you are the best judges as to what should be a fair wage for your officers? Personally, I do.
347. It seems very strange then that you should leave it to us? The general opinion outside was that the Board was overmanned and overpaid, and your opinion was required to settle the matter once and for all.
348. *President.*] No one can object to that view of the case; now as to the question of representation. You are a representative of the people, Mr. Birkenhead, and I wish to know if you can assure us—because being a representative of the ratepayers your opinion will have great weight—whether the people are ready to find this additional sum for the purpose of being represented by four members instead of two? I believe so.
349. You can assure us that the people are prepared to put their hands in their pockets and pay this additional expense to enable them to have four members rather than two? I believe so.
350. They would rather have four representatives, irrespective of the amount to be paid; in other words, they would rather pay £400 per annum and have four representatives, than £150 for two? Yes, I think so.

Joseph Brown Barclay, Municipal member of the Hunter District Water Supply and Sewerage Board, sworn and examined:—

J. B. Barclay. 5 Nov., 1897.

351. *President.*] You are one of the Municipal representatives on the Board? Yes.
352. How long have you held that position? I was originally elected in June, 1896, after which I was unseated, but again returned at the beginning of this year. So I have sat for about ten months.
353. We are anxious to get all the information we can in order to carry out the object of the Commission; will you, therefore, kindly give us any information at your disposal? One great point the public are very anxious about (and that is the main reason we asked the Public Service Board to be appointed as a Royal Commission) is with regard to the number employed by the Board on the staff. There is a great impression outside that we are overmanned. I might say at once that for years I myself held that impression, but since I became a member of the Board I have altered that opinion considerably, because, so far as I have been able to judge, I see that everyone is fully employed; but not being altogether competent to judge in office work, I was one of those who thought that you gentlemen should come up here to judge whether the staff was fully employed or not, and the public will be more satisfied after your report has gone forth. Another opinion I held with regard to the Board was that it was overmanned as far as its representatives were concerned. That opinion I have also altered, as I consider it would be detrimental if the Board were reduced in numbers, although I hold that the fees can be considerably reduced. I am inclined to think that the meetings might be held fortnightly, with one guinea as the fee for the sitting. It might be said that we could not get good and competent men to come here for guinea; but we have no authority for saying that competent men will be sent here by the municipal vote, no matter what the fees might be. It is simply the man who has the best grasp of the aldermen who is returned, whether he is a practical man or not. Most of the work of this Board comes within my profession, and I have a good idea of the work required. I think, therefore, that meetings once a fortnight, with a guinea as remuneration, will be quite sufficient. Another opinion I hold is that if the meetings are held at night good men will be found to come and give their time for very little. These are my views, though I might say that I can spend the fees as well as any other member of the Board.
354. Most people can do that? I believe that during the last few months a considerable saving has been made by the present Board. The Board seems to be willing to do all they can for the people. So far as the membership of the Board is concerned I should not, as a member of the Board, like to see it reduced, as the interests are so widely apart here; but, in my opinion, the fees should be reduced.
355. That would be twenty-six guineas a year for each member? Yes.
356. If your Board met of an evening would that get a number of competent men to compete? Yes; that is my opinion, and I think it can be done.
357. As an elected member of the Board do you think you voice the opinion of all the ratepayers, that they would prefer to have four members at a higher cost rather than two members at a lower cost? No; not at a higher cost. I think they would prefer to have the four members as at present, but at reduced fees. As a matter of fact, at a conference of the aldermen of the district, it was resolved that the meetings should only be held fortnightly, and that the fee should be one guinea per sitting.
358. If the fees are reduced they would rather have the same representatives than reduce the members and pay higher fees? That is the opinion of the district. 359.

J. B. Barclay. 5 Nov. 1897.

359. Is it the opinion of the people that the fees are too high? Yes; personally, I thought once that a smaller Board was necessary; but I have changed in my views since I became a member.
360. There was a great deal of dissatisfaction about the cost of the works;—is that dissatisfaction still in existence, and is it well founded? I think the people were greatly misled with respect to the cost of the works.
361. Do you think the works have cost too much? I think so.
362. In what respect? I cannot say exactly. Seeing that the estimate was so far exceeded, I think that the Government of the day should have informed the people at the time.
363. But putting that aside, do you think that the works have cost too much? I am not prepared to answer that.
364. You are satisfied that the first estimate was wrong? The first estimate was absurd.
365. The estimate for the Walka Lagoon was something like £10,000 I believe, and it cost over £50,000, did it not? It was a very absurd estimate, compared with the cost, I know. I am not prepared to say that the works cost too much, but I know the estimate was perfectly absurd.
366. On the whole you are not prepared to dispute the cost of the works? I am not prepared to dispute the cost, but the people were misled though. They should have been informed by the Government, and then the scheme would not have attained such magnitude. The great cause of the dissatisfaction here is that the people are compelled to pay, and all do not use the water. I think, to get on another subject, that a great injustice is being done our young officers here. If I had a son of my own here I would naturally look to his rising, but the way the staff is isolated from the Public Service there is no possible chance of promotion. I would very much like to see the staff put under the Public Service Board.
367. Would not the ratepayers object very much to that? No; I do not think they would object at all, but on the other hand I think they would like to see it done.
368. Would they not say that we are interfering with their staff? I do not think so. We have lads growing up in our service here, and what possible chance has the Board to do anything for them.
369. They could come into the Service now, providing they are not over 30 years of age, and pass the examination required;—that is, they would be eligible for the Service? If we had a vacancy for Mr. Fry to-morrow, we could not engage him as matters are now.
370. *Mr. Powell.*] You consider the Board overpaid;—do you consider your officers overpaid? I think that some of the officers are underpaid.
371. Does it not rest with the Board to say so? I am not competent, nor have I the time to go into all the details of a clerk's work. If I were the President, I might do so. I look at it in this way; we have men here with families getting £125 to £150 a year, and I do not think that they are overpaid at all; but if we could get some of them away into the Public Service, the younger clerks could then have a show.
372. Do you think that £90 a year is a fair salary for a cashier? No; it is not conducive to honesty.
373. There is apparently a division of the Board into sections;—you have one representative for the Maitland district, two for the mining townships, and one for Newcastle. Is there anything antagonistic between these sections. Why not take one electorate for the whole of the district under the Board? I do not think that one electorate for the whole would do. For instance, I know nothing about the Maitland district or its requirements, therefore, I should be very sorry to see its representative taken away. It might be possible to make Newcastle and the suburbs one electorate, but I do not think it would work in the case of Maitland.
374. You think that Newcastle and the mining townships might return members as one electorate? Yes; that might be done, though the interests are very different. I would sooner see the fees reduced than the members of the Board altered.
375. Local requirements seem to me to scarcely affect the question at all as far as representation is concerned;—the Board is to carry out the scheme for all? Yes; but supposing the Board were composed of three members, one would be a Government member and the other two municipal members, the Maitland people would not have the same voice in their election as now, because the Newcastle people could quite outvote them. Then there is no guarantee that practical men will be returned. They might veto the President, the Minister would then have to uphold the President, and so practically the work of Board would be carried out by the Government altogether.
376. So far as you are concerned, you would like to see the district represented as at present? Yes.
377. You and your colleague might hold different views, and then your district would be non-represented? Yes; but in any matters we do not thoroughly understand it is our rule, as a Board, to go and make a close inspection ourselves first before dealing with the subject.
378. In the event of yourself and your colleague differing, your constituents would be non-represented? Yes.
379. Would it not be better then to have only one member? The only trouble would be that he and the other would retire every four years, and then you would practically have a new Board every time.
380. Why should there be seven representatives for this Board, and only seven representatives for the Sydney Board;—how much capital do you deal with here? I cannot say exactly, but I think it is about half a million.
381. And it takes seven men to look after it once a week? Yes.
382. The Sydney Board has seven members, and their capital is six millions;—they manage to get through their work and meet once a week, still the Public Service Board, as you know, has expressed the opinion that the Board can be carried on just as efficiently with fewer members? There is no guaranteeing that you can get practical men on the Board.
383. If it were more convenient to hold meetings of a night, that is a matter which the Board has under its own control, is it not? Yes. I moved it once on the Board.
384. You think that the fees are too high, but you would still retain the seven members on the Board, and you also consider fortnightly meetings will be sufficient? Yes.
385. Do you think that lowering the fees would lower the tone of the representation? I do not think so. If they had any patriotism at all they would do the work for nothing if it came to that.
386. Patriots like to be paid you know? Yes; but not overpaid. I have no hesitation in saying that if the Board fees are lowered one-half the people will be very much more satisfied.

John Ewing, Official Member of the Hunter District Water Supply and Sewerage Board, sworn and examined :—

J. Ewing. Nov., 1897

387. *President.*] You are, I believe, an official member of the Board appointed by the Government? Yes.
388. We shall be only too glad to hear anything you may have to say to us? I have noticed your report in connection with the Metropolitan Board, and I have come to the conclusion that your decision with regard to the number of members on our Board will be very much the same, and I want to point out——
389. We have come to no decision on that point yet? The constitution of the present Board is, in my opinion, a very happy one. We have four municipal members here, and they represent equal constituencies of ratepayers, and if it were reduced one-half the effect would be that the Maitland district would be disfranchised altogether on the Board. The suburbs of Newcastle have three-fourths of the voting-power, and the members returned would represent the Newcastle district alone. I am certain the Maitland people would feel very much aggrieved; in fact, they would feel that they had been disfranchised if the present arrangements were altered. I have been a long time an alderman, and I can tell you that the people value the right of being represented very highly, and if they felt that they were not represented I think that a feeling of antagonism to the Board might spring up, and the President, whoever he might be, would have to be receiving deputation after deputation from the Maitland people. Under the present system we work very smoothly indeed, and the people are satisfied, because they are represented here. I certainly think that the wisest course would be not to disturb the present position of the Board, and leave it as it is. Perhaps the cost of the Board could be reduced, but do not reduce the representation. As for the two official members, I take it that you can do what you like with us, but do not take away the representatives from the municipalities. The people all over the Colony are imbued with the principle that taxation without representation is wrong. I believe that if you take away any of the present representatives you will have a lot of deputations waiting on the President, and the business of the Department would be retarded. The business of the official members is to keep things as smooth as possible. Sometimes the municipal members are apt to think they are in the majority, as indeed they are, and in that case it is our duty as official members to bring about harmony as much as possible, and we have succeeded very well in that so far. It would be unwise to disturb the constitution of the Board. That is the only matter I think I have to speak about.
390. What reduction, if any, do you think should be made in the fees paid to the Board? I believe that they might be reduced one-half by reducing the meetings by one-half. I would like to see the Board worked as economically as possible. I am very sorry to see that the President does not get more than he does, though.
391. Your President is getting a Government salary elsewhere, but at the same time I am certain that no one would belittle the work of your President on this Board or elsewhere. You think that the staff is not overmanned or overpaid? That is a matter on which I do not feel myself called upon to give an opinion. My particular value to the Board is as an engineer, and I have had very little experience as to the clerical duties of the staff. There is a feeling outside that the Board is overmanned, and there is also a contention that the staff is overpaid, but we want you gentlemen to see to that.

Joshua Binnington Henson, Engineer to the Hunter District Water Supply and Sewerage Board, sworn and examined :—

(Henry Deane Walsh, President of the Hunter District Water Supply and Sewerage Board, being also present.)

J. B. Henson. Nov., 1897.

392. *President.*] What position do you hold in the Board's service? I am the Board Engineer.
393. How long have you held that position? Since the inception of the Board.
394. Can you give us any information which will assist us in carrying out the object of this Commission? With regard to the management of the department over which I have control—that is, the pumping works, and the distribution of the water generally—I should like to point out that since the Board took control there has been no increase in the staff, and no increase in the expenses, except what is due to the actual increase of water pumped, necessitating an increased expenditure for coal and stores.
395. Can you tell me what duty the engines perform now, as compared with what they did at first? For the year ending 30th June, 1893, the quantity of water pumped was 164,616,850 gallons—that is, from the clear-water tank to the service reservoirs; for the year ending 30th June last, 266,979,583 gallons were pumped, which is an advance of (say) 100,000,000 gallons, or about 60 per cent. more water pumped.
396. And yet the expenses have not increased? That is so, except for fuel and stores, and more water yet could be pumped by same staff.
397. What does it cost you per thousand gallons to pump? At per thousand gallons, with a lift of 100 feet, it cost ·413d. for the quarter ending June last. It was more than that when the Board took charge.
398. How does that compare with the Metropolitan Board? At Crown-street it cost ·347d.; Ryde, ·324d. At Crown-street they pump more water than we do, and at Ryde they also pump more.
399. I suppose you mean that with the present working capacity of your engines you could lift a much larger quantity of water with practically the same expense? Yes; but at times in the height of summer the pumping will occupy the time of two shifts—the working hours of the staff will be arranged to suit the occasions.
400. It costs you practically one-third more here? Yes.
401. Is it not a fact that your coal is much cheaper? Yes.
402. What would the difference in cost be if you were put upon the same footing as Sydney;—it would increase you how much? I have not worked it out.
403. Would there be an increase? It would certainly be an increase, but I cannot say exactly what it would be. We pay 5s. 6d. a ton for our coal.
404. How much do they pay in Sydney? I cannot say.
405. *Mr. Powell.*] There would only be the freight on.
406. *President.*] Will you find that matter out about the cost of the coal? Yes. [*Vide Appendix O.*] In connection with our works we have to filter, and also have to do two pumpings.
407. That is of great importance in the cost, of course; but would not your 100 feet be included in that;—

are

are there two lifts in your 100 feet? It is rather a difficult matter to make an exact comparison. I have included all the pumping done at the station in working out the cost of lifting 1,000 gallons 100 feet. J. B. Henson. 5 Nov., 1897.
408. You have to do double pumping, then? Yes, to a large extent; and we have to pump to the storage reservoir also.
409. Taking everything into consideration, you think that the cost here will compare pretty nearly with the rate in Sydney? I think that if we pumped as much water here as they do in Sydney, we could do it cheaper.
410. Do you think that your staff is fully manned, or over-manned? I do not think that we are over-manned, and I consider that the present staff has as much as it can do. Mr. Hackett, the engineer-in-charge at Walka, has furnished me with a statement showing that in 1889 the cost per 1,000 gallons 100 feet lift was 1·534d.; in 1892, the year the Board commenced, it was ·790d.; in 1897, ·377d. This decrease in price was brought about by an increase in the quantity of water pumped, and partly due to the more efficient state in which the engines had been brought, and fall in price paid for coal.
411. Can you hand in that return as being correct? Yes. [*Vide Appendix* N.]
412. *Mr. Walsh.*] Perhaps I may be permitted to point out that at the first portion of the time to which Mr. Henson refers we had to keep up the full staff, but on account of the small amount of water pumped it was only necessary for the pumps to work six or seven hours. We had to pay for a full shift, although practically only a half shift was really worked.
413. *President.*] *To Witness:* Is there anything you can suggest? Not with regard to my staff.
414. Are they paid a fair rate of wages? Recently I had a consultation with the Secretary, and suggested making some of the payments more uniform.
415. *To Mr. Walsh:* You have dealt with that, I believe? Yes.
416. *To Witness:* Mr. Walsh has given effect to that;—is there anything else you can think of? There is one matter to which I should like to refer, as it may affect my position as Engineer to the Board. I understand that the Act provides that the members of the Board may, if they so desire it, act as contractors to the Board, and that being so, it places me, as the engineer in charge of all the works, in a position which I do not altogether care to be placed in. I believe that members have either directly or indirectly been interested in tendering for contracts under the Board, but it is more with a view to the future that I mention the matter.
417. The meaning of the section of the Act to which you refer is this: That a member of Parliament may be elected a member of the Board and receive payment without incurring forfeiture of his seat.
418. *To Mr. Walsh:* Is there no clause in your Act to exclude members of the Board contracting with the Board. I know that there is an unwritten law that members of any Board would not be eligible to hold a contract under the Board? There is nothing special in our Act.
419. *To Witness.*] The section simply means that a Member of the Legislative Assembly could hold a seat on your Board and receive payment without any risk of forfeiting his seat in the House. That is all it refers to. It means that it would not be considered an office of profit under the Crown, that is all. I most certainly do not think that it can be taken to imply that members can act under it as contractors to the Board? The interpretation given to me was that members of the Board could contract.
420. Who gave you that interpretation? The Secretary.
421. It does not contemplate that at all. It is certainly not intended to cover a case of a member having a contract under the Board?
422. *Mr. Powell.*] I take that view of it entirely.
423. *President.*] It is not intended to cover such a case at all. Have cases arisen here in which members of the Board have been contractors under it? No.
424. Why do you bring up the question, then? Because members have either directly or indirectly tendered for work under the Board, though they never got any contracts.
425. *To Mr. Walsh.*] Do you know of any such cases? Yes; the firm of E. and A. Rodgers tendered for work under the Board whilst Mr. J. S. Rodgers was a member of the Board, but they did not get it.
426. Were you aware at the time that he was a member of the firm? I did not know. He was the managing director of the firm. He disclaimed having anything to do with the firm. Mr. Barclay, a municipal member of the Board, is the Government contractor for castings for this district, and he has supplied a number of castings under his schedule.
427. He holds his contract under the Department of Public Works, does he not? Yes.
428. And does that bind your Board in their requirements? Up to 30th June last it did, but there is now a special provision in the contract excluding the Metropolitan and Hunter River Boards.
429. How long did that last? Ever since Mr. Barclay was on the Board. Under the Municipalities Act there is a clause forbidding contracting, but in ours there is none.
430. There is the unwritten law, though. [*To witness.*] Have you any reason to fear that such things might occur? It may occur in the future if the Board carry out any extensive contracts.
431. Have you any reason to fear that such a thing will occur? No particular fear. It may occur if the opportunity remains.

THURSDAY, 18 *NOVEMBER*, 1897.

[*At the Offices of the Public Service Board, Sydney.*]

Present:—

JOSEPH BARLING, Esq., J.P., President.
GEORGE ALEXANDER WILSON, Esq., J.P.
JAMES POWELL, Esq., J.P.

Walter Liberty Vernon, Government Architect, sworn and examined:—

432. *President.*] In carrying out the inquiry entrusted to us in connection with this matter, we have had occasion to take the evidence of Mr. Walsh, the President of the Hunter District Water Supply and Sewerage Board, and, in the course of his evidence, he stated that it would add to the more economical management of the Board if either the present offices occupied by them were resumed, or if new offices were put up for them. We then decided to ask you to be so good as to look into the whole matter and give your opinion thereon. We will give you a free hand? I have not been to Newcastle to see the present

W. L. Vernon. 18 Nov., 1897.

W. L. Vernon. 18 Nov., 1897.

present building or the site of the proposed building, and can, therefore, only speak from recollection, as far as the site is concerned; nor could I give an opinion at the present moment as to the advisability of purchasing the present building, as I have no information as to values, &c.

433. I may tell you that the Board do not look with favour on the resumption of the present building? I have kept myself strictly to seeing how the accommodation required can be provided on the Government land immediately adjoining the Custom House, in a new building attached to the present one. Having as a guide the plan supplied by Mr. Walsh, in which he shows the requirements in the way of floor space, and the manner in which the different rooms are to be utilised, there is left to me little more than the very simple matter of transcribing the plan on to the present Custom House. On the ground floor the accommodation that is required has been carefully examined, and two or three minor improvements made on the plan submitted by Mr. Walsh. Being attached to the existing building, on the side facing the "Great Northern Hotel," it blocks up two small windows; but as these only light a passage, there is really no harm done—that is, the lighting of this passage should not stand in the way.

434. *Mr. Wilson.*] If I understood Mr. Walsh aright, the building was to be in the corner, where the cottage now stands? I am not quite certain yet which is the most economical way of utilising the land. It might be that placing the building there would destroy the corner.

435. *President.*] If the building were erected where suggested by you, that would leave a very valuable corner at the disposal of the Government? In that case the most economical arrangement would be to have the building alongside. Then, on the first floor, the new building would not interfere at all with the light of the present building, and if it were so desired at any time, the two places could be connected by doorways, and converted into one building.

436. That is, if the Government required, they could take the whole building, and the Water and Sewerage Board go somewhere else? Yes; the corridor could be completed, and that would give access to the centre of the building. I may say that the office accommodation is as shown by Mr. Walsh, except that I have shortened the corridor on one side and thrown the space into the rooms, which, I think, is an improvement. I have also given better construction to the fireplaces upstairs than provided for on the plan, *e.g.*, I have removed the fireplaces in the assessor's room and placed them at the end of the building. The strong-room which Mr. Walsh suggested should be in the basement, I have provided a place for, subject, of course, to its being considered convenient, under the lavatories. I have done that for these reasons: In the first place, it would be impossible, if placed in a basement, to drain it, and then it would very likely be liable to the action of the flood—I mean the salt water flood—the ebb and flow of the tide. I have, therefore, kept it up to the ground level, and access thereto can be gained by going through the hall and down three or four steps. This would provide a strong room in which all the safes could be placed; or these could be done away with, and a good strong door provided for the room. This room would, as I have said, form the base of the lavatories. It will be seen that I have provided only one nest of lavatories, instead of two, as suggested, but it is of much larger dimensions. Mr. Walsh suggested two w.-c's., whilst I have provided three; I have also provided four washing basins, and the same number of urinals as suggested. I have got all the extra accommodation on to one floor, and have disconnected the main building by a small corridor for the purposes of ventilation. One great drawback, as regards cost, is that the floor of the whole must be kept to the same level as the floor of the Custom House, and that is considerably above the ground; therefore it will be necessary to have extra foundation that would in other cases be unnecessary.

437. Does not the ground rise there? It may to some extent, but I do not think the rise is appreciable. If you will recollect, the railway platform is built on a level. It is a drawback, that more brickwork is required in the foundations than for an ordinary building. Then, the building will have to be carried up to the same height as the Custom House, in which the rooms are very lofty. I think you can see at a glance that it is necessary to continue this wing to balance the other part of the building, and it might be necessary to throw something out in the centre of the building.

438. *Mr. Powell.*] I think the cellars are used? That is no drawback; the cellars could be used for Custom House purposes, or even for Water and Sewerage Board purposes.

439. I think they are used, but they are wet. What I mean is, that the Custom House people want to get at them?——

440. *Witness continuing.*] In consequence, the cost is rather forced up.

441. *President.*] What is the cost? I have cubed this up, and at 6d. a foot, which is rather low, the cost would be £3,373. At 7d. a foot it would come to about £4,000.

442. And what would you allow for wear and tear? The wear and tear of Government buildings, generally, is about 2½ per cent., but they do not get attention up to that.

443. That would be a fair thing? Yes.

444. That would be £100 per annum? Yes; but for the first few years it would not amount to this.

445. *Mr. Wilson.*] They have to keep the present premises in order, as well as pay the rent.

446. *President.*] Still, they would not have to do the same as to this building?——

447. *Mr. Wilson.*] They have to keep it in tenantable repair.——

448. *President.*] Reckoning at the rate of 3 per cent. on the cost of the building, that would be £220 per annum for a more commodious building.

449. *Mr. Powell.*] What do you think of the site for their particular business? It is a very central site, near the railway station, and easy of access to those coming in from the various surrounding districts. I think it is about equal to Hunter-street—not better and not worse; and, seeing that the Government has the land there, it seems to me that the advantage is on the side of the site.

450. *President.*] Would not there be a further advantage in this, that if at any time they wished to extend the Custom House they could take this building? Yes; the size of the Custom House could be increased without any more capital cost. I forgot to mention, too, that the tram runs by the proposed site, whereas it is not in Hunter-street.

451. *Mr. Wilson.*] If this proposal is to be carried out, the Government will have to build and charge rent.

452. *President.*] Yes, the Government would bear the cost, and practically the Water and Sewerage Board would have to pay the Government interest on their outlay, and also keep the building in repair.

453. *Mr. Wilson.*] The best thing would be to charge them 5 per cent. to cover interest and maintenance. That amounts to just about what the President of the Board said.

454. *Mr. Powell.*] It would make a nice addition to the building? It would improve the appearance of the present building.

455.

455. *President.*] Of course we are not allowing for the land, but that is lying idle now? I think the cottage stands partly on the land. W. L. Vernon.
456. What is the frontage? Sixty-two feet. I think it would be more economical to attach the building to the Custom House. 18 Nov., 1897.
457. I think it would be as well to see Mr. Young, and have the amount included in the Estimates at once. If the Government received 5 per cent., it would involve no loss to the State? No.
458. It would mean that they would only have to pay £200 per annum, instead of £350 as they do now? That would be so.
459. Is there nothing else to be said on the subject? I do not know of anything else. I now hand in the plan prepared by me. [*Vide Appendix* U.]

MONDAY, 22 NOVEMBER, 1897.

[*At the Offices of the Public Service Board, Sydney.*]

Present:—

JOSEPH BARLING, Esq., J.P. (President).
GEORGE ALAXANDER WILSON, Esq., J.P.
JAMES POWELL, Esq., J.P.

Alfred Ernest Fry further examined:—

460. *President.*] Are you prepared to hand us your financial statement now? Yes; I hand in a statement showing the estimated revenue and expenditure of the Board for the year ending the 30th June, 1898, under the Amending Bill, which has now been paseed into law, and also statement of the estimated capital debt. In this connection I desire to point out that, in my previous evidence, the cost of the storage reservoir, filter-beds, and tanks at Walka was taken at £50,000. I find, on going into the matter carefully since, that these works cost £65,058. The item for the annual instalment to the Sinking Fund will therefore be reduced from £2,560 to £2,434. Full particulars are given in the return now handed in. [*Vide Appendices* Q *and* R.] A. E. Fry. 22 Nov., 1897.

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APPENDIX A.

RETURN showing the total amount of Salaries and Fees paid to the Board.

Year ending—	President's Salary.	Members of Board (6).	Total.
	£ s. d.	£ s. d.	£ s. d.
30 June, 1893	400 0 0	594 0 0	994 0 0
30 June, 1894	300 0 0	598 0 0	898 0 0
30 June, 1895	300 0 0	602 0 0	902 0 0
30 June, 1896	.....*	570 0 0	570 0 0
30 June, 1897	100 0 0	548 0 0†	648 0 0
£	1,100 0 0	2,912 0 0	4,012 0 0

* The £100 due to Mr. Brown has not been drawn by him.
† Mr. Barclay, elected 30 June, 1896, was ousted, but subsequently re-elected on 30 December, 1896.

Board's Office, Newcastle, 1st September, 1897.

ALFRED E. FRY,
Secretary and Accountant.

APPENDIX B.

RETURN as to Board.

Member's Name.	Tenure of office closes.	Attendances during the year ending 30th June, 1897.	Amount of Salary or Fees received during year ending 30th June, 1897.	Remarks.
Official Members—			£ s. d.	
Walsh, Henry Deane	30 June, 1898	52	100 0 0	M.Inst.C.E., President.
Ewing, John	30 June, 1900	50	100 0 0	
Lee, Henry William	30 June, 1900	50	100 0 0	
Municipal Members—				
Gardiner, Archibald	30 June, 1898	52	100 0 0	Vice-President.
Birkenhead, Joseph William	30 June, 1898	50	100 0 0	
Webb, George William	30 June, 1900	51	100 0 0	
Barclay, Joseph Brown	30 June, 1900	24	48 0 0	

Mr. Barclay was elected 30 June, 1896, was ousted and subsequently re-elected on 30 December, 1896.

Meetings of Board held weekly on Mondays at 10 a.m.

Rates of Remuneration.

President—Entitled to be paid such salary as the Governor may determine and as may be voted by Parliament—at present £100 per annum.

Official and Municipal Member—Entitled to receive as remuneration for his services a sum not exceeding £100 per annum, to be paid to him in the form of a fee for each meeting of the Board at which he shall have been present up to the termination thereof, and of such amount as the Governor may appoint.

Board's Offices, Newcastle, 31st August, 1897.

H. D. WALSH,
President.

APPENDIX C.

STATEMENT showing Capital Debt of the Hunter District Water Supply and Sewerage Board.

	£ s. d.	£ s. d.
Year ending 30th June, 1893:—		
As gazetted—		
On account of permanent works		237,256 3 6
On account of renewable works	180,065 7 7	
Less value of stock, included in above figures, taken over by the Board at inception	14,344 13 2	
		165,720 14 5
		402,976 17 11
Additions during the year—		
Renewable works	175 12 10	
Office furniture and fittings	1,254 18 10	
		1,430 11 8
Total		£404,407 9 7
Year ending 30th June, 1894:—		
Capital debt at 30th June, 1893, as shown above		404,407 9 7
Additions during the year—		
Renewable works	320 15 1	
New mains	1,701 13 9	
Office furniture and fittings	102 6 0	
Legal and witness' expenses (colliery cases)	62 16 11	
	2,187 11 9	
Less materials since recovered, and which will be utilised on works as required	723 9 5	
		1,464 2 4
Total		£405,871 11 11

Hunter District Water Supply and Sewerage Board,
Board's Offices, Newcastle, 1st September, 1897.

ALFRED E. FRY,
Secretary and Accountant.

APPENDIX B (*continued*).

CAPITAL Debt of the Hunter District Water Supply and Sewerage Board.

	£ s. d.	£ s. d.
Year ending 30th June, 1895 :—		
Capital debt at 30th June, 1894 (as shown)		405,871 11 11
Additions during the year—		
Renewable works	125 1 0	
New mains	5,936 17 11	
Office furniture and fittings	15 12 0	
Legal and witness' expenses (colliery cases)	683 5 3	
		6,860 16 2
Total		£412,732 8 1
Year ending 30th June, 1896 :—		
Capital debt at 30th June, 1895 (as shown)		412,732 8 1
Additions during the year—		
Permanent works	69 11 11	
Renewable works	41 5 2	
New mains	2,623 11 0	
Office furniture and fittings	10 9 6	
Legal and witness' expenses (colliery cases)	257 4 7	
		3,002 2 2
Total		£415,734 10 3
Year ending 30th June, 1897 :—		
Capital debt at 30th June, 1896 (as shown)		415,734 10 3
Additions during the year—		
Renewable works	4,258 8 6	
New mains	6,750 17 2	
Office furniture and fittings	13 19 7	
Legal and witness' expenses (colliery cases)	1,267 13 0	
		12,290 18 3
Total debt as per Ledger at 30th June, 1897		£428,025 8 6*

ALFRED E. FRY,
Secretary and Accountant.

Hunter District Water Supply and Sewerage Board,
Board's Offices, Newcastle, 1st September, 1897.

* This total will be altered when the capital debt is determined under the provisions of the amending Act.

APPENDIX D.

STATEMENT of Revenue and Expenditure for the Year ending 30th June, 1893.

Revenue.	£ s. d.	*Expenditure.*	£ s. d.
Revenue struck (as per details in Appendix E)	22,651 4 6	Interest for the year on the estimated amount of Capital Debt (as per Annexure), 3½ per cent on £404,407	14,154 4 10
		Management Expenses— £ s. d.	
		Board Fees	594 0 0
		Expenses	3,720 6 10
			4,314 6 10
		Working Expenses	3,727 19 9
		Maintenance (actual expenditure only)	354 15 1
		Balance	99 18 0
	£22,651 4 6		£22,651 4 6

MEMO.--In this series of Returns the actual expenditure for maintenance is shown, which is much less than the amount of the proper annual instalment to the Sinking Fund for renewals, which is fully explained in a later Return. (*Vide Appendix* Q.)

ALFRED E. FRY,
Secretary and Accountant.

Board's Offices, Newcastle, 1st September, 1897.

RETURN showing the Revenue and Expenditure of the Board for the Year ending 30th June, 1894.

Revenue.	£ s. d.	*Expenditure.*	£ s. d.
Revenue struck (as per details in Appendix E)	21,406 9 11	Interest for the year on the estimated amount of the Capital Debt (as per Annexure), 3½ per cent. on £405,871	14,205 9 8
		Management Expenses— £ s. d.	
		Board Fees	598 0 0
		Expenses	4,021 7 9
			4,619 7 9
		Working Expenses	4,193 17 4
Balance	2,184 11 10	Maintenance (actual expenditure only)	572 7 0
	£23,591 1 9		£23,591 1 9

ALFRED E. FRY,
Secretary and Accountant.

Board's Offices, Newcastle, 1st September, 1897.

RETURN

APPENDIX D—*continued.*

RETURN showing the Revenue and Expenditure of the Board for the year ending 30th June, 1895.

Revenue.	£ s. d.	*Expenditure.*	£ s. d.
Revenue struck (as per details in Appendix E)	20,367 2 1	Interest for the year on the estimated amount of the Capital Debt (as per annexure), 3½ per cent. on £412,732	14,445 12 0
		Management Expenses— £ s. d.	
		Board Fees 602 0 0	
		Expenses 3,974 12 10	
			4,576 12 10
		Working Expenses	4,066 0 9
Balance	3,100 13 3	Maintenance (actual expenditure only)	379 9 5
	£23,467 15 4		£23,467 15 4

ALFRED E. FRY,
Secretary and Accountant.

Board's Offices, Newcastle, 1st September, 1897.

RETURN showing the Revenue and Expenditure of the Board for the year ending 30th June, 1896.

Revenue.	£ s. d.	*Expenditure.*	£ s. d.
Revenue struck (as per details in Appendix E)	20,779 6 2	Interest for the year on the estimated amount of the Capital Debt (as per annexure), 3½ per cent. on £415,734	14,550 13 9
		Management Expenses— £ s. d.	
		Board Fees 570 0 0	
		Expenses 3,863 0 6	
			4,433 0 6
		Working Expenses	3,990 18 4
Balance	2,583 9 10	Maintenance (actual expenditure only)	388 3 5
	£23,362 16 0		£23,362 16 0

ALFRED E. FRY,
Secretary and Accountant.

Board's Offices, Newcastle, 1st September, 1897.

RETURN showing the Revenue and Expenditure of the Board for the year ending 30th June, 1897.

Revenue.	£ s. d.	*Expenditure.*	£ s. d.
Revenue struck (as per details in Appendix E)	22,518 0 9	Interest for the year on estimated amount of the Capital Debt (as per annexure), 3½ per cent. on £428,025	14,980 17 9
		Management Expenses— £ s. d.	
		Board Fees 548 0 0	
		Expenses 3,834 16 5	
			4,382 16 5
		Working Expenses	4,211 7 3
Balance	1,466 14 4	Maintenance (actual expenses only)	409 13 8
	£23,984 15 1		£23,984 15 1

ALFRED E. FRY,
Secretary and Accountant.

Hunter District Water Supply and Sewerage Board,
Board's Offices, Newcastle, 1st September, 1897.

APPENDIX E.

RETURN showing Amount of Revenue Struck, Collected, and Outstanding, for the year ending 30th June, 1893.

Head of Revenue.	Struck, year ending 30th June, 1893.	Collected, year ending 30th June, 1893.	Over-payments refunded.	Net Collections for the year.	Outstandings, 30th June, 1893.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Rates	18,232 16 9	11,902 8 4	16 1 8	11,886 6 8	6,346 10 1
Special fees	92 0 3	89 18 0	.....	89 18 0	2 2 3
Meter accounts	4,220 14 10	3,218 19 10	.....	3,218 19 10	1,001 15 0
Miscellaneous	106 2 8	95 18 6	.....	95 18 6	10 4 2
Total Revenue	22,651 14 6	15,307 4 8	16 1 8	15,291 3 0	7,360 11 6
Other items (not revenue)	2,007 4 3	1,694 8 3	.....	1,694 8 3	312 16 0
Totals	24,658 18 9	17,001 12 11	16 1 8	16,985 11 3	7,673 7 6

ALFRED E. FRY,
Secretary and Accountant.

Hunter District Water Supply and Sewerage Board,
Board's Offices, Newcastle, 1st September, 1897.

APPENDIX E—*continued.*

RETURN showing Amount of Revenue Struck, Collected, and Outstanding, year ending 30th June, 1894.

Head of Revenue.	Arrears at 30th June, 1893.	Struck for year ending 30th June, 1894.	Total.	Collected, year ending 30th June, 1894.	Over-payments refunded.	Net collections for the year.	Outstanding at 30th June, 1894.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Rates	6,346 10 1	19,016 6 6	25,362 16 7	19,803 1 1	66 15 9	19,736 5 4	5,626 11 3
Special fees	2 2 3	111 0 5	113 2 8	107 2 8	.....	107 2 8	6 0 0
Meter accounts	1,001 15 0	2,194 9 3	3,196 4 3	2,388 13 11	2 5 7	2,386 8 4	809 15 11
Miscellaneous	10 4 2	84 13 9	94 17 11	88 4 10	0 2 6	88 2 4	6 15 7
Total revenue	7,360 11 6	21,406 9 11	28,767 1 5	22,387 2 6	67 3 10	22,317 18 8	6,449 2 9
Other items (not revenue)	312 16 0	715 0 4	1,027 16 4	857 17 11	3 1 8	854 16 3	173 0 1
Totals £	7,673 7 6	22,121 10 3	29,794 17 9	23,245 0 5	72 5 6	23,172 14 11	6,622 2 10

ALFRED E. FRY,
Secretary and Accountant.

Hunter District Water Supply and Sewerage Board,
Board's Offices, Newcastle, 1st September, 1897.

RETURN showing Amount of Revenue Struck, Collected, and Outstanding, year ending 30th June, 1895.

Head of Revenue.	Arrears at 30th June, 1894.	Struck for year ending 30th June, 1895.	Total.	Collected, year ending 30th June, 1895.	Over-payments refunded.	Net collections for the year.	Outstanding at 30th June, 1895.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Rates	5,626 11 3	17,466 16 2	23,093 7 5	18,171 6 1	17 19 8	18,153 6 5	4,940 1 0
Special fees	6 0 0	108 3 0	114 3 0	110 15 6	0 5 0	110 10 6	3 12 6
Meter accounts	809 15 11	2,642 2 10	3,451 18 9	2,611 18 6	.....	2,611 18 6	840 0 3
Miscellaneous	6 15 7	150 0 1	156 15 8	152 14 0	3 0 0	149 14 0	7 1 8
Total revenue	6,449 2 9	20,367 2 1	26,816 4 10	21,046 14 1	21 4 8	21,025 9 5	5,790 15 5
Other items (not revenue)	173 0 1	644 12 3	817 12 4	763 14 5	.....	763 14 5	53 17 11
Totals £	6,622 2 10	21,011 14 4	27,633 17 2	21,810 8 6	21 4 8	21,789 3 10	5,844 13 4

ALFRED E. FRY,
Secretary and Accountant.

Hunter District Water Supply and Sewerage Board,
Board's Offices, Newcastle, 1st September, 1897.

RETURN showing Amount of Revenue Struck, Collected, and Outstanding, year ending 30th June, 1896.

Head of Revenue.	Arrears at 30th June, 1895.	Struck for year ending 30th June, 1896.	Total.	Collected, year ending 30th June, 1896.	Over-payments refunded.	Net collections for the year.	Outstanding at 30th June, 1896.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Rates	4,940 1 0	16,938 13 0	21,878 14 0	15,643 19 7	15 9 11	15,628 9 8	6,250 4 4
Special fees	3 12 6	201 6 8	204 19 2	192 2 8	0 16 0	191 6 8	13 12 6
Meter accounts	840 0 3	3,405 12 9	4,245 13 0	3,319 7 2	0 9 10	3,318 17 4	926 15 8
Miscellaneous	7 1 8	229 17 3	236 18 11	229 17 3	.....	229 17 3	7 1 8
Meter hire	.....	3 16 6	3 16 6	3 16 6	.....	3 16 6	.....
Total revenue	5,790 15 5	20,779 6 2	26,570 1 7	19,389 3 2	16 15 9	19,372 7 5	7,197 14 2
Other items (not revenue)	53 17 11	121 17 0	175 14 11	122 7 0	.....	122 7 0	53 7 11
Totals £	5,844 13 4	20,901 3 2	26,745 16 6	19,511 10 2	16 15 9	19,494 14 5	7,251 2 1

ALFRED E. FRY,
Secretary and Accountant.

Hunter District Water Supply and Sewerage Board,
Board's Offices, Newcastle, 1st September, 1897.

RETURN

APPENDIX E—*continued.*

RETURN showing Amount of Revenue Struck, Collected, and Outstanding, year ending 30th June, 1897.

Head of Revenue.	Arrears at 30th June, 1896.	Struck for year ending 30th June, 1897.	Total.	Collected, year ending 30th June, 1897.	Over-payments refunded.	Net collections for the year.	Outstanding at 30th June, 1897.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Rates	6,250 4 4	16,126 15 11	22,377 0 3	17,082 16 7	10 15 11	17,072 0 8	5,304 19 7
Special fees	13 12 6	252 7 9	266 0 3	247 15 3	0 15 0	247 0 3	19 0 0
Meter accounts	926 15 8	5,945 0 8	6,871 16 4	5,002 6 3	0 3 6	5,002 2 9	1,869 13 7
Meter hire	. ..	46 3 5	46 3 5	41 16 3	0 1 10	41 14 5	4 9 0
Miscellaneous	7 1 8	147 13 0	154 14 8	147 15 0	0 3 0	147 12 0	{ 0 3 6 { 6 19 2
Total revenue	7,197 14 2	22,518 0 9	29,715 14 11	22,522 9 4	11 19 3	22.510 10 1	7,205 4 10
Other items (not revenue)	53 7 11	428 14 3	482 2 2	472 17 5	. ...	472 17 5	9 4 9
Totals .... £	7,251 2 1	22,946 15 0	30,197 17 1	22,995 6 9	11 19 3	22,983 7 6	7,214 9 7

Hunter District Water Supply and Sewerage Board,
Board's Offices, Newcastle, 1st September, 1897.

ALFRED E. FRY,
Secretary and Accountant.

APPENDIX F.

RETURN showing Revenue Derived by the Board from Government Properties.

Year ending.	Railway Department.		Other Government Departments.			Total for Year.
	Revenue from Premises rated.	Revenue for Water consumed (where premises are not rated).	Revenue from Premises rated.	Meter Accounts in excess of rates.	Revenue for Water consumed (where premises are not rated).	
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
30th June, 1893	.. . ..	. . . .	418 7 1	112 4 4	38 0 7	568 12 0
30th June, 1894	0 16 6	688 8 8	923 3 11	200 18 8	112 13 10	1,926 1 7
30th June, 1895	0 16 6	934 18 9	1,042 19 4	74 3 11	135 5 3	2,188 3 9
30th June, 1896	1 4 6	1,297 4 0	1,141 13 7	243 10 10	207 1 5	2,890 14 4
30th June, 1897	2 15 10	1,647 4 5	1,094 11 6	121 8 0	163 18 0	3,029 17 9
£	5 13 4	4,567 15 10	4,620 15 5	752 5 9	656 19 1	10,603 9 5

Hunter District Water Supply and Sewerage Board,
Board's Offices, Newcastle, 1st September, 1897.

ALFRED E. FRY,
Secretary and Accountant.

APPENDIX G.

RETURN showing percentage of Revenue to Capital Indebtedness.

Year ending.	Revenue.	Management and Working Expenses—Maintenance.	Net Revenue.	Capital Debt	Percentage for year.
	£ s. d.	£ s. d.	£ s. d.	£	
30th June, 1893	22,651 14 6	8,397 1 8	14,254 12 10	404,407	3·52
30th June, 1894	21,406 9 11	9,385 12 1	12,020 17 10	405,871	2·96
30th June, 1895	20,367 2 1	9,022 3 0	11,344 19 1	412,732	2·75
30th June, 1896	20,779 6 2	8,812 2 3	11,967 3 11	415,734	2 88
30th June, 1897	22,518 0 9	9,003 17 4	13,514 3 5	428,025	3·13

Hunter District Water Supply and Sewerage Board,
Board's Offices, Newcastle, 1st September, 1897.

ALFRED E. FRY,
Secretary and Accountant.

APPENDIX H.

APPENDIX H.

RETURN of the Clerical Staff of the Board at 31st August, 1897.

Surname and Christian Name.	Age last Birthday	Date of Appointment.	Mann of Appointment.	By whom recommended.	Length of Service up to 30 June, 1897	Break in Service	Position held	Amount of Annual Salary Received	Amount of Allowances, Fees, or other Emoluments	Total Amount of Salary and Emoluments.
Secretary's Branch.								£		£
Fry, Alfred Ernest	30	1 Aug, 1892	Governor in Council	Minister for Works	4 11	Nil	Secretary and Accountant	350	Nil	350
Hibble, Charles	31	1 Aug, 1892	By nomination	Acting-Secretary and Secretary	4 11	,,	Records, Corresponding, and Shorthand Clerk	175	,,	175
Accountant's Branch (Head Office).										
Fry, Alfred Ernest							(See Secretary's Branch)			
O'Connor, Joseph Graham	57	20 Aug, 1892	By nomination	Minister for Works	4 10	Nil	Chief Clerk	300	,,	300
Cooke, Montague Edward	26	1 Aug., 1892	,,	Acting-Secretary and Secretary	4 11	,,	Principal Bookkeeper and Chief Cashier	150	,,	150
M'Cue, Walter	28	1 Aug, 1892	,,	,, ,,	4 11	,,	Rates Ledger-keeper	125	,,	125
Thurlow, Harold Robert	25	1 Aug, 1892	,,	,, ,,	4 11	,,	Cashier	90	,,	90
Cuthbertson, George Robert	23	1 Aug, 1892	,,	,, ,,	4 11	,,	Assistant Bookkeeper and Assistant Cashier	60	,,	60
Newton, Albert Ernest	20	1 Aug, 1892	,,	,, ,,	4 11	,,	Junior Clerk	52	,,	52
Brooks, William Ernest	20	1 Aug, 1892	,,	,, ,,	4 11	,,	Rates Ledger-keeper's Assistant	52	,,	52
(Maitland Branch.)										
Crothers, Alexander Brooks	23	11 Oct., 1893	,,	Secretary and Accountant	3 8	,,	Cashier	65	,,	65
Birkenhead, Richard Carlyle	23	16 April, 1894	,,	,, ,,	3 5	,,	Assistant Cashier and Junior Clerk	52	,,	52
Assessor's Branch (Head Office).										
Hart, Prosper de Mestre	36	1 Aug, 1892	,,	Acting-Secretary and Metropolitan Board	4 11	,,	Assessor	250	,,	250
Thomas, Edwin	53	1 Aug, 1892	,,	Acting-Secretary and Secretary	4 11	,,	First Clerk	150	,,	150
Lynch, Thomas Patrick	36	3 Sept., 1892	By ballot	Board	4 10	,,	District Clerk	150	,,	150
Rodgers, William Porteous	28	21 Sept, 1892	By nomination	Secretary and Accountant	4 10	,,	District Clerk and Outside Cashier	125	,,	125
Asher, Alfred Robert	25	1 Aug, 1892	,,	Acting-Secretary and Secretary	4 11	,,	Second Clerk	100	,,	100
Elliott, William	37	1 July, 1892	By transfer	District Engineer, Public Works	5	,,	Meter-reader, Waste-water Inspector, and Special Fees Clerk	141	,,	141
Assessor's Branch (Maitland Office).										
Nash, Edward	38	1 July, 1892	By transfer	,, ,,	5	,,	District Water Inspector	234	Forage £30	264
Pritchard, James	68	17 Oct, 1892	By nomination	Secretary and Accountant	4 8	,,	District Clerk	156	Nil.	156
Engineer's Branch (Head Office).										
Watson, William	21	1 Aug, 1892	,,	Acting-Secretary and Secretary	4 11	,,	Junior Clerk	52	,,	52
Cleaner and Messenger (Head Office)										
Cooper, John	33	2 Sept, 1892	,,	Secretary and Accountant	4 10	,,	Cleaner and Messenger	156	No quarters	156
Charwoman (Maitland Branch).										
Nies, Mrs. Catherine	54	10 Nov, 1892	,,	,, ,,	4 9	,,	Cleaner	15/12/-	,,	15/12/-
								3,000/12/	30	3,030/12/-

Board's Offices, Newcastle, 31st August, 1897.

ALFRED E. FRY, Secretary and Accountant

H. D. WALSH, President.

RETURN of the Engineering and Mechanical Staff of the Board at 31st August, 1897

Surname and Christian Name	Age last Birth day	Date of Appointment	Manner of Appointment	By whom recommended	Length of Service up to 30 June 1897	Break in Service	Position held	Amount of Annual Salary received	Amount of Allowances Fees, or other Emoluments			Total Amount of Salary and Emoluments
									House	Fuel	Grazing	
Newcastle District	Yrs				Years			£ s d	£ s d	£ s d	£ s d	£ s d.
Henson, Joshua Binnington	39	1 Aug, 1892	Governor in Council	Minister for Works	4 11/12	Nil	Board Engineer	400 0 0	Nil	Nil	Nil	400 0 0
Watson, William							(See Clerical Staff)					
Richmond, James	36	12 Dec, 1892	By nomination	President	4 1/12	Nil	Inspector of Plumbing	200 0 0	,,	,,	,,	200 0 0
Richards, Edward	36	1 July, 1892	By transfer	Newcastle Borough Council	5	,,	Turncock	140 0 0	,,	,,	,,	140 0 0
Boardman, James	39	1 July, 1892	,,	District Engineer, Works Department	5	,,	,,	125 0 0	,,	,,	,,	125 0 0
Percy, William Henry	52	1 July, 1892	,,	,, ,,	5	,,	,,	125 0 0	,,	,,	,,	125 0 0
Dawson, James Bernard	49	1 July, 1892	,,	,, ,,	5	,,	Reservoir Caretaker and Engine driver	120 0 0	15 12 0	,,	,,	135 12 0
Stanton, John	53	1 July, 1892	,,	,, ,,	5	,,	Reservoir Caretaker and Turncock	108 0 0	15 12 0	,,	,,	123 12 0
Smith, Henry	49	1 July, 1892	,,	,, ,,	5	,,	,, ,,	120 0 0	15 12 0	,,	,,	135 12 0
Morgan, Henry John	37	1 July, 1892	,,	,, ,,	5	,,	,, ,,	108 0 0	15 12 0	,,	,,	123 12 0
Aspinall, Sam	43	1 July, 1892	,,	,, ,,	5	,,	,, ,,	108 0 0	15 12 0	,,	,,	123 12 0
Maitland District												
Nash, Edward							(See Clerical Staff)					
Waters, Spencer William	34	1 July, 1892	By transfer	District Engineer, Works Department	5	Nil	Turncock and Meter Reader	125 0 0	Nil	,,	,,	125 0 0
Wall, Thomas	41	1 July, 1892	,,	,, ,	5	,	Reservoir Caretaker and Maintenance	108 0 0	15 12 0	,,	,,	123 12 0
Fletcher, Frederick	45	1 July, 1892	,,	,, ,,	5	,,	,, ,,	120 0 0	15 12 0	,,	,,	135 12 0
Walka Pumping Station												
Hackett, Ernest	42	1 July, 1892	,,	,, ,,	5	,,	Resident Mechanical Engineer	250 8 0	32 10 0	1 10 0	2 12 0	287 0 0
Wood, James Sidney	43	1 July, 1892	,,	,, ,,	5 months	,,	Second Engineer	171 0 0	Nil	Nil	2 12 0	173 12 0
Murdoch, Peter	30	5 Oct, 1896	By nomination	Board Engineer	8 years	,,	Third Engineer	156 0 0	Pays rent	1 10 0	Nil	157 10 0
Betteridge, George	43	1 July, 1892	By transfer	District Engineer, Works Department	5 months	,,	Fireman	125 0 0	,,	1 10 0	2 12 0	129 2 0
Campbell, Frank	36	26 Feb, 1897	By nomination	Board Engineer	4 years	,,	,,	125 0 0	,,	1 10 0	2 12 0	129 2 0
M'Mahon, Patrick	36	1 July, 1892	By transfer	District Engineer, Works Department.	5	,,	Oiler and Cleaner	125 0 0	,,	1 10 0	Nil	126 10 0
Mott, John	46	1 July, 1892	,,	,, ,	5	,,	,, ,,	109 0 0	Nil	Nil	2 12 0	111 12 0
Newton, Denis	56	1 July, 1892	,,	,, ,,	5	,,	Filterman	120 0 0	15 12 0	1 10 0	2 12 0	139 14 0
Ewing, James	22	16 Sept, 1895	By nomination	Board Engineer	1 9/12	,,	Cleaner	78 0 0	Nil	Nil	Nil	78 0 0
							£	3,166 8 0	157 6 0	9 0 0	15 12 0	3,348 6 0

Board's Offices, Newcastle, 31st August, 1897

ALFRED E FRY, Secretary and Accountant

H D WALSH, President.

APPENDIX I.

HUNTER DISTRICT WATER SUPPLY AND SEWERAGE BOARD.

RETURN showing Percentage of Expenditure to Revenue, year by year.

Year ending—	Revenue.	Expenditure—Details	Amount	Percentage of Expenditure to Revenue.
	£ s. d.	£ s. d.	£ s. d.	
30th June, 1893	22,651 14 6	Management expenses—		
		Board fees	594 0 0	
		Expenses	3,720 6 10	
			4,314 6 10	19·04
		Working expenses	3,727 19 9	16·50
		Maintenance	354 15 1	1·56
£	22,651 14 6		8,397 1 8	37·10
30th June, 1894	21,406 9 11	Management expenses—		
		Board fees	598 0 0	
		Expenses	4,021 7 9	
			4,619 7 9	21·57
		Working expenses	4,193 17 4	19·59
		Maintenance	572 7 0	2·67
£	21,406 9 11		9,385 12 1	43·83
30th June, 1895	20,367 2 1	Management expenses—		
		Board fees	602 0 0	
		Expenses	3,974 12 10	
			4,576 12 10	22·47
		Working expenses	4,066 0 9	19·96
		Maintenance	379 9 5	1 86
£	20,367 2 1		9,022 3 0	44·29
30th June, 1896	20,779 6 2	Management expenses—		
		Board fees	570 0 0	
		Expenses	3,863 0 6	
			4,433 0 6	21·33
		Working expenses	3,990 18 4	19 20
		Maintenance	388 3 5	1·86
£	20,779 6 2		8,812 2 3	42·39
30th June, 1897	22,518 0 9	Management expenses—		
		Board fees	548 0 0	
		Expenses	3,834 16 5	
			4,382 16 5	19·46
		Working expenses	4,211 7 3	18·70
		Maintenance	409 13 8	1·81
£	22,518 0 9		9,003 17 4	39·97

Board's Offices, Newcastle, 3rd September, 1897.

ALFRED E. FRY,
Secretary and Accountant.

APPENDIX J.

SCHEDULE of Revised Salaries and Allowances.

A.—*Clerical Staff*

Surname and Christian Name.	Position held.	Present— Annual Salary.	Present— Allowances, Fees, or other Emoluments	Present— Total Emoluments	Remarks.	Proposed— Annual Salary.	Proposed— Allowances, &c.	Proposed— Total Emoluments.	Remarks
Secretary's Branch.		£		£		£		£	
Fry, Alfred Ernest	Secretary and Accountant	350	Nil	350		350	Nil	350	
Hibble, Charles	Records, Corresponding, and Shorthand Clerk	175	,,	175		175	,,	175	
Accountant's Branch (Head Office).									
O'Connor, Joseph Graham	Chief Clerk	300	,,	300		200	,,	200	£100 decrease.
Cooke, Montague Edward	Principal Bookkeeper and Chief Cashier	150	,,	150		180	,,	180	£30 increase.
M'Cue, Walter	Rates Ledger keeper	125	,,	125		150	,,	150	£25 ,,
Thurlow, Harold Robert	Cashier	90	,,	90		115	,,	115	£25 ,,
Cuthbertson, George Robert	Assistant Bookkeeper and Assistant Cashier	60	,,	60		85	,,	85	£25 ,,
Newton, Albert Ernest	Junior Clerk	52	,,	52		65	,,	65	£13 ,,
Brooks, William Ernest	Rates Ledger-keeper's Assistant	52	,,	52		65	,,	65	£13 ,,
(Maitland Branch)									
Crothers, Alexander Brooks	Cashier	65	,,	65		90	,,	90	£25 ,,
Birkenhead, Richard Carlyle	Assistant Cashier and Junior Clerk	52	,,	52		65	,,	65	£13 ,,
Assessor's Branch (Head Office).									
Hart, Prosper de Mestre	Assessor	250	,,	250		250	,,	250	
Thomas, Edwin	First Clerk	150	,,	150		160	,,	160	£10 ,,
Lynch, Thomas Patrick	District Clerk	150	,,	150		150	,,	150	
Rodgers, William Porteous	District Clerk and Outside Cashier	125	,,	125		140	,,	140	£15 ,,
Asher, Alfred Robert	Second Clerk	100	,,	100		100	,,	100	
Elliott, William	Meter-reader, Waste-water Inspector, and Special Fees Clerk.	141	,,	141		140	,,	140	£1 decrease.
Assessor's Branch (Maitland Office).									
Nash, Edward	District Water Inspector	234	Forage £30	264		250	Forage, £30	280	£16 increase
Pritchard, James	District Clerk	156	Nil	156		150	Nil	150	£6 decrease.
Engineer's Branch (Head Office).									
Watson, William	Junior Clerk	52	,,	52		80	,,	80	£28 increase.
Cleaner and Messenger (Head Office).									
Cooper, John	Cleaner and Messenger	156	No quarters	156		120	,,	120	£36 decrease.
Charwoman (Maitland Branch).									
Nies, Mrs. Catherine	Cleaner	15/12/-	,,	15/12/-		15/12/-	,,	15/12/-	
		3,000/12/-	30	3,030/12/-		3,095/12/-	30	3,125/12/-	

H. D. WALSH, President.

APPENDIX J—*continued.*

SCHEDULE of Revised Salaries and Allowances.

B.—Engineering and Mechanical Staff.

Surname and Christian Name.	Position held.	Present— Annual Salary.	Present— Allowances, Fees, or other Emoluments. House.	Fuel.	Grazing.	Total Salary and Emoluments.	Remarks.	Proposed— Annual Salary.	Proposed— Allowances. Fuel.	Grazing.	Total Emoluments.	Remarks.
Newcastle District.		£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.		£	£ s. d.	£ s. d.	£ s. d.	
Henson, Joshua Binnington ...	Board Engineer	400 0 0	Nil.	Nil.	Nil.	400 0 0	.....	400	Nil.	Nil.	400 0 0	
Richmond, James	Inspector of Plumbing	200 0 0	,,	,,	,,	200 0 0	.....	200	,,	,,	200 0 0	
Richards, Edward	Turncock	140 0 0	,,	,,	,,	140 0 0	.....	132	,,	,,	132 0 0	£8 decrease.
Boardman, James	,, ...	125 0 0	,,	,,	,,	125 0 0	.....	125	,,	,,	125 0 0	
Percy, William Henry	,, ...	125 0 0	,,	,,	,,	125 0 0	.....	125	,,	,,	125 0 0	
Dawson, James Bernard.....	Reservoir Caretaker and Engine-driver.	120 0 0	15 12 0	,,	,,	135 12 0	House rent free	125	,,	,,	109 8 0	Less 6s. per week rent.
Stanton, John	Reservoir Caretaker and Turncock.	108 0 0	15 12 0	,,	,,	123 12 0	,,	120	,,	,,	104 8 0	,, ,,
Smith, Henry	,, ,, ..	120 0 0	15 12 0	,,	,,	135 12 0	,,	125	,,	,	109 8 0	,, ,,
Morgan, Henry John	,, ,, ...	108 0 0	15 12 0	,,	,,	123 12 0	,,	120	,,	,,	104 8 0	,, ,,
Aspinall, Sam	,, ,, ...	108 0 0	15 12 0	,,	,,	123 12 0	,,	120	,,	,,	104 8 0	,, ,,
Maitland District.												
Waters, Spencer William	Turncock and Meter Reader ...	125 0 0	Nil.	,,	,,	125 0 0	.....	125	,,	,,	125 0 0	
Wall, Thomas	Reservoir Caretaker and Maintenance.	108 0 0	15 12 0	,,	,,	123 12 0	House rent free	120	,,	,,	104 8 0	,, ,,
Fletcher, Frederick.....	,, ,, ...	120 0 0	15 12 0	,,	,,	135 12 2	,,	125	,,	,,	109 8 0	,, ,,
Walka Pumping Station.												
Hackett, Ernest	Resident Mechanical Engineer	250 8 0	32 10 0	1 10 0	2 12 0	287 0 0	House rent free	285	1 10 0	2 12 0	256 12 0	Less £32 10s. per annum rent.
Wood, James Sidney	Second Engineer	171 0 0	Nil.	Nil.	2 12 0	173 12 0	.....	171	Nil.	2 12 0	173 12 0	
Murdoch, Peter	Third Engineer	156 0 0	Pays rent	1 10 0	Nil.	157 10 0	.....	156	1 10 0	Nil.	157 10 0	
Betteridge, George	Fireman	125 0 0	,,	1 10 0	2 12 0	129 2 0	.....	125	1 10 0	2 12 0	129 2 0	
Campbell, Frank	,, ...	125 0 0	,,	1 10 0	2 12 0	129 2 0	.....	125	1 10 0	2 12 0	129 2 0	
M'Mahon, Patrick	Oiler and Cleaner	125 0 0	,,	1 10 0	Nil.	126 10 0	... .	125	1 10 0	Nil.	126 10 0	
Mott, John	,, ...	109 0 0	Nil.	Nil.	2 12 0	111 12 0	.....	109	Nil.	2 12 0	111 12 0	
Newton, Denis	Filterman	120 0 0	15 12 0	1 10 0	2 12 0	139 14 0	House rent free	120	1 10 0	2 12 0	108 10 0	Less 6s. per week rent.
Ewing, James	Cleaner	78 0 0	Nil.	Nil.	Nil.	78 0 0	.....	78	Nil.	Nil.	78 0 0	
	£	3,166 8 0	157 6 0	9 0 0	15 12 0	3,348 6 0		3,256	9 0 0	15 12 0	3,123 6 0	

H. D. WALSH, President.

APPENDIX J. (*continued*).

SUMMARY.

Present Expenditure:—		
Clerical Staff	£3,030 12 0	
Engineering and Mechanical Staff	3,348 6 0	
		£6,378 18 0
Proposed Expenditure:—		
Clerical Staff	£3,125 12 0	
Engineering and Mechanical Staff	3,123 6 0	
		£6,248 18 0
Net saving		£130 0 0

APPENDIX K.

INFORMATION supplied to the Metropolitan Board of Water Supply and Sewerage, Sydney, as to the Water Rates and Charges by some of the Principal Cities of Australia, England, and America.

Name of City, &c.	Assessment. £25 house.	£50 house.	£100 house.	£150 house.	£300 house.	Meter. Per 1,000 gallons.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	
Adelaide	1 5 0	2 10 0	5 0 0	6 11 0	8 16 0	1s. to 1s. 9d.
Melbourne	0 12 6	1 5 0	2 10 0	3 15 0	7 10 0	1s.
Sydney	0 12 6	1 5 0	2 10 0	3 15 0	7 10 0	1s.
Belfast	1 0 10	2 1 8	4 3 4	6 5 0	12 10 0	5½d. to 10d.
Bradford	1 15 0	3 5 0	5 10 0	8 0 0	15 0 0	6½d. to 9d.
Dublin	0 14 7	1 9 4	2 18 8	4 8 0	8 16 0	4d. to 6d.
Dundee	1 7 1	2 14 2	5 8 4	8 2 6	16 5 0	7d. to 8d.
East London	1 5 0	2 10 0	5 0 0	7 10 0	15 0 0	6d. to 9d.
Edinburgh	0 15 8	1 11 3	3 2 6	4 13 9	9 7 6	6d.
Kent (London)	1 8 0	2 10 0	4 0 0	6 0 0	12 0 0	10d.
Leeds	1 1 0	2 0 0	3 10 0	6 0 0	12 0 0	6d.
Liverpool	1 8 2	2 16 3	5 12 6	8 8 9	17 17 6	7d. to 10½d.
Manchester	1 5 0	2 10 0	5 0 0	7 10 0	15 0 0	4d. to 6d.
Nottingham	1 5 0	2 2 0	3 0 0	4 10 0	9 0 0	6d. to 1s.
Newcastle-on-Tyne	1 5 0	2 0 0	3 0 0	4 10 0	9 0 0	5d. to 1s. 2d.
Southwark and Vauxhall (London).	1 5 0	2 10 0	5 0 0	7 10 0	15 0 0	6d. to 9d., high level 25 per cent. addition; minimum consumption, 25,000 gallons per quarter.
Baltimore, U.S.A.	From 12s. 6d. for 12 ft. house frontage to £2 12s. 6d. for 22 ft. and over house frontage.					
Brooklyn, U.S.A.	For one-storey house of 16 ft. frontage, 16s. 8d.; one-storey of 50 ft., £3 10s. 10d.; to five storeys of 50 ft., £4 7s. 6d.; corner houses count both sides.					
Boston, U.S.A.	1 0 10	1 0 10	1 0 10	1 5 0	1 9 2	4d. to 7d. per 100 ft.; minimum charge, £3 2s. 6d. per annum.
Chicago, U.S.A.	From 12s. 6d. for 12 ft. frontage to £6 2s. 9d. for 87 ft. frontage; in addition, 2s. 1d. per occupier.					
Detroit, U.S.A.	For each family, £1 0s. 10d. per annum.					
Montreal, Canada	2 9 0	4 8 6	8 0 0	12 0 0	23 0 0	
New York, U.S.A.	From 16s. 8d. for 16 ft. house frontage of one storey to 75s. for 50 ft. house frontage of five storeys.					8d.
Philadelphia, U.S.A.	...					4½d.
Pittsburg, U.S.A.	From 10s. 5d. for one room to £2 3s. 4d. for ten rooms ...					2½d. to 10d.
St. Louis, U.S.A.	From 2s. 1d. to 4s. 2d. per room, according to number of residents.					5d. to 1s. 3d.
St. Paul, U.S.A.	From 12s. 6d. for one family, four rooms, to 33s. 2d. of ten rooms; above this, 12s. 6d. per family.					5d. to 10d.
Spring Valley (San Francisco).	From 32s. 6d. for building occupying 500 square ft. or under, to 95s. for buildings covering 2,000 square ft.					2s. 4d.
Toronto, Canada	4s. 2d. per room, and 4s. 2d. per inmate					1s.

NOTE.—Where no amounts are specified under the above headings, the required information has not been furnished.

APPENDIX L.

INFORMATION supplied to the Metropolitan Board of Water Supply and Sewerage, Sydney.

Special Fees.

Name of City, &c.	Baths.	Building Purposes.	Gardens.	Gas Engines.	Stock.	Steam Engines.	Motors.	Urinals.	Wash-hand Basins.	Water Closets.
Adelaide	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Melbourne	.....	.....	.....	.....	10s.	10s. per h.p. ...	.....	.....	.....	.....
Sydney	.....	½d. per cubic yard on cubical contents.	10s. per 750 super. square feet.	5s. per 2 h.p...	5s.	20s. per 3 h.p...	40s. per ½ h.p...	.....	.....	.....
Belfast	.....	¼d. to 1½d. per square yard.	.....	2s. 6d. per h.p..	5s. to 10s.	20s. per h.p. ...	20s.	5s. to 50s.	5s. to 60s.	7s. 6d. to £8.
Bradford	3s. to 12s.	6s. 8d. per cent. on contract.	.....	.....	5s.	.....	.....	5s.	.....	20s.
Dublin	.....	.....	20s. to 40s. ...	.....	20s. to 40s. ...	.....	.....	.....	.....	.....
Dundee	.....	1 per cent. on cost ...	Special agreement.	3s. to 5s. per h.p.	8s. 6d.	30s. per h.p. ...	.....	20s.	.....	20s.
East London	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Edinburgh	.....	.....	10s. 6d. to 21s..	.....	5s.	Up to 3 h.p., 42s.	.....	.....	.....	.....
Kent (London)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Leeds	.....	.....	.....	.....	5s.	.....	.....	10s. 8d.	.....	5s. 4d.
Liverpool	.....	4d. in the £ on the building, or 5s. per £100 on contract.	10s. per 100 square yards.	.....	5s.	.....	.....	.....	.....	.....
Manchester	10s.	4d. per square yard of brick.	10s. per 800 square yards.	.....	10s.	.....	.....	.....	.....	10s.
Nottingham	.....	1d. to 2d. per square yard.	.....	Meter only ...	5s.	Meter only ...	Not allowed ...	Meter only ...	.....	4s. to 12s.
Newcastle-on-Tyne	.....	.....	.....	.....	.....	.....	.....	.....	.....	6s. to 10s.
Southwark and Vauxhall (London)	.....	.....	.....	.....	.....	.....	.....	.....	.....	4s. to 12s.
Baltimore (U.S.A.)	41s. 8d.	.....	.....	.....	6s. 3d.	12s. 6d. per h.p.	.....	.....	.....	.....
Brooklyn (U.S.A.)	12s. 6d.	2½d. per 1,000 bricks ..	.....	.....	8s. 4d.	.....	.....	.....	.....	8s. 4d.
Boston (U.S.A.)	.....	3½d. per 1,000 bricks ..	.....	.....	.....	25s. per h.p. ...	.....	.....	.....	20s. 10d. to 41s. 8d.
Chicago (U.S.A.)	12s. 6d.	2½d. per 1,000 bricks ..	12s. 6d. per 1,000 square feet.	.....	10s. 5d.	16s. 8d. per h.p.	.....	4s. 2d.	6s. 3d.	12s. 6d.
*Detroit (U.S.A.)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Montreal, Canada	.....	3d. per 1,000 bricks ...	.....	.....	8s. 4d.	29s. 2d. per h.p.	.....	4s. 2d.	.....	16s. 8d.
*New York (U.S.A.)	.....	5d. per 1,000 bricks, 1s. 8d. per 100 yards for plastering.	.....	.....	4s. 2d. to 8s. 4d.	41s. 8d. per h.p.	.....	8s. 4d.	.....	20s. 10d.
Philadelphia (U.S.A.)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh (U.S.A.)	From 10s. 5d...	5d. per 1,000 bricks ...	From 33s. 4d...	.....	10s. 5d.	14s. 7d. per h.p.	.....	From 6s. 3d. to 33s. 2d.	12s. 6d.	From 12s. 6d. to £5 4s. 2d.
St. Louis (U.S.A.)	.....	5d. per 1,000 bricks, ¼d. per square yard for plastering.	8s. 9d. for 25 feet frontage.	.....	12s. 6d.	1s. 8d. per sq. foot of fire surface.	.....	.....	.....	21s. 10d. to 41s. 8d.
St. Paul (U.S.A.)	8s. 4d.	5d. per 1,000 bricks ...	12s. 6d. for 50 feet.	20s. 10d. for 7 h.p.	8s. 4d.	16s. 8d. per h.p.	20s. 10d.	12s. 6d.	.....	8s. 4d.
Spring Valley, San Francisco (U.S.A.)	1s. 8d. to 3s. 9d.	6d. per 1,000 bricks ...	.....	4s. 2d. to 29s. 2d. h.p.	1s. 8d.	4s. 2d. to 29s. 2d. per h.p.	.....	5d. to 1s. 8d....	.....	1s. to 3s. 6d.
Toronto (Canada)	.....	2½d. per barrel of lime	From 16s. 8d. per 1,000 feet.	25s. per h.p. ...	4s. 2d.	29s. 2d. per h.p.	.....	20s. 10d.	8s. 4d.	20s. 10d.

NOTE.—Where no amounts are specified under the above headings, the requ[illegible] information has not been furnished. * These denote that the informa[illegible] equested has not been furnished, but compiled from Annual Reports.

APPENDIX M.

RETURN showing Number of Properties within 180 feet of Board's Mains charged on 30th September, 1897.

Municipality or District.	Number of properties connected.	Vacant lands not connected.	Houses not connected.	Total number of properties charged.
Newcastle	2,380	62	184	2,626
West Maitland	1,116	195	430	1,741
Wickham	994	24	379	1,397
Hamilton	601	28	394	1,023
Merewether	251	18	541	810
East Maitland	299	73	227	599
Plattsburg	155	19	329	503
Carrington	285	31	160	476
Wallsend	154	8	295	457
Waratah	199	19	221	439
Lambton	89	12	428	529
Adamstown	101	15	238	354
Morpeth	95	31	154	280
New Lambton	53	5	137	195
Unincorporated	92	24	44	160
Minmi	35	.....	118	153
Cockle Creek Line	10	.....	.....	10
Totals	6,909	564	4,279	11,752

APPENDIX N.

STATEMENT of Cost of Pumping.—Walka Pumping Station.

Period.	Cost per 1,000 galls. 100 ft.	Cost per 1,000,000 galls. 100 ft.	Coal used per 1,000,000 galls. 100 ft.
	d.	£ s. d.	tons.
1889	1·534	4 6 2	2·5
1891	·8091	3 7 5	1·873
1892	·790	3 5 10	1·873
1893	·741	3 1 11	1·827
1894	·691	2 17 6	1·826
1895	·565	2 7 1	1·841
1896	·499	2 1 7	1·632
1897 (to June)	·377	1 11 8	1·5

Had the coal consumption of 1889 been maintained in 1897, 712 tons would have been used for the quarter ending June 30th. As a fact, we consumed 423 tons, a saving of 289 tons—at present prices, £79 for the quarter.

MEMO. *re* Water Supply and Walka Pumps for the President, 20 August, 1897.

Water pumped at Walka to service reservoirs.

Year ending.	Average daily pumping.	Total pumped for year.	Houses supplied.	Estimated Population supplied.	Average daily consumption.	
					Per house.	Per head.
	gallons.	gallons.				
30 June, 1893	451,005	164,616,850	3,421	17,105	132	26·37
30 ,, 1894	418,766	152,849,650	3,848	19,240	109	21·76
30 ,, 1895	518,038	189,084,003	4,660	23,300	111	22·23
30 ,, 1896	606,728	222,062,466	6,246	31,230	97	19·42
30 ,, 1897	731,451	266,979,523	6,931	34,655	105	21·10

Length of reticulation mains at commencement of Board..... 105 miles 1,442 yards.
,, ,, laid by Board ..... 28 ,, 1,406 ,,
Total at 30 June, 1897 ..... 134 ,, 1,088 ,,

Improvements to pumps at Walka.

Nos. 1 and 2 pumping engines, now each raise ..... 83 gallons per revolution.
Before alterations ..... 52·5 ,, ,,
Increase ..... 20·5 ,, ,,

The new pumps now raise about one-third more water in the same time as formerly, or will do the same work in nine hours as they formerly required twelve hours to do.

For same conditions of pumping, the addition of the second rising main has reduced the head against pumps from 300 feet to 262 feet.

The addition of the third pump to No. 3 pumping engine has increased the quantity of water which can be lifted per revolution from 125·1 gallons to 268·5 gallons.

APPENDIX O.

APPENDIX O.

Cost of Coal supplied to the Chief Pumping Stations of the Metropolitan and the Hunter District Water Supply and Sewerage Boards.

Year.	Metropolitan Board.		Hunter District Board.
	Crown-street Pumping Station.	Ryde Pumping Station.	Walka Pumping Station.
	s. d.	s. d.	s. d.
1892	12 6	14 6	8 0
1893	11 9	13 9	7 6
1894	11 0	11 0	7 0
1895	10 7	11 0	6 9
1896	8 11	8 11	6 0
1897	9 0	10 6	5 6

Note.—The coal used at Walka pumping station contains from 15 to 20 per cent. of ash. This must be about twice the amount of ash contained in the coal used by the Metropolitan Board.

Newcastle, 10th November, 1897. J. B. HENSON.

APPENDIX P.

Dear Sir, Hunter District Water Supply and Sewerage Board, Newcastle, 8 November, 1897.

Referring to my evidence recommending that the Board's staff should be placed under the Public Service Board, I wish to let you know that at the Board meeting held to-day I had an opportunity of talking over matters at length with the members, with the result that the Board are unanimously of the opinion that, in order to widen the scope of promotion for the officers of the professional and clerical staff, they should be placed under the Public Service Board.

The Board, however, think that the mechanical staff should remain, as at present, under their control, as that branch of the service would practically have nothing to gain by the change suggested in the case of the other officers. A greater scope would be no advantage to them, as the Board has every reason to believe that they are quite satisfied with their present positions and prospects.

The municipal members of the Board did not overlook the fact that in agreeing to the transfer recommended they were giving up a certain amount of patronage, but were, nevertheless, unanimously of the opinion that to retain control of the professional and clerical staff, as at present, meant to practically cut off all chances of promotion for the members of the staff, owing to the necessarily restricted scope of a small department such as this.

The Board feel, too, that the general public will be quite satisfied to see the control of the salaries, &c., of the staff in the hands of the Public Service Board.

With regard to the feelings of the staff on this matter, I instructed the Secretary to ask each individual officer, and he informs me that the staff is unanimously in favour of the change suggested.

Yours faithfully,
H. D. WALSH,
President.

J. Barling, Esq., President,
Royal Commission on Hunter District Water Supply and Sewerage Board, Sydney.

J.B., 11/11/97. Seen.—G.A.W. Jas. P.—Forward to Mr. Hull, 11/11/97. Mr. Hull.—J.W.H., *per* D.C., 12/11/97.

APPENDIX Q.

APPENDIX Q.

ESTIMATED CAPITAL DEBT of the Hunter District Water Supply and Sewerage Board at 30th June, 1897, under the Amending Bill.

	£ s. d.	£ s. d.
Permanent Works.		
Land	31,660 0 0	
Survey	7,711 0 0	
Storage Reservoir, filter-beds and tanks at Walka Pumping Station (say)	65,058 0 0	
Salaries, wages, and incidentals	19,809 0 0	
Cost of temporary supply to Newcastle	2,047 0 0	
		126,285 0 0
Renewable Works.		
Pipe line	9,896 0 0	
Reservoirs (service)	35,664 0 0	
Engine and boiler houses	19,017 0 0	
Residences	4,727 0 0	
Pumping engines, boilers, &c.	30,787 0 0	
Pipes	99,055 0 0	
Laying pipes	50,424 0 0	
Newcastle reticulation	13,743 0 0	
Fencing	552 0 0	
Telephone line and instruments	484 0 0	
		264,349 0 0
Capitalized Interest.		
To 30th June, 1892	£91,478 0 0	
Less revenue received up to that date	39,240 0 0	
		52,238 0 0
Estimated debt at 30th June, 1892		442,872 0 0
Additions since.		
Works carried out by Board	22,200 0 0	
New duplicate suction and rising mains	25,000 0 0	
Deficiency on the five years' working since the inception of the Board (say)	26,700 0 0	
		73,900 0 0
Estimated debt at 30th June, 1897		£516,772 0 0

Board's Offices, Newcastle,
22nd November, 1897.

ALFRED E. FRY,
Secretary and Accountant.

APPENDIX R.

HUNTER DISTRICT WATER SUPPLY AND SEWERAGE BOARD.

STATEMENT showing Estimated Revenue and Expenditure for Year ending 30th June, 1898.

Revenue.	£	£	*Expenditure.*	£	£
Average Revenue during the last 5 years, including Rates, Meters, Special Fees, &c.	...	21,540	Interest on the Capital Debt, 3½ per cent. on £516,772 (as per details attached)	...	18,087
Estimated Additional Revenue under the Amending Bill	...	3,800	Sinking Fund for reconstruction of renewable works, on basis of a life of 60 years. The value of renewable works handed over to Board at its inception was £264,349 (see details attached), but as 12 years have now elapsed since their construction, allowance must be made accordingly, and instalment is therefore calculated as for 48 years; annual sum to reach £264,349 in 48 years, such instalment bearing interest at 3½ per cent. per annum	2,194	
Deficiency		3,679	Instalment for new works on 60 years' basis, £47,200	240	
					2,434
			Expenses of management, taking average of last 5 years	...	4,460
			Working expenses, taking average of last 5 years	...	4,038
£	...	29,019	£	...	29,019

(*a*) The above statement shows that if the present maximum rate of 1s. in the £ be adhered to, the annual deficiency will be £3,679.

(*b*) Remission of Capital Debt necessary to enable Board to pay their way on a 1s. rate would be £105,114.

(*c*) Remissions have been made to country towns, varying from 2 per cent. to 65 per cent., the average working out as 19½ per cent. of debt gazetted.

Board's Offices,
Newcastle, 22nd November, 1897.

ALFRED E. FRY,
Secretary and Accountant.

[Five plans.]

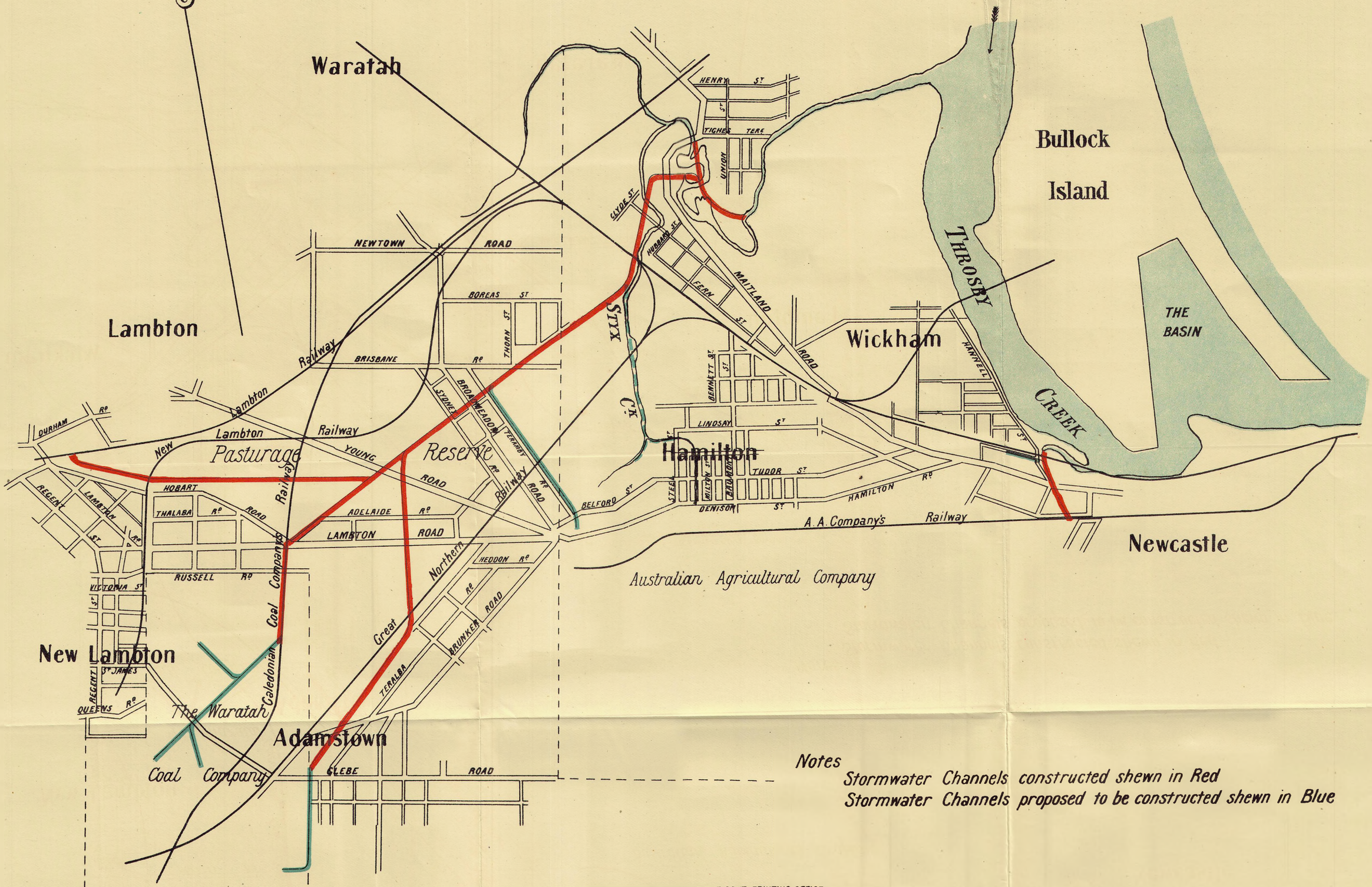
Sydney William Applegate Gullick, Government Printer.—1897.

*279—H

APPENDIX S.

NEWCASTLE AND SUBURBS
STORMWATER DRAINAGE

Scale - 20 Chains to an inch



Australian Agricultural Company

Notes

Stormwater Channels constructed shewn in Red

Stormwater Channels proposed to be constructed shewn in Blue

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SYDNEY, NEW SOUTH WALES.
10920

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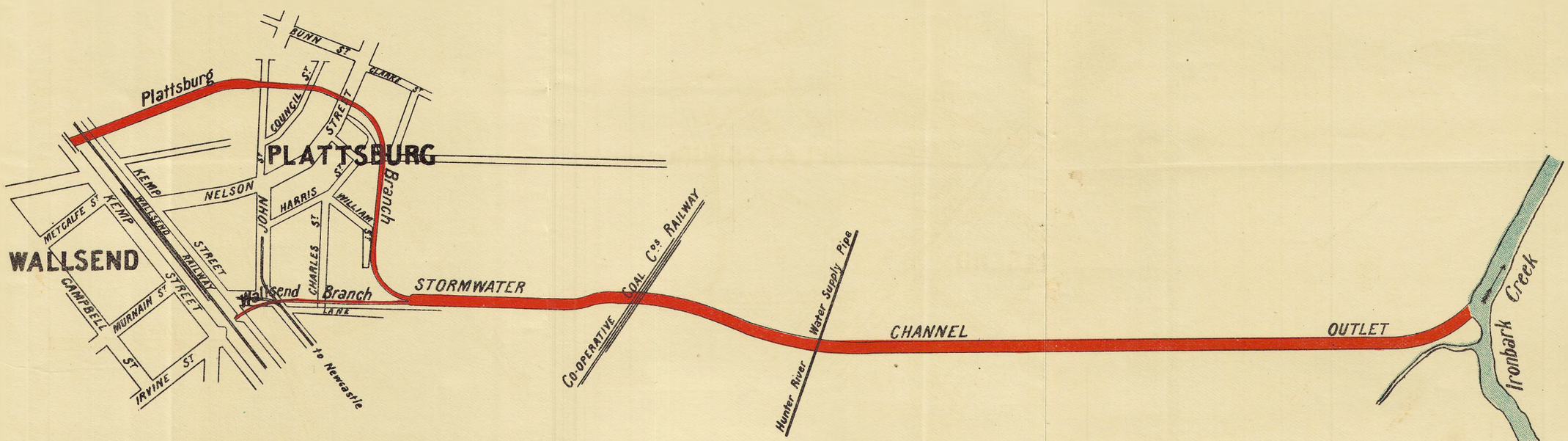
APPENDIX T.

Plattsburg and Wallsend
Stormwater Drainage

Scale 8 Chains to 1 Inch



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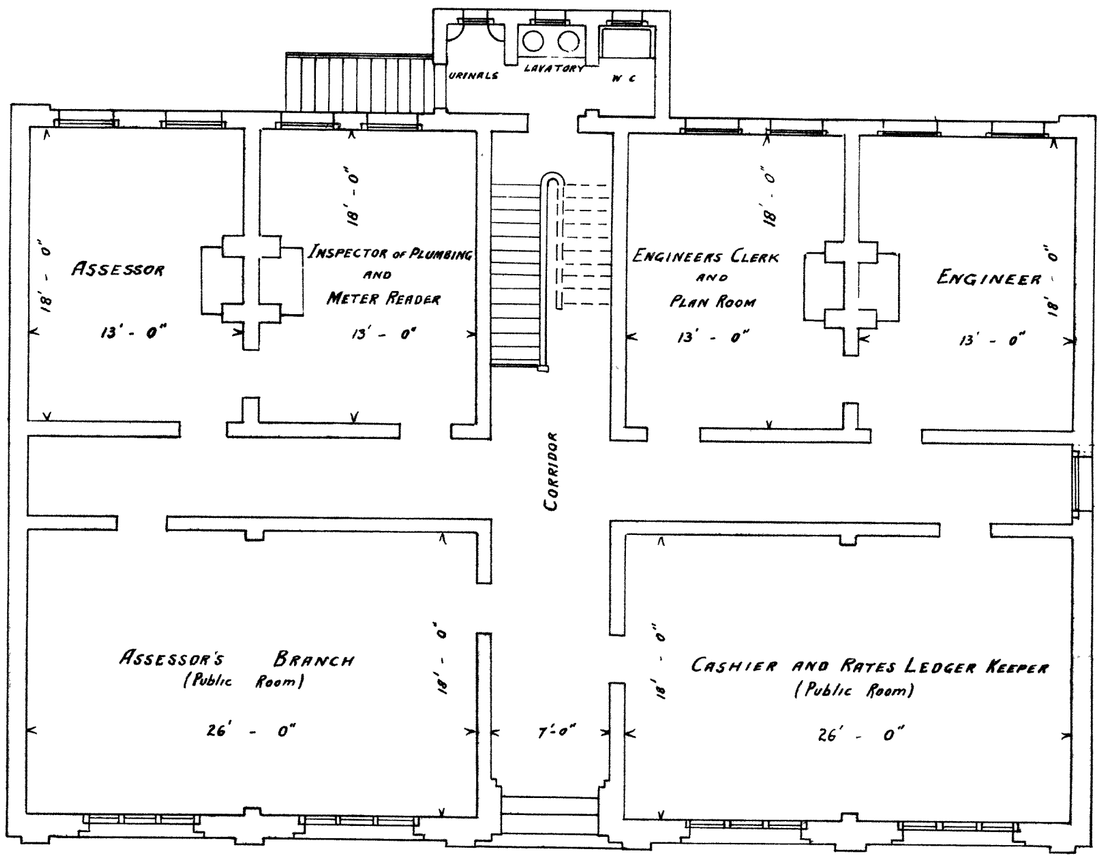
SYDNEY, NEW SOUTH WALES.
10920

H . D . W . S . & . S . B .

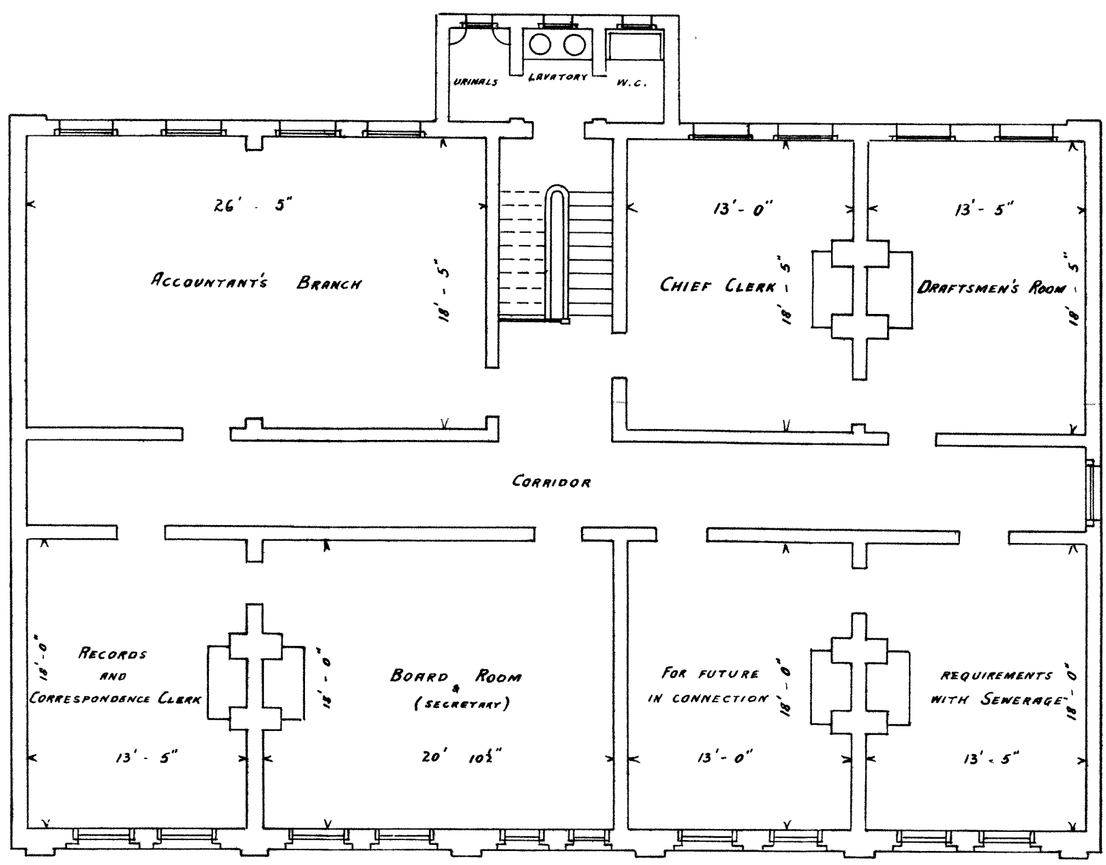
— OFFICES NEWCASTLE —



— Note :- Strong room required in basement —

— GROUND PLAN —

13 feet in height



— FIRST FLOOR PLAN —

12 feet in height

HOW 11/11/87

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10920

Appendix U.

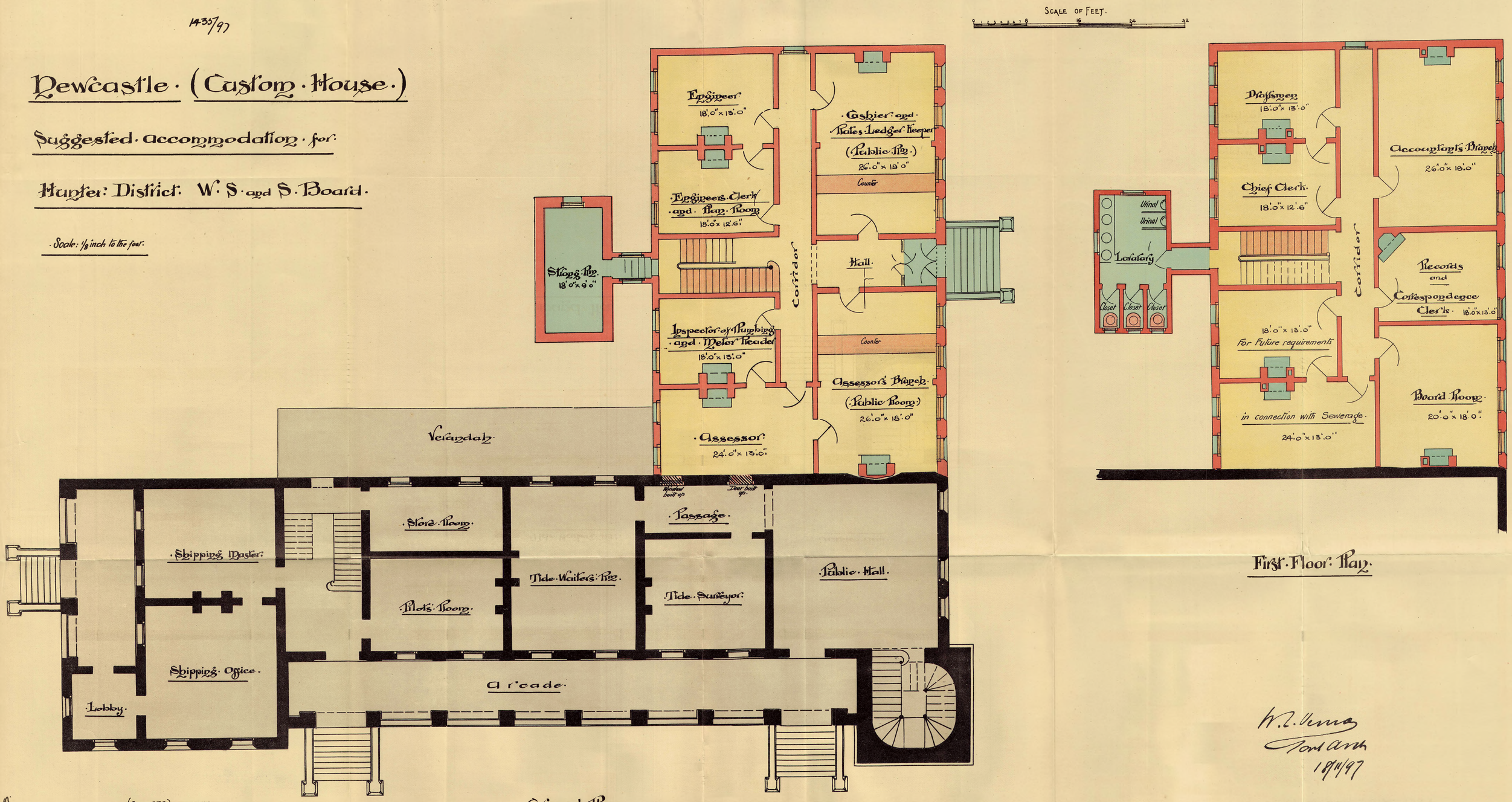
1435/97

Newcastle. (Custom House.)

Suggested accommodation for

Hunter District W. S. and S. Board.

Scale: 1/8 inch to the foot.



(Sig. 279) 10920

PHOTO-LITHOGRAPHED AT THE GOVT. PRINTING OFFICE, SYDNEY, NEW SOUTH WALES.

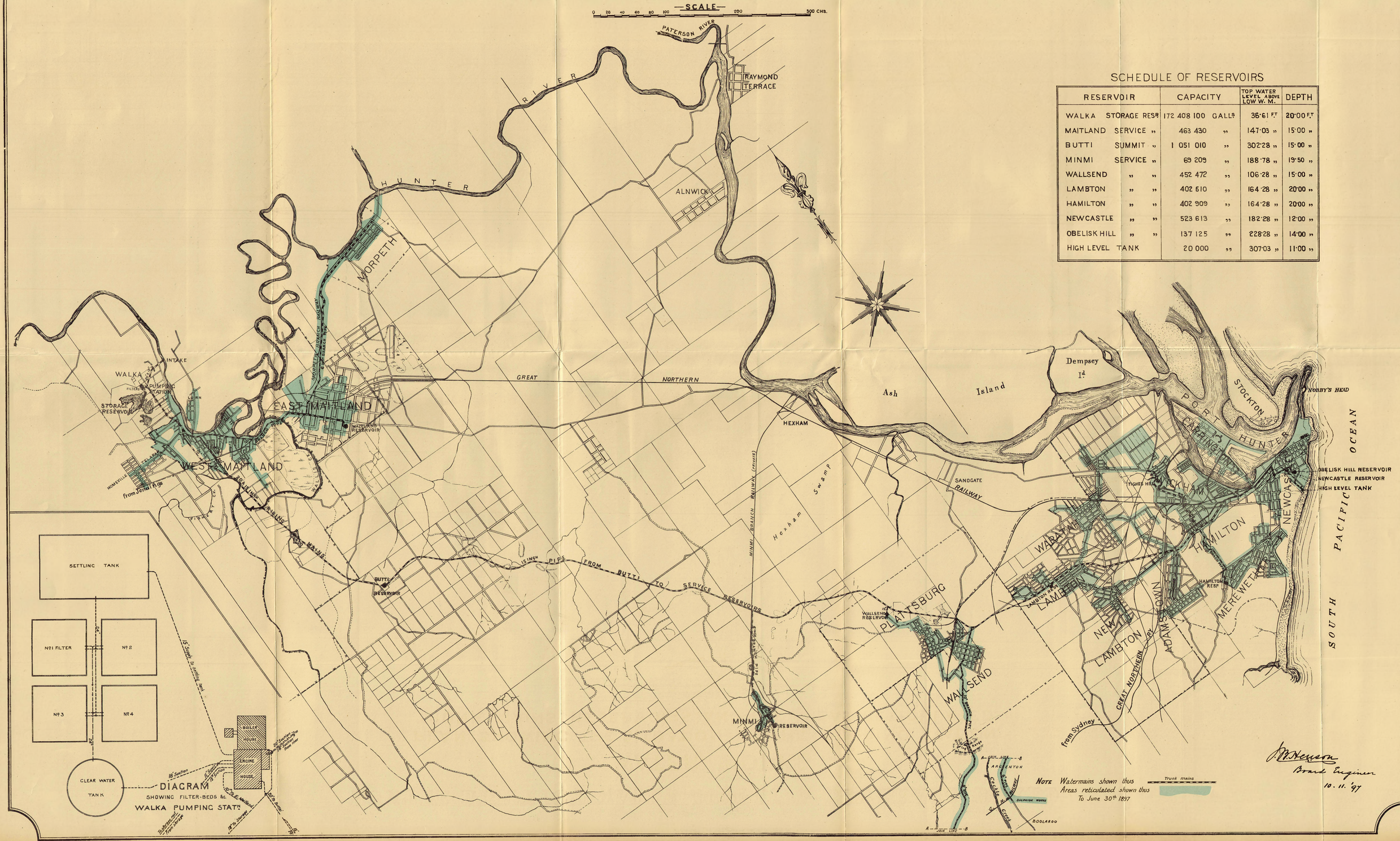
E. of. Oakeshott 18/11/97
Chief Draftsman.

W. L. Verna
Govt Arch
18/11/97

HUNTER DISTRICT WATER SUPPLY & SEWERAGE BOARD

WATER WORKS

PLAN SHOWING THE SITUATION OF THE PUMPING STATION, TRUNK MAINS, RESERVOIRS AND THE AREAS RETICULATED.



SCHEDULE OF RESERVOIRS

RESERVOIR	CAPACITY	TOP WATER LEVEL ABOVE LOW W. M.	DEPTH
WALKA STORAGE RESR	172 408 100 GALLS	36·61 FT	20·00 FT
MAITLAND SERVICE "	463 430 "	147·03 "	15·00 "
BUTTI SUMMIT "	1 051 010 "	302·28 "	15·00 "
MINMI SERVICE "	69 209 "	188·78 "	19·50 "
WALLSEND " "	452 472 "	106·28 "	15·00 "
LAMBTON " "	402 610 "	164·28 "	20·00 "
HAMILTON " "	402 909 "	164·28 "	20·00 "
NEWCASTLE " "	523 613 "	182·28 "	12·00 "
OBELISK HILL " "	137 125 "	228·28 "	14·00 "
HIGH LEVEL TANK	20 000 "	307·03 "	11·00 "

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1897.

LEGISLATIVE ASSEMBLY.

NEW SOUTH WALES.

REPORT

ON

THE PROSPECTS OF IRRIGATION AND WATER-CONSERVATION

IN

NEW SOUTH WALES.

BY COLONEL F. J. HOME, C.S.I.,
ROYAL ENGINEERS (RETIRED).

Printed under No. 19 *Report from Printing Committee,* 14 *October,* 1897.

SYDNEY: WILLIAM APPLEGATE GULLICK, GOVERNMENT PRINTER.

1897.

*304—*a* [4*s.*]

REPORT by Colonel F. J. Home, C.S.I., Royal Engineers (retired), on the Prospects of Irrigation and Water-conservation in New South Wales.

In drawing up a report on the prospects of irrigation and water-conservation in New South Wales, it will be convenient to follow the system adopted in the First Report submitted in 1885 by the Royal Commission on Conservation of Water, and to take into consideration the conditions of the principal river-basins and other drainage areas in the same order in which they appear in pages 45 to 66 of that Report, under heading (10).

The Coast River-basins.

2. The coast river-basins have not been visited, as the necessity for irrigation in this portion of the Colony, with its damp climate and generally favourable rainfall, can hardly be considered pressing; and the want of level ground would prevent its being carried out on a large scale, such as would call for intervention on the part of Government. There are, perhaps, localities where special circumstances may render irrigation desirable and profitable, and the growing dairy industry may lead to a higher class of cultivation in small holdings, and so give rise to a demand for water; but all such requirements would doubtless be met by private enterprise now that security is afforded by the Water Rights Act. A separate report has been submitted regarding the Mulgoa Irrigation Scheme on the Nepean River, above Penrith, which had been started by a company and left incomplete. The Government were invited to take over the scheme and complete it; but a close investigation showed that it would be far from remunerative. This is not put forward as a proof that all schemes for irrigation in the coastal districts would be unremunerative; but it indicates the necessity for caution in undertaking such works.

The Snowy River.

3. The Snowy River is really one of the coast rivers; but it appears to have separated from the rest on account of the suggestion that its waters might be diverted into the Murrumbidgee River. This suggestion was originally put forward by Mr. Adams, at that time Surveyor-General, and a contour line was afterwards surveyed for 32 miles towards the Snowy River from the lowest gap in the ridge dividing the valleys of the two rivers. The locality was visited in January, 1897, and it was found that the difficulties to be overcome are by no means slight. The valley of the Snowy River, the direction of which is about from north to south, after the Eucumbene River joins it, is shut in on the east side by the rocky Jindabyne Range, which rises to a height of at least 800 feet above it, extends for some distance down stream, and throws out to the east a high spur, known as Varney's Range.

4. In order to divert the water of the Snowy River at a sufficiently high level to take it across the Dividing Range into the Murrumbidgee River, it would be necessary either to contour the channel round the Jindabyne Range, and through, or round, the Varney's Range spur, or to tunnel through the Jindabyne Range from some point on the Eucumbene River to where the survey work ended on the Wullwye Creek, a distance of not less than $7\frac{1}{2}$ miles. The distance as the crow flies from the gap on the Dividing Range to the Wullwye Creek is $11\frac{1}{4}$ miles, while that along the survey line is 32 miles. Owing to the detours necessitated by the high ranges and the Eucumbene Valley, the length of a contoured channel from the Snowy

Snowy River to the Dividing Range would not be less than 100 miles, and for the alternative scheme not less than 42 miles of contour channel would be required in addition to a tunnel 7½ miles long, while in both cases the Eucumbene River would have to be crossed and its water picked up.

5. The great cost of either of these schemes, and the heavy annual charges for maintaining them, would preclude all hope of their proving remunerative, and it further appears that only a moderate supply could be obtained from the Snowy River in dry years. On the 23rd January, 1897, the discharge of the Snowy River at Jindabyne was about 300 cubic feet per second, and it was said to be not at its lowest then; the discharge of the Crackenback Creek (or Thredbo, as it is locally called) was estimated the following day at about 90 cubic feet per second, and this must be deducted, because the levels show that the head of the canal must be above the junction of the creek with the river, so that only a little over 200 cubic feet per second would have been available at a time when the supply in the Murrumbidgee River begins to fall off rapidly. After allowing for losses in the canal up to the Dividing Range, in Slack's Creek between that range and the Murrumbidgee River, and finally in the river itself, but little assistance would have been afforded to the Murrumbidgee River in a year such as 1897.

6. It has been suggested that, instead of feeding the Murrumbidgee River, the water of the Snowy River might be utilised for the irrigation of the Monaro Plains; but here again the high cost of bringing the water to a point where irrigation could commence would be far too great a burden for any irrigation project to bear if it is to be classed as remunerative. It need hardly be pointed out that the same objections apply with still greater force to any extension of the scheme, in the direction of Lake George and the Lachlan-Murrumbidgee divide, as that would entail a further increase in the cost of conducting the water to a point where it would commence to earn revenue. The idea of utilising the water of the Snowy River outside its own valley must therefore be abandoned: within the valley there does not appear to be any demand for irrigation at present.

Basin of the Billabong Creek and Edward River.

7. The Billabong Creek is the central drainage line of the plain country enclosed between the Murray River and its tributary, the Murrumbidgee River, above their confluence. Its source is in the hilly country round Germanton, in the county of Goulburn, and its general course is a little north of west, through the counties of Goulburn, Hume, Urana, Townsend, and Wakool, to its junction with the Edward River at Moulamein, the principal township on it being Jerilderie. In the plain country it has generally a well-defined but tortuous channel, about 60 feet wide and 15 feet deep. It is connected with the Murrumbidgee River through the Yanko Creek, which leaves the left bank of that river about 10 miles in a direct line below the town of Narrandera, and joins the Billabong Creek about 30 miles in a direct line below Jerilderie. The Colombo branch of the Yanko Creek, which leaves it near the Morundah Railway Station, joins the Billabong Creek about 13 miles in a direct line above Jerilderie. The Yanko Creek used only to run with a fairly high flood in the Murrumbidgee, but the improvements carried out at its head enable water to enter it now with a much lower river. Below the head of the Yanko it is understood that water finds its way from the Murrumbidgee River to the Billabong Creek only during extraordinary floods. The Billabong Creek is also said to receive water from the Murray River during extraordinary floods through the Ten-mile Creek, which leaves the valley of the Murray just above the township of Howlong. The flood-water which passes down this shallow channel finds its way into the Berrigan and Coreen (or Algudgerie) Creeks, which unite and join the left bank of the Billabong Creek about 13 miles in a direct line below Jerilderie.

8. The supply of water in the creek is intermittent and uncertain, and in dry seasons the stations on the lower part of the creek complain of the scarcity of water; but it is understood that comparatively little has been done there to conserve the water in the channel when it does run through the creek. The Urana Lake, which is situated within the drainage area of the Billabong Creek, is fed by the Urana and Coonong Creeks, but it is only after years of very heavy rainfall, such as 1870, that it is filled sufficiently to escape into the creek, and in dry years it is of

no

no assistance; neither does it appear possible to conserve water in the hill portion of the catchment area. It is not to be expected, therefore, that the creek should provide water for irrigation purposes, for which it would be more proper to look to the rivers on either side of it; but for other purposes it seems probable that sufficient water might be conserved in the channel if suitable dams were constructed by those interested in maintaining a supply.

9. The Edward River, which joins the Billabong at Moulamein, is really an ana-branch of the Murray River which runs with moderate floods, being fed by the Tuppal, Jarapna, Gulpa, and other creeks. At Deniliquin it throws off a branch to the left, known as the Wakool River, which is also fed from the Murray through the Thule and other creeks. The two rejoin about 30 miles in a direct line below Moulamein, and from this point to its confluence with the Murray, 10 miles as the crow flies, the river is marked on the map as the Wakool. The country below Deniliquin, between the Edward and the Murray, is intersected by numerous creeks and channels, and is consequently unsuited to irrigation; so the possibility of utilising this river appears to be limited to the country on the right bank below Moulamein. But as it is understood that high "mallee" country commences on the right bank below the confluence of the Box or Forest Creek, which is about 10 miles in a direct line below Moulamein, irrigation by gravitation appears impossible. No surveys appear to have been made in connection with the scheme for utilising this river which was brought forward in the third and final Report of the Commissioners; but it is certain that works of any magnitude, such as the weir across the Murray at Tocumwal then contemplated, would not be justifiable, and that outlay of any kind on the improvement of the Edward River appears neither necessary nor likely to be remunerative.

Basin of the Murray River.

10. The sources of the Murray River are on the western slope of the Snowy Mountains, the principal one being under the Kosciusko range in New South Wales, and the next in importance under a mountain called "The Pilot" in Victoria. The former is locally known as the Swampy Plain River, and the latter as the Indi River; and after their confluence, a little below the station of Bringenbrong, they form the Murray River. Both sources are similar in character, starting with a rapid fall down to a reach of comparatively level bed (known as the Geehi Flats on the Swampy Plain River, and Tom Grogan's Flats on the Indi River), and then a steep slope for several miles through a narrow and deep rocky gorge to a broad valley. In the case of the Swampy Plain River, this gorge is known as the Murray Gates; and the top of the Geehi Wall, through which range the water has found a passage, is 800 feet above the bed of the river at the head of the gorge. From Bringenbrong to Welaregang, a distance of about 15 miles, the Murray has a northerly course; and it then turns to the west, being never very far off the 36th parallel of latitude between Welaregang (long. 148°) and Moama (long. 145° nearly). Its course is then about north-west to Wentworth (lat. 34°, long. 142°), and afterwards about west to the South Australian border, at long. 141°.

11. The river is in hilly country as far as the town of Albury (long. 147°), the last spur of rock on the right (north) bank being at Bungowannah, 7 miles lower down; but its valley consists of broad alluvial flats of varying width, the hills on either side being rarely less than half a mile apart. The only place where the valley narrows to a quarter of a mile is a little above Mr. Smithwick's house in the parish of Talmalmo, county of Goulburn, about 52 miles by road above Albury, where rock is found in the bed, and is, doubtless, continuous right across. The channel is about 150 feet wide and very tortuous: the bed consists of small shingle, rock but rarely appearing in it, and its average slope is moderate, being made up generally of low rapids and long pools.

12. Between Bringenbrong and Albury the principal affluents are from the hills on the left (Victorian) bank of the river, the only important tributary on the right (New South Wales) bank being the Tooma River, which joins above Welaregang. Between Albury and the South Australian border the only tributaries on the right bank are the Murrumbidgee (about lat. $35\frac{1}{4}°$, long. $143\frac{1}{4}°$) and the Darling at Wentworth: the Wakool, which joins in about 15 miles in a direct line above the

the Murrumbidgee, is really the tail of an ana-branch and contributes scarcely any water from its own catchment. The principal tributaries on the left bank are the Ovens joining below Corowa, the Goulburn and Campaspe near Moama, and the Loddon above Murray Downs, all of the junctions being above the confluence of the Murrumbidgee. As might be expected from this arrangement of the tributaries, a large tract of plain country is found on the New South Wales (north) bank of the river, while the country slopes up from the river on the Victorian bank, and as the high banks close in below the Murrumbidgee junction, the only opportunity of utilising to any considerable extent the low-water supply of the Murray by gravitation will be on this flat country. This was recognised by Mr. H. G. McKinney, when Engineer to the Royal Commission, and his notes on the subject will be found appended to the First and Final Reports of the Commissioners, a further memorandum being contained in the Progress Report for 1891 of the Water Conservation Branch, Department of Mines and Agriculture.

13. The tract in question is bounded on the south by the Murray and Edward Rivers; on the north by the Billabong River; on the east by the Corowa-Urana Road; and on the west by the common boundary of the counties of Townsend and Wakool: the country between the Edward and the Murray Rivers, and the portion of the county of Wakool which is between the Edward and Billabong Rivers, is too much broken up by creeks to be profitably irrigated. The length of the tract from east to west is about 110 miles, and its total area about 2,810 square miles; but from this must be deducted about 280 square miles, occupied or masked by a granite outcrop between the town of Berrigan and the Murray River, leaving a net area of 2,530 miles, or about 1,620,000 acres, available for irrigation operations. The soil in this tract is excellent, and wheat is already cultivated to a considerable extent, nearly 150,000 acres having cropped in 1896 in the counties of Denison and Townsend. The average rainfall for the seventeen years ending with 1896 was 18·84 inches, the maximum being 28·57 inches in 1887, and the minimum 12·27 in 1884: in twelve years out of the seventeen the rainfall was below the average, and in nine years it was below 18 inches. The rainfall is, however, on the whole, distributed favourably to the growth of wheat, an analysis of the monthly averages for each year of the period showing that in eight years out of the seventeen the rainfall was sufficient and well timed, while in three other years there would have been only a slight demand for the artificial irrigation of this crop: in the remaining six years substantial benefit would have been derived if canal water could have been supplied when it was wanted. Besides wheat, lucerne and other fodder crops and maize might be expected to take water during the summer months, and in years of drought water would doubtless be extensively used to promote the growth of grass for stock. Under existing conditions of population and markets the area under fruit and vegetables would not be large, and on the whole the demand for water would be very fluctuating. In fact, irrigation would be looked upon as an insurance against dry seasons, and the water would not yield its full value.

14. Mr. McKinney recommended from the first that the head of the canal to irrigate this tract should be at Bungowannah, about 7 miles by road below Albury, where the last spur of the Jindera range of hills abuts on the river, and an inspection showed that this is certainly the best site: as he has pointed out, the head could hardly be placed above this rocky spur on account of the difficulty of taking a canal past it, and if the head were placed below it there would be loss of level, and consequent increased depth of cutting where the canal enters the high bank. The spur would also afford material for, and protection to, one flank of the head works, while the presence of broad river flats, extending from the spur to the town of Howlong, a distance of over 11 miles, would allow of the canal being kept in moderate cutting. The river channel is close under the high bank near Howlong, but north of the township a channel is found through which the water of very high floods escapes from the river, and finds its way through the Ten-mile Creek to the Billabong River, as already mentioned in dealing with the basin of the Billabong: by utilising this channel to a certain extent the canal water could be brought to the surface of the country at 25 miles from the head without an excessive depth of cutting, and as the country has a slope from east to west of about 2 feet per mile, the whole of the tract would be under perfect command.

15. The full supply which appears suitable for a canal from the Murray at Bungowannah is 1,300 cubic feet per second, and it also appears desirable to provide for

for at least 700 cubic feet being passed down the river below the head of the canal; the total requirements would thus be 2,000 cubic feet, and the registers of the Albury gauge and the discharges observed there by the Water Conservation Department show that this volume would always have been available in the last six months of the year during the 17 years ending with 1896. This full supply would not always be needed, as the demand would vary with the rainfall, the seasons, and the crops on the ground; ordinarily, the strongest demand would be in the case of insufficient rain falling in September and October, when the large wheat crop would be on the ground, but a succession of dry months, such as occurred in the first half of the current year, would also give rise to a wide-spread need of irrigation.

16. In order to give an idea of what the demand would have been during the 17 years ending with 1896, and how far the river would have been able to meet it, separate diagrams have been prepared for each year showing for each month the mean rainfall over the tract to be irrigated; the mean supply needed to meet both the demand for irrigation and the provision of 700 cubic feet for the river below the head of the canal; the mean supply available in the river, the highest figure used in striking the mean being 2,000 cubic feet; and the mean deficiency, which would have to be made good by storage. On tabulating the deficiencies (*see Appendix* A), it is found that in nine years out of the seventeen there would have been sufficient water, but that in the remaining eight years there would have been shortage, the maximum being in 1882, when storage sufficient to supply 8,000 millions of cubic feet at the head of the canal would have been needed. The next largest deficiencies would have been about 4,500 millions in the years 1884, 1886, and 1892, but in the current year it is found that about 6,000 millions would have been required up to the 20th June, when rain fell. In 1882, however, the river was abnormally low, the mean discharge in February and March being considerably below the proposed allowance of 700 cubic feet per second, and in such a case it would be sufficient to pass on the actual supply in the river; the maximum storage requirements would then be reduced to about 7,000 millions of cubic feet delivered at the head of the canal.

17. From an inspection of the river above Albury, and inquiries made on the spot, it appeared that there were not many places where a large volume of water could be impounded at all at a reasonable cost, the only likely sites heard of being above the Murray Gates, on the Swampy Plain River, in the county of Selwyn, and at Talmalmo, on the Murray River, in the county of Goulburn. Subsequent inquiries and rough surveys by Mr. Seaver confirmed this idea, it having been ascertained that a third site, at Tom Grogan's Flats on the Indi River, was too inaccessible to be any use, so that the choice seems to lie between these two. The Murray Gates site has the advantages of being entirely in New South Wales, of a narrow gorge in hard granite rock, and of only one small patch of land to be resumed; its disadvantages are being a long distance from the head of the proposed canal, and somewhat difficult of access, and a possible difficulty in obtaining sufficient quantities of sand. The Talmalmo site is only 60 miles by road from the head of the proposed canal, would require a comparatively low weir, and has a fine basin for storage above it; but a large area of valuable land and some houses would be submerged in both New South Wales and Victoria, the roads on both banks would have to be shifted to higher levels, the length of the dam would be about 1,400 feet, and the quality of the rock is not very good. As far as can be judged from the rough surveys, the required storage might possibly be obtained at either site without exceeding the height of dams that have already been constructed, but the cost at Talmalmo would probably be double that at the Murray Gates, so the latter site should be given the preference if a detailed survey is undertaken.

18. It will thus be seen that there are no serious difficulties, from an engineering point of view, in bringing water from the Murray River to this tract by gravitation, and in maintaining the supply during years of drought. The necessity for keeping up the supply in such years is manifest, for there could be no confidence in a canal which failed to provide water when it is most wanted. Without detailed surveys and estimates it is impossible to arrive at the probable cost of this project; but as it appears that a canal from the Murrumbidgee River is more needed and likely to prove less costly, and as that river is entirely within the Colony, it does not appear necessary to undertake the further investigation of the Murray project at once. The experience gained on the Murrumbidgee will doubtless be found useful if it should be desired to do so later on.

19. Before quitting the subject of the Murray River an alternative scheme for a canal from that river may be alluded to. It is noticed that the rainfall decreases rapidly towards the western end of the tract between the Murray and Billabong rivers, the mean annual rainfall being only 15·27 inches in the portion to the west of Deniliquin and 19·90 inches to the east of it. There is further a larger area of country between the Billabong and the Murrumbidgee Rivers than can be properly irrigated by a canal from the Murrumbidgee. The right bank of the Murray River, below Tocumwal, is said to be low, and it might be possible to take a canal out from near that place at a reasonable cost to irrigate the drier country to the west of a line drawn between Tuppal and Conargo, and, crossing the Billabong River near the latter place, to take up some of the dry country west of a line between Conargo and Maude on the Murrumbidgee River. If this were found practicable, the Murray water would be taken to the country where the rainfall is lightest, but much would depend on whether the land is well suited to irrigation, and this would be the first point to inquire into. In case of the Murray canal project being taken up, this alternative scheme should not be lost sight of.

Basin of the Murrumbidgee River.

20. The Murrumbidgee River rises in high mountainous country near Kiandra (about lat. 36°, long. 148½°), and, in the first instance, flows a little east of south to near the town of Cooma (lat. 36⅕°, long. 149⅙°), it then turns a little west of north to the junction of the Yass River (about lat. 35°, long. 148¾°), from which point, turning west, the 35th parallel of latitude is closely followed to longitude 147°, about midway between the towns of Wagga Wagga and Narrandera. Its next course is north of west, past the town of Hay, to the Lachlan Junction (about lat. 34⅓°, long. 144°), whence it turns south-west, past the town of Balranald, to join the Murray River. It receives numerous affluents in the upper portion of its course, the principal of which are: The Umaralla, on the right bank, near Cooma; the Molonglo, on the right bank, near Queanbeyan; the Goodradigbee, on the left bank, near Yass; and the Tumut, on the left bank, near Gundagai. The last-named is the most important, rising in the Snowy Mountains, near the source of the Murray River, not far south-west from the head of the Murrumbidgee River, and the country enclosed between it and the Murrumbidgee River contains many lofty mountains, on which snow remains for several months at a time.

21. The river emerges from the hill country at Narrandera (lat. 34¾°, long. 146½°), and from this outwards, with the exception of a few outcrops of rocks, on the right bank from the Narrandera Range, there are comparatively level plains on either side, extending to the Mirool Creek and Lachlan River, with an average width of about 20 miles on the right (north) bank, and to the Billabong and Edward Rivers, with an average width of 45 miles on the left (south) bank; in round numbers, there are 3,000 square miles to the north and 7,000 square miles to the south. The Lachlan River is the only affluent of the Murrumbidgee below Narrandera, and it only contributes during comparatively high floods. The Yanko Creek, which leaves the left bank of the Murrumbidgee about 10 miles below Narrandera, has already been mentioned in connection with the Billabong Creek, into which it and its branch, the Colombo Creek, bail. Originally the Yanko Creek did not flow, unless the Murrumbidgee was in high flood; but since the channel at its head has been deepened and straightened a moderate rise suffices to give it a supply.

22. The Murrumbidgee, below Narrandera, has a well-defined channel over 20 feet deep, which winds through broad alluvial flats subject to inundation. During high floods the water extends beyond these flats, as in the case of the Gum Creek, on the south bank, which leaves the river 30 miles in a direct line below the Yanko head, and returns to it 50 miles in a direct line lower down, below the Burrabogie head station, after having been 15 miles back from the river. There are also several ill-defined channels still further back, through some of which it is said that floodwater finds its way occasionally from the Murrumbidgee to the Billabong, and on the north bank, 20 to 30 miles below Narrandra, very high floods are said to overflow to the Mirool Creek. Below Hay the escape of floodwater from the south bank becomes more frequent, and below the Lachlan junction still more so from both banks. Above the confluence with the Murray River there are high "mallee"

"mallee" banks on either side of the river to some distance back from it, that on the left side extending up the right bank of the Edward River to within 10 miles of Moulamein.

23. The first suggestion for utilising the water of the Murrumbidgee by gravitation was made by Mr. H. G. McKinney at the time of his employment as Engineer to the Royal Commission on Water Conservation. His original idea was to construct a weir at Pomingalana, about 6 miles direct below Wagga Wagga, and from above it to take out a canal on either bank. The canal on the south bank was to throw off a branch to fill Lake Urana, and was then to pass on to the country between the Murrumbidgee River and the Billabong Creek. A closer investigation showed physical difficulties in the way of carrying a canal over the upper portion of the proposed line; and it was then proposed to take the canal out a little below Narrandera without a weir, but with a branch as before to Lake Urana. The main canal was to cross the Yanko Creek, and to follow the ridge between the Murrumbidgee and Billabong down to the Dry Lake, near the common boundary of the counties of Waradgery, Caira, and Wakool, and there were to be five branch canals. In the latest report on the subject, dated 18th April, 1893, the main features of this scheme were retained; but it was proposed to exclude for the present the utilisation of Lake Urana as a storage reservoir.

24. As regards Lake Urana, there does not appear to be any hope of its being profitably used as a reservoir. It covers an area of 16,200 acres, and doubtless a large volume of water could be stored in it; but the depth would be small, and the loss by evaporation would be very great in comparison with the capacity. Neither is there a large tract of land at hand which could be irrigated by gravitation, the lake being close to the angle formed by the Colombo and Billabong Creeks, and its bed well below the level of the ground, so that the greater part of the water stored would have to be lifted. The level is also too low to serve as a storage reservoir for the canal.

25. The exclusion of this part of the original scheme may, therefore, be accepted; and in this case there is no reason why the head of the canal should not be placed below, instead of above, the head of the Yanko Creek, the crossing of which would prove expensive both to construct and maintain. An inspection of the river below the off-take of the Yanko showed a convenient site for the head of a canal, where the line would run between two sandhills, and the channel could easily be protected against high floods; and levels taken since have proved that water could be brought to the surface in about 12 miles without deep cutting. A low, permanent weir, with movable shutters on the top of it, would be needed; but this would have been absolutely necessary at any site in order to secure control over the distribution of the water in the river, and would here have the further advantage of allowing water to be forced down the Yanko Creek when it can be spared. It is certain, therefore, that the low water supply of the Murrumbidgee could without difficulty be delivered by gravitation on the surface of the country, so as to command practically the whole of the tract between that river and the Billabong Creek. The longitudinal slope, from east to west, of the tract is about $1\frac{3}{4}$ feet per mile, which is far more than is needed for a canal.

26. Owing to the limited supply of water in the river, it was proposed to tail the canal into a dry lake in the Tchelery Holding, county of Wakool, and the area of the principal holdings thus brought within reach of the proposed canal was found to be about 3,600,000 acres, or 5,625 square miles. This is a very large area, and it would be desirable to reduce it still further. The soil is of good quality, but there is practically no cultivation at present. The average rainfall for the seventeen years ending with 1896 was 15·91 inches, the maximum being 25·87 inches in 1889, and the minimum 8·06 inches in 1888. In twelve years out of the seventeen the rainfall was below the average, and in ten years it was below 15 inches. The rainfall decreases from east to west, and is generally higher along the Murrumbidgee than along the Billabong. On the whole its distribution during the year is not very favourable to the growth of wheat, an analysis of the monthy averages for each year of the period showing that in twelve years out of the seventeen there would have been a demand for the irrigation of this crop, and that in nine years out of the twelve the demand would have been strong. Lucerne and maize might also be expected to take water during the summer months, and in years of drought there would be a good demand for watering paddocks to promote the growth of feed for stock.

27. As compared with the tract to the north of the Murray River, the average rainfall is 3 inches less, and the need for irrigation considerably greater; and although the tract on the Murray has advantages in the shape of a well-established wheat cultivation and a considerable number of farmers and selectors, still the selectors on the Murrumbidgee side and many of the larger pastoralists have expressed their willingness to take water in considerable quantities, so that an early commencement of irrigation might be hoped for.

28. Mr. McKinney proposed that 1,000 cubic feet per second should be allotted to the canal and 500 feet to the river below the off-take. The total supply required in the river would thus be 1,500 cubic feet; and as it is found that this supply could nearly always be depended on during the months of September, October, and November, when a deficient rainfall causes great injury to wheat and pasture, this may be accepted as suitable. As in the case of the Murray River, diagrams have been prepared for each of the seventeen years ending with 1896, showing for each month the mean rainfall over the tract to be irrigated; the mean supply needed to meet the demand in the canal and the provision of 500 cubic feet for the river; the mean supply in the river, the highest figure used in striking the mean being 1,500 cubic feet; and the mean deficiency, which would have to be made good by storage. It is found (*see Appendix* B) that in seven years out of the seventeen there would have been no deficiency, and that of the remaining ten years the maximum shortage would have occurred in 1884, when storage sufficient to supply about 8,000 millions of cubic feet at the head of the canal would have been required. In 1882 and 1886 the deficiencies would have been over 7,000 millions, and in the first half of the current year 7,500 millions would have been required. In the years of low supplies the volume in the river was practically never below 500 cubic feet, so no reduction could have been made in the volume of water to be passed on during those years, and the full storage for a delivery of 8,000 millions at the head of the canal would have to be provided.

29. In the Report of the Royal Commission it was mentioned that a site for a storage reservoir at Tantangara had been roughly surveyed, and gave promise of proving suitable. This site was inspected in January last, and was found to have many advantages. It is about 10 miles in a direct line north-east of Kiandra (lat. $35\frac{5}{6}°$, long. $148\frac{1}{2}°$), at a place called "The Gulf," where the Murrumbidgee River passes through a rocky gorge about 200 feet wide at the bottom, the rock, a crystalline sandstone, being hard and apparently compact. Above the gorge the valley widens out, and gives room for storage over land of little value. The site has since been surveyed in detail, and a map of it is appended. The catchment area is about 188 square miles, and the mean annual rainfall at Kiandra for the seventeen years ending with 1896 was 63·66 inches. Assuming one-third of this to run off, the volume available would be 9,268,000,000 cubic feet, which could be stored by a dam 125 feet high, at a probable cost of about £150,000, and might be expected to yield the 8,000 millions required at the head of the proposed canal. One disadvantage of the site is its distance from the head of the proposed canal, entailing a loss of water the amount of which cannot be calculated with accuracy, and another is its distance from the railway, which would raise the cost of the cement required for the construction of the dam.

30. Later on Mr. Seaver was deputed to make inquiries about other suitable sites for reservoirs, and out of a number reported on two were considered worthy of further investigation. One site is on the Murrumbidgee River below the junction of the Umaralla River. It is 4 miles from the Bredbo Station on the Cooma railway, and about 20 miles due north of Cooma (lat. $36\frac{1}{6}°$, long. $149\frac{1}{6}°$). Here the Murrumbidgee enters a rocky gorge, 200 feet wide at bottom, across the upper end of which a dam might be constructed to hold up water over the river flats. Mr. Seaver's rough estimate showed that a dam 60 feet high would store about 6,000 millions of cubic feet of water, at a total cost of £45,000 including land. This volume would not be sufficient to meet the requirements of the proposed canal, and the levels of the railway line are apparently too low to allow of a higher dam being constructed, but the detailed surveys would throw further light on these points.

31. The other site is on the Murrumbidgee River, about 2 miles below the confluence of the Goodradigbee River, and about 25 miles south-west from Yass (lat. $34\frac{5}{6}°$, long. 149°), where the river passes between two granite hills, that on the right (north) bank being known as Barren Jack, and that on the left (south) bank

as

as Black Andrew. At the narrowest point the width at the bottom is 60 feet, and at a height of 80 feet it is 210 feet. Mr. Seaver estimates that a weir 80 feet high would hold up 10,000 millions of cubic feet at a cost of about £71,000; but these figures will be required to be verified by a detailed survey. The Goodradigbee contributes a steady supply to the Murrumbidgee, and the catchment of the latter at this point is so large that the reservoir would be certain to fill. This site has the advantage of being much nearer to the proposed off-take of the canal than either of the other two, and appears likely to prove also the cheapest.

32. Whichever site may eventually be selected as the best, it may safely be assumed that the additional water required to assure the supply of the proposed canal at all seasons of the year, and during years of drought, could be conserved at no very extravagant cost, and in this case the cost of the whole project might not prove so high as to prevent its being classed as remunerative. This project has much to recommend it in respect of facilities for leading water from the river, soil, and need for irrigation, and appears to be more likely to pay than that for a canal from the Murray River. It is therefore recommended that, after taking the further levels that may be required, careful estimates should be prepared in full detail of the cost of all the works connected with the project, the annual cost of maintaining the works, and the revenue that may be expected from them being at the same time worked out in detail. In the case of canals it is always difficult, even in countries where construction has been carried on for long periods, to prepare rough estimates with any approach to accuracy, owing to the great variety of works entailed, and it appears necessary that particular care should be taken in preparing the estimates for the first project of this kind that is brought forward for the consideration of the Government.

33. Mr. McKinney's proposals for the irrigation of the tract to the north of the Murrumbidgee are detailed in the Progress Report for 1891 of the Water Conservation Branch of the Department of Mines and Agriculture. The object was to feed the large Mejum and Coolagumparma Lakes (see map), which are situated a few miles to the north of the township of Narrandera, and to draw off a supply from them for the irrigation of the country to the westward. The feeding canal from the Murrumbidgee was to take off above a weir at Pomingalana, about 6 miles below the township of Wagga Wagga, and was to be capable of carrying 1,000 cubic feet per second, the length down to the lakes being about 60 miles. The distributing canal from the lakes was to be capable of carrying 600 cubic feet at its head, and its length was to be about 130 miles, with nearly 80 miles of branches, the area commanded by it being about 1,500,000 acres. The cost, without land, was estimated at £509,360, viz., £363,000 for the feeding portion, and £146,000 for the distributing portion.

34. The lakes to be filled are three in number, viz., Coolagumparma, Mejum Swamp, and Mejum Lake, and are enclosed by hills, or by rising ground, on all sides. The first named is the largest and deepest, and is the most westerly of the three; it is about 4 miles north of Narrandera, and when inspected in March last was quite dry. The bed is almost perfectly level, and covers an area of nearly 3,000 acres; it consists of fine clay, and is quite free from cracks, so it probably holds water well. This lake has no outlet, the lowest points in the range of low hills which forms its western border being two saddles, each about 22 feet above the bed, to which height water has never yet risen. The country falls rapidly on the west side of the southern saddle, and in 3 miles the ground is at the same level as the bed of the lake, so that the whole of the water could be drawn off if the lake were utilised as a storage reservoir.

35. The Mejum Swamp adjoins the Coolagumparma Lake, and is connected with it by a rather narrow gap; its bed covers about 1,000 acres, and is at a slightly higher level. To the east of this depression is a long, narrow, natural ridge or spur of ground which juts out from the range of hills to the north, and on which the homestead and out-buildings of the Mejum Pastoral Station have been built; at the homestead the ground is about 14 feet above the bed of the Coolagumparma Lake. The natural connection between the Mejum Lake and the Swamp is round the south end of this spur, along a shallow valley; but a dam has been thrown up across this valley, and a by-wash, or escape weir, pitched with stone, has been made through the spur, its sill being about $3\frac{1}{2}$ feet below the top. The Mejum Lake is supplied by the Watti Creek, the valley of which is said to be flooded from the Mirool Creek after heavy rain. In 1870 heavy floods came down filling both the Mejum

Swamp and the Coolagumparma Lake to nearly the level of the homestead. There is no possibility of divesting the Watti Creek, as the levels of the country forbid it, but the Mirool floods might probably be prevented from breaking out.

36. In these circumstances it is evident that, in order to store a large volume of water, the Mejum Homestead and other buildings would have to be removed to a higher level, and a considerable area of freehold land in the Watti Valley would also have to be reserved. The volume which could be stored up to the level of the homestead (contour 510) would be insufficient to supply water to a large tract of country, and it would not be safe to hold up water even to that level, on account of the possibility of a flood similar to that of 1870 coming down on the top of a full reservoir. Neither would it be feasible to raise the full supply level of the reservoir by means of an embankment along the spur, as there would then be no means of escape for flood-water coming down the Watti Valley until it had risen to above the level of the water in the reservoir, so that the land in the valley and the homestead would still remain liable to be submerged: thus, for purposes of the proposed scheme, it would be necessary to allow the water stored to spread without restraint over all three lakes. According to the figures shown on the map, the storage capacity would be 8,500 millions of cubic feet when the water rose to the level of the 520 feet contour, which is about the level of the saddles on the west side of Lake Coolagumparma, and this corresponds closely with the volume shown, in Appendix D, to be required; but in case of a flood like that of 1870 coming down on a full reservoir, the water would probably rise to the 525-foot contour.

37. The supplying canal from the Murrumbidgee was to start from Pomingalana, about 6 miles below Wagga Wagga, where a spur of the Malebo range of hills comes down to the right bank of the river. The valley here is about half a mile wide at the narrowest point, and there are hills on the left bank also. The alluvial flats are from 25 to 35 feet above the bed of the river, and are much cut up by spill channels. It was proposed to raise the water by means of a weir to about 23 feet above the existing surface level, when 2,500 feet per second are passing down the river, and to give the canal a full supply depth of 7 feet. The site does not appear favourable to a high weir, as there is no certainty of obtaining a rock foundation in the river bed, and the left bank of the river, being soft, would require a great deal of protection to make it safe; the spill channels would also require careful protection and constant attention to prevent the river taking to them. There would also be objections to a high weir on the part of the inhabitants of Wagga Wagga, which was inundated during the high floods of 1870 and 1891, and, no matter what length of crest were given to the weir, it would be difficult to persuade them, or a jury, that the weir was not responsible for any inundations that might occur after its construction.

38. The country through which the canal would pass in its length of 60 miles to the lakes is also far from favourable; in addition to the $3\frac{1}{2}$ miles of fluming mentioned by Mr. McKinney, and which the surveys show that it would be difficult to avoid, there would be a good deal of sidelong ground along which it would not be easy to carry a large channel with at all an even depth of cutting, or to maintain it without a considerable annual outlay. There is also a long sandy spur, running right down to the river at the Ganmain Homestead, which it would be difficult to cross without interfering with the station buildings. It was thought that the necessity for a high weir might be obviated by a flatter bed gradient, but it was found that this would result in a considerable increase in cost owing to the larger bed width and greater depth of cutting, and it appears certain that the lakes cannot be fed from the Murrumbidgee without a large outlay.

39. In order to obtain an idea of the volumes which a canal capable of 1,000 cubic feet per second might be expected to deliver into the lakes, a statement (*Appendix* C) has been prepared from the daily discharges of the river at Wagga Wagga during the seventeen years ending with 1896. It has been assumed that no water would have been drawn off until the discharge of the river rose to 2,500 cubic feet, because, in addition to 1,500 cubic feet required for the Lower South Murrumbidgee canal and the river below it, the storage reservoir for that canal would have taken off a good deal of water. The volumes included in the statement are, therefore, those which the canal could have drawn off when the discharge of the river was between 2,500 and 3,500 cubic feet per second, and the monthly and yearly totals of the daily discharge

discharge in the head of the canal are exhibited. As might be expected from the irregular flow in the river, the volumes that would have reached the reservoir vary very largely in different years, and fall very low between 1880 and 1886. This would evidently have been a critical period, during which the reservoir might have been depleted if the distributing canal had been unduly large, and as it was found that a canal with a maximum discharge of 450 cubic feet per second, running for eight months in the year, would have been suitable, the probable working of the reservoir during this period with such a canal, is roughly shown in another statement (*Appendix* D). A canal of this capacity would not be large enough to cope with an area of 1,500,000 acres, and the scope of the project would evidently have to be considerably reduced.

40. The cost of bringing the water into the reservoir, and of compensation for the land and property in its bed, would be so large that this scheme is not at all likely to prove remunerative for the purposes of irrigating ordinary crops: high-class crops, which could afford to pay good rates for water, would be needed to make it a success, and at present there does not appear to be any hope of such crops being grown on a big scale in a locality so far distant from large markets. It cannot, therefore, be recommended that this scheme should be undertaken.

41. The Upper Murrumbidgee Southern Canal, which is referred to in the Progress Report for 1891 above mentioned, was suggested as a supply channel to Lake Cullivel, in the county of Urana, about 15 miles to the north-east of the township of Urana, the idea being to irrigate by gravitation the land below the lake. The canal was to start from above the weir at Pomingalana, already mentioned in connection with the Northern Canal, and its full supply was to be 500 cubic feet per second. The total length to the lake would have been about 60 miles, and at about 40 miles from the head the Boree Creek Ridge, which is 50 feet higher than the starting point of the canal, would have been met, involving 2 miles of heavy cutting and 2 miles of tunnel. The cost of the supply channel and its works was estimated at £170,000, exclusive of land; but the cost of works at the lake and of distributing channels was not estimated, neither were any particulars given of the area and capacity of the lake. It is probable that the cost of getting through the Boree Creek Ridge has been under-estimated, and the high cost of bringing water to the lake would certainly be a bar to its proving a remunerative project. It could not in any case be carried out separately from the North Murrumbidgee Canal, as the whole cost of the weir would then fall upon it; and the scheme must, for the above reasons, be given up.

42. In Mr. McKinney's report on irrigation and water conservation in Riverina, appended to the Royal Commission's third and final report, reference is made to the benefits derived from the overflow of flood-water from the Murrumbidgee River below Hay, and measures for extending these benefits are suggested. It was pointed out that the occurrence of floods sufficiently high to cause a beneficial overflow is very irregular, while a moderate rise in the river is of little or no service; and it was suggested that a system of weirs, designed to utilise every considerable rise in the river, would do much good, and would compensate for the possible withdrawal of large supplies of water from the river higher up. As far as can be seen, the supplies withdrawn from the river are not likely to be so considerable as to make any material reduction in the amount of inundation now caused by high floods, as the high floods occur in good seasons, when there would not be much demand for irrigation, and all the canals which were originally proposed will in all probability not be carried out. The question of compensation may, therefore, be put on one side, and consideration confined to that of improving the supply of flood-water.

43. Works of this description would only be of use for pastoral purposes, the object being to induce an artificial flooding, similar to that which takes places naturally when the river rises to a sufficiently high level, and so to promote the growth of pasture. There would be no question here of the irrigation of crops, and if any works of the kind were constructed by the Government, a return sufficient to cover interest and cost of maintenance would have to be guaranteed by those who would benefit by them. The most simple way of creating an inundation of this kind would be by utilising an ana-branch or an effluent creek, and by deepening its head and the outflows from it, to enable it to flow with as low a river as possible. There appears to be such a creek leaving the left bank of the Murrumbidgee, about 8 miles in a direct line about the township of Maude, from which floods overflow in different

different directions, and which might possibly be made use of in the above-mentioned way with the aid of a weir in the river below the offtake; but the cost of a weir to increase the height of water, say from 8 to 15 feet, would not be trifling, and the interests of others lower down the river, both as regards inundation and navigation, would have to be considered.

44. Below the junction of the Lachlan River there are two systems of hollows in the right (west) bank of the Murrumbidgee, which are filled by its floods. The upper, known as the Gannaway system, consists of the Gannaway, Tori, Maremley, and Nowie Lakes. Lake Gannaway is about $2\frac{3}{4}$ miles in a direct line from the river, and the intervening flat country is under water nearly up to the lake during floods or heavy freshes, the connection with the lake being a short, well-defined creek, into which shallow watercourses converge. When Lake Gannaway is about three-quarters full it overflows into Tori on the north and Maremley and Nowie to the south-west. Maremley has a depth of 30 feet, and the supply is practically permanent; the depth in the others varies from 8 to 12 feet, and they frequently dry up. The total area is about 7 square miles, Maremley being the smallest with half a square mile. When all the lakes are full a large quantity of water flows back again to the river as it falls. It seem probable that the flow into these lakes might be made to commence with a lower river than at present by a few miles of judiciously aligned channel between the river and Lake Gannaway, and that the back flow of the water, when the lakes are full, might be prevented. From evidence given before the Royal Commission it appears that the river banks are not very sound here, and in this case weirs would be liable to have their flanks turned unless strongly protected.

45. The lower group, known as the Paika system of lakes, consists of the Paika, Macommon, Dundomallee, Pitarpunga, and Muckee Lakes, which cover an area of about 36 square miles, with depths varying from about 8 feet in the large Pitarpunga Lake ($24\frac{1}{2}$ square miles) to about 25 feet in the Paika (15 square miles) and 40 feet in the Muckee ($\frac{3}{4}$ square mile). The Paika Lake has practically a permanent supply, having only been dry twice. It is nearest to the river, about 5 miles in a direct line, and is fed by the Paika Creek, which collects water from the flooded flats and does not become well defined until it approaches the lake. A branch, called the Penarie Creek, takes off to the north from the Paika Creek, and feeds the Macommon Lake, and through it the Dundomallie Lake, which lies to the south-east of it and is connected with it by a narrow and deep channel. When these lakes are full the water spreads out over a broad flat to the north of Lake Macommon to the Geraki Creek, which feeds Lake Pitarpunga at its northern end. Lake Muckee, which lies about $1\frac{1}{2}$ miles to the south, is fed from Lake Pitarpunga, but scarcely ever fills. The Merowie or Box Creek, into which the Lachlan floods find their way from near Hillston, falls into the west side of the Pitarpunga Lake, but hardly ever brings any water into it. Beyond the Pitarpunga Lake there are other depressions into which no water has ever been known by white men to flow. In the case of this system also, there does not appear to be any need for a weir, but the supply to the Paika Lake might be maintained by improving the feeding creek. With a low river (3 ft. 9 in. on the Hay gauge) the water surface was 4 feet higher than the bed of the creek 3 miles away, and the river bank was only $6\frac{1}{2}$ feet above the water. Even with a weir it would scarcely be possible, during moderate floods, to fill the large Macommon and Dundomallee Lakes, or to push water through the wide-spreading Pitarpunga Lake to the dry depressions beyond it. There is no back flow when the lakes of this system are full.

46. On the left (east) bank of the river are the Tala and Yanga Lakes; the former is about 10 miles in a direct line north-east of the township of Balranald, and the latter about 5 miles to the south-east. Both are connected with the river by well-defined creeks, hold over 20 feet of water when full, and are fed when the river is comparatively low (Balranald gauge, 8 feet, and Hay gauge, 7 feet). The area of the Tala Lake is about $2\frac{1}{4}$, and that of the Yanga Lake, about $5\frac{1}{2}$ square miles. The Yanga Lake is said never to run dry, and there appears to be no reason why the Tala Lake should either. No weirs appear to be needed for these lakes. There remains Lake Waldaira, on the right (west) bank of the Murrumbidgee, about 10 miles above its confluence with the Murray River. This is fed by two creeks which take off close to one another, and, after joining, throw off a branch to the lake; the main (Manie) Creek joins the Murray River, but a dam is thrown across it to force the

the water into the lake. At the time of Mr. McKinney's inspection, the bed of the creek, where it left the river, was 10 or 11 feet above the surface of the river, so that a high weir would be required to force any water into it. Unless such a weir should be required for navigation purposes, it would not pay to construct one at this point for the lake alone.

47. The whole of these lakes are situated in the county of Caira, and are at present used for pastoral purposes, stock being watered at them, and pasture springing up as the shallower portions dry up. No irrigation is done from them, nor does it appear probable that they will be utilised in that way in the near future; only the deeper ones would afford a permanent supply, and water would have to be lifted from them, as their beds are well below the general level of the surrounding country. Nearly all the lakes have sand ridges round their margins.

48. The only irrigation scheme which has been proposed in this neighbourhood is one at the township of Balranald, an Act for which was passed in 1893. Under this Act the members of the Council of the municipality of Balranald were constituted a Trust for the purpose of constructing and managing works designed to irrigate a plot of about 2,000 acres to the north and west of the township; but the Trust were unable to raise the necessary funds, and nothing has been done beyond some surveying. The water was to have been pumped from the Murrumbidgee River, and, according to the report supplied by the Trust, the lift would have been moderate, the water would have been easily distributed over the land, which is said to be suitable to irrigation, while the mean rainfall is only 13 inches. There was, therefore, a fair chance of success if the works had been properly carried out. Small schemes of this kind in the neighbourhood of townships where the supply of water is assured and other conditions are favourable would be of considerable use in spreading the practice of irrigation, and in gradually turning out men who have had experience in this class of agriculture.

Drainage Areas of the Mirool and other Creeks.

49. This tract is situated between the Murrumbidgee and Lachlan Rivers, commencing near Temora (lat. 34½°, long. 147½°), and stretching north-west through the counties of Bourke, Cowper, Sturt, and Nicholson to the Lachlan River at Hillston (lat. 33½°, long. 145½°), with an average length of about 100 miles, and breadth of about 30 miles. Low ranges of hills are found scattered over the greater portion of the tract, but the average rainfall is not heavy (about 17 inches), and most of it soaks into the ground. The Mirool is the principal creek, and it does not continue to flow for long after even a heavy rainfall; dams have been constructed along it for pastoral purposes, and its water scarcely ever reaches the Lachlan River. The only chance of irrigation in this tract is on the left bank of the Mirool west of long. 146½°, where the country would be under command of the North Murrumbidgee Canal, if that were ever carried out. Water is conserved in a general way for watering stock, and with so poor a flow of water in most years, nothing further can be looked for in this tract.

Basin of the Lachlan River.

50. The Lachlan River is a tributary of the Murrumbidgee, which it joins in about latitude 34⅓° and longitude 144°; the last 15 miles of its course, below the town of Oxley, are in a large reed bed intersected by small channels. Its basin is bounded on the south by those of the Mirool Creek and Murrumbidgee River; on the east by that of Lake George and by the coastal range; and on the north-east by those of the Macquarie and Bogan Rivers. The effective catchment covers about 20,000 square miles, and terminates at about the 146th parallel of longitude, where the Willandra Billabong leaves the right bank of the river; to the west of this is a large deltaic tract between the Willandra and the Lachlan. The upper portion of the catchment, down to about the town of Forbes (lat. 33½°, long. 148°), is in hilly country with a good average rainfall, but in dry years the river receives but little water, and the supply at Forbes becomes insignificant; below Forbes comparatively little water enters the river, excepting in years of heavy rainfall, although

although there are low hills scattered about on either side; thus the Lachlan has an uncertain supply, and is subject to prolonged periods of low river.

51. The Willandra Billabong above mentioned is a natural channel, which in times of high floods is filled to a distance of over 100 miles, in a direct line from its head, as far as Lake Moornanyah, in about latitude 33° and longitude 144°, and it is said to have been traced 80 miles further, in a direct line, about south-west to Arumpo Head Station (lat. 33¾°, long. 143⅙°), and thence 60 miles in a south-easterly direction to Lake Waldaira, near the confluence of the Murrumbidgee and Murray. A cutting to supply the channel of the Willandra was made many years back at the cost of the neighbouring pastoralists, and in the present decade a crib-work weir across the Lachlan has been constructed by the Government to maintain a supply in the channel when the river rises above a certain height. The Willandra Billabong from the Kilfera Station upwards and the weir at its head have lately been inspected, and it was found that the channel below Mossgiel (lat, 33⅙°, long. 144½°) is not well defined, and that flood-water spreads out to a considerable width on either side; elsewhere the channel has a better section. There are numerous dams on it for pastoral purposes, but the supply is insufficient for irrigation, and there were no depressions where flood-water could be stored to a sufficient depth to allow of irrigation being practised. The Billabong had been dry for some time, and water had not yet reached many of its dams at the beginning of September.

52. The base of the delta formed by the Lachlan and the Willandra may be taken to coincide with the 144th parallel of longitude, which passes through the confluence of the Lachlan with the Murrumbidgee, and its length is about 100 miles. The country falls from the apex to the base of the delta at the rate of about 1·8 feet per mile, and the average rainfall is below 15 inches. From the apex of the delta to the base, in a direction perpendicular to it, is about 120 miles, so that the area of the delta is about 6,000 square miles, and throughout this area there are remains of numerous creeks and old channels. One of the principal of these is the Merowie Creek, which starts from the right bank of the Lachlan, about 20 miles in a direct line from the head of the delta, and has a longer course than the parent river, tailing into the Pitarpunga Lake about 30 miles to the west of the Lachlan-Murrumbidgee junction; it is said to be well defined for 100 miles, and to have numerous depressions along it which might be filled. Licenses for existing dams have been applied for in connection with this channel.

53. Another important channel is the Middle Billabong, which starts from the right bank of the Lachlan, about 10 miles in a direct line below the Willandra off-take. Its course for about 80 miles as the crow flies is parallel to that of the Merowie Creek, the distance between them being at one place only about a mile. A timber weir is being constructed on the Lachlan by the Government, with a cutting from the river into the head of the middle billabong, so that when the river rises above a certain point the water will pass down the Billabong. A cutting is also to be made between the Billabong and the Merowie Creek, at the point where the two channels are closest together, so that the creek may also receive a share of the flood waters. The weir, which was visited, is nearly complete, and the cutting in connection with it is ready.

54. On the Lachlan itself, from the township of Booligal down to that of Oxley, a distance of 50 miles as the crow flies, a number of earthen dams have been constructed by private enterprise to spread the water over adjacent lands, and channels have also been excavated in connection with them to lead the water into numerous depressions, where it is stored for pastoral purposes.

55. On the river, above the head of the delta, there are two lakes which receive a supply from the river during floods, both being on the left (south) bank. The upper of these is Lake Cowal, in the county of Gipps (lat. 33⅔°, long. 147½°), which is not less than 10 miles from the river. Its natural source of supply is the Bland and other creeks, which drain about 3,000 square miles of country, and enter at the southern end, but when the river is in high flood, water also comes into it from that source. The effluent channel at the north end is called the Manna Creek, and leads to the Lachlan. The main (southern) portion is known as Lake Cowal, and the northern portion as the Nerang Lake. The former covers an area of about 39 square miles, and the latter an area of about 26½ square miles. Both lakes are shallow, and run dry with the exception of about 300 acres at the south-east end of Lake Cowal. In May, 1892, after the heavy flood of 1891, the depth of water in

Lake

Lake Cowal did not average more than about 5 feet. More water might be retained in it by putting a self-acting sluice in the effluent creek, but the supply would not hold out till the time when water is most required.

56. The other is Lake Cudgellico, which is about 30 miles in a direct line above the head of the delta, in the parish of Gurangully, county of Dowling. It is supplied from the Lachlan during flood-time by overflow, and through Lake Creek, the water being retained in it by self-acting flood-gates, constructed by the Government across the creek, 7,360 feet below its head. The minimum distance from the river to the lake is abont $2\frac{1}{4}$ miles, and the total length of the lake is about 9 miles in a southerly direction. It covers an area of $11\frac{1}{2}$ square miles, with a maximum depth of 14 feet when full, but the depth would be smaller in Lake Maine and Lake Maria, which are comprised in this area. The lake has also a catchment of its own, the ground rising away from it with a more or less steep slope in many directions; but the rainfall is small, and the water which the lake receives would be insufficient to cover the loss by evaporation in dry years. Up to this the water in the lake has only been used for pastoral purposes; but until quite lately the nearest railway station was about 100 miles off. Irrigation could only be carried on by pumping, and a moderate area might perhaps be watered when the railway comes closer, though there would always be a danger of the supply being exhausted during a drought, as a high river is required to put water into the lake, and the cost of a weir in the river would be prohibitive.

57. The head waters of the Lachlan River have been inspected by Mr. Seaver, with a view to finding sites for storage reservoirs, but only one was discovered where any volume of water could be conserved. This was near the head of the river, at a distance of 2 miles from the Cullerin railway station of the Southern line and 20 miles west of Goulburn, where the river channel is in slate rock; and he estimated that a weir 60 feet high would impound 3,750,000,000 cubic feet, at a cost of about £30,000. The catchment is, however, only 110 square miles, and judging from what occurs 30 miles away, at Lake George, the run-off would be poor; so it is doubtful whether a reservoir of that size would fill in years of moderate rainfall. The only use that could be made of the stored water would apparently be to assist the river when the supply falls very low. With a full reservoir it would be possible to keep up a supply of 200 cubic feet per second for seven months, which would doubtless have been a boon in a season like that of the present year to those located along the river. It would be well to make further investigations regarding the volume of water that could be stored at this site and its cost, the periods of low water in the river, and the possibility of obtaining a return for the outlay.

The Manara County Drainage Areas.

58. The Willandra Billabong and Merowie Creek have already been dealt with under the head of the Lachlan River, and there only remains the tract to the north, between the Lachlan and Darling basins, which belongs to the Crowl or Sandy Creek. According to the evidence on the Darling River given by Mr. G. W. Moore, Inspector of Runs, on the 4th October, 1886 (page 86 of third and final report), this creek ends in box flats at Baden Park, near Moira Plains, where a sand-hill runs right across the bed of the creek; its basin is therefore a true basin, without any outlet. The boundaries are roughly:—On the north, a line joining Cobar with McCulloch's Range, near Lake Poopelloe; on the west, a line joining McCulloch's Range with Mount Manara; on the south, a line joining Mount Manara with the common boundary of the counties of Mowramba, Blaxland, Cunningham, and Flinders; on the east, a line from the common boundary to Cobar. The rainfall in this tract is small, and the water that does not soak into the ground is conserved in tanks and dams for pastoral purposes. There is nothing further to be done in this basin.

Basin of the Darling.

59. The effective catchment area of the Barwon (Darling) River above the junction of the Namoi River at Walgett is about 19,000 square miles, of which about 10,000 square miles, with an average rainfall of about 31 inches, belong to New South Wales, and about 9,000 square miles, with an average rainfall of about 25 inches,

to Queensland. The main heads of the river are the Moonie, Weir, Macintyre, Dumaresqu, and Gwydir, but the Macintyre and Dumaresq give the bulk of the supply when the river is low. At Walgett the Namoi joins on the left bank, and between Walgett and Brewarrina (lat. $34\frac{5}{6}°$; long. $146\frac{5}{6}°$) on the same bank the Castlereagh and Macquarie. Between Brewarrina and Bourke (lat. 30°, long. 146°) the Bogan joins on the left bank and the Bokhara and Culgoa on the right bank. The two latter are branches of the Balonne River, which has a large catchment in Queensland, and bifurcates at a point about 40 miles north of the New South Wales border, below which other channels take off, such as the Narran, ending in the Narran Lake and the Birrie connecting the Bokhara with the Culgoa; the Narran water does not reach the Barwon (Darling), and the other channels only contribute in times of flood. The next tributary is the Warrego, which joins the right bank of the Darling, about 45 miles in a direct line below Bourke. It rises 5 degrees further north in latitude 25°, and enters New South Wales at Barringun (lat. 29°, long. $145\frac{5}{6}°$), throwing off near that place the Cuttaburra and Irrara channels on its right bank, which take the flood-waters through a large area of country. The last tributary is the Paroo, which crosses the Queensland border at Hungerford (lat. 29°, long. $144\frac{1}{2}°$); but it ends in a series of swamps to the north of Wilcannia (lat. $31\frac{1}{2}°$; long. $143\frac{1}{3}°$), and its water but rarely reaches the right bank of the Darling at that township.

60. The Darling has throughout a deep well-defined channel, which only overflows during high floods, when a great width of flat country is under water. Beyond this flooded area the ground rises on either side, in some places rapidly. The channel is very tortuous, the distance by river from Walgett to the confluence with the Murray at Wentworth being nearly 1,200 miles, and the fall in flood surface averages only a little over 3 inches per mile of channel. At Bourke the floods rise over 40 feet. The supply in the river is not to be depended on, there being no regular rainy season in the catchment area, and the flow in it has even been known to cease altogether.

61. In these circumstances it is impossible to look for any irrigation from the Darling by gravitation, and the only means of utilising the water would be by pumping it from the river, or from reservoirs filled by the river when it is in flood. The former plan might be resorted to in places where a good waterhole exists, and where suitable land can be found on the margin of the river; but most of the flooded land is not well suited to irrigation, and this class of irrigation could hardly be practised on a large scale. The latter plan would have greater advantages, but the difficulty in this case is to store a sufficient depth of water to cover the loss by evaporation, &c., during the period between two floods. As will be seen from the map, there are many lakes along the Darling into which flood-water finds its way, but at present none of them afford a really permanent supply of water, although they are only used for watering stock.

62. In 1893 an Act was passed enabling a private company to utilise the water of Lake Menindie for purposes of irrigation, but the necessary works were not carried out by the company. As there has lately been some mention of reviving this scheme, and the locality has lately been inspected, it will not be out of place to allude to it here in connection with the subject of storing flood-water for purposes of irrigation. The lake is on the right bank of the Darling, with which it is connected by two short creeks, taking out a short distance below the township of Menindie, the bed of the upper creek being at a higher level than that of the lower. At present the flood-water begins to enter the lake when the river rises to about 14 feet on the Menindie gauge, and flows back again as it falls. No water is conserved in the lake itself, but two smaller lakes, Cawndilla and Speculation, the beds of which are at a lower level, get a supply from it which is retained to a depth of about 20 feet, and used only for watering stock. They were filled in 1893, and received some water in 1894, but have only 4 feet in them now. About 1887 water was impounded in the Menindie Lake by means of a rough dam, but the flood of 1890 carried it away, and there is now a wide and deep channel round its north flank. The Company proposed to impound water to ordinary flood-level by means of suitable works, and to pump up water for the irrigation of 25,000 acres of land on the north side of the lake. The area of the lake is 38,707 acres according to the map, and it was expected by the Company that a maximum depth of 20 feet and a mean depth of 16 feet could be stored over that area.

63. The levels taken by the Water Conservation Department in April, 1891, are not in sufficient detail to allow of these figures being fully checked, but the deepest soundings showed the maximum depth to be 14 feet, with about 25 feet on the Menindie gauge, and the lowest bed to be 20 feet below the high flood-level of 1890, when the gauge read 31 feet. The ordinary flood-level may be taken to be that due to 28 feet as the Menindie gauge, in which case the maximum depth would only be 17 feet. According to the evaporation observations at Lake George, the annual loss there in years when no water enters the lake is about 4 feet, and at Menindie it is not likely to be less than 5 feet, which agrees with the results obtained at Wilcannia: the rainfall at Menindie averages about 10 inches, so that the net loss would be 4 feet per annum, and the lake would dry up in four years without irrigation unless replenished. According to the records of the Menindie gauge for the years 1880 to 1885, inclusive, no replenishment worth mentioning could have taken place during those six years, and, if used for the irrigation of 25,000 acres, the lake would have been dry for the latter half of the period. Such an occurrence would have meant the ruin of an irrigation settlement.

64. The best site for a sluice to impound water in the Menindie Lake would be about half a mile below the bridge over the Menindie (or low-level) Creek, just above the point where the creek bifurcates. Here the soil is hard and the creek comparatively shallow, and the ground on either side is fairly high. Embankments would be required on either flank of the sluice to connect it with the high ground on the margin of the lake, and would have to be protected against wave action. That on the south flank would not be of great length, but that on the north flank would be much longer, and would have to be carried across the Billabong (or high-level creek) at a suitable place. The cost of these works would be considerable, but not perhaps excessive if permanent water could be secured by them.

65. The area which it was proposed to irrigate is situated on the north side of the lake, and is undulating, with a general rise away from the lake, the distance to its northern boundary being nowhere less than 8 miles. It would, therefore, be impossible to take water to all parts of it without lifting the water to a considerable height, and it might not be found worth while to irrigate more than the flat portions which are at a low level. The soil is described as a light sandy loam, but it was noticed that wherever the top soil had been swept off by wind a hard red clay, with limestone nodules in places, was exposed to view, which would of course be very ill-suited to irrigation. A careful examination of the subsoil would, therefore, be necessary before the tract could be accepted as one on which an irrigation colony could be settled.

66. As far as can be judged at present, the Menindie Lake scheme is not likely to prove a success, and it would probably be found better to pump from the Darling near the township, where there is a long waterhole, if a fair area of suitable land can be found within reasonable distance. It is also clear that there is likely to be considerable difficulty in finding depressions where flood-water can be stored to a depth sufficient to provide irrigation throughout the dry periods which occur periodically on this river.

67. From where the Darling crosses the 144th parallel of longitude, about 40 miles in a direct line above the township of Wilcannia, down to its confluence with the Murray, there are indications of a considerable change having taken place in the course of the river. It would appear that it has at some time followed the course of the Upper and Lower Talyawalka Creeks, which now lie on the left bank, and of the Great Ana Branch, which is on the right bank and has an independent confluence with the Murray River. The Upper and Lower Talyawalka Creeks form a continuous channel about 300 miles long, from Cultowa Station (lat. $31\frac{1}{3}°$, long. $143\frac{3}{4}°$), down to below Menindie (lat. $32\frac{1}{3}°$, long. $142\frac{2}{5}°$), the change of name taking place about 10 miles below Wilcannia, where the Ten-mile Creek connects them with the river. The upper creek begins to run with about 29 feet on the Wilcannia gauge, and feeds several lakes of considerable size, the water of which is used for pastoral purposes; but the supply is not permanent. The Ten-mile Creek commences to run with about 29 feet on the Wilcannia gauge, and the Lower Talyawalka feeds a large cluster of lakes covering 160,000 acres when full, the centre of which is about 55 miles due east of Menindie, water being forced into them through the Teryawcynya Creek by a dam across the Talyawalka Creek. This dam was constructed in 1868, at the cost of the pastoral stations in which the

lakes are situated, and has been maintained ever since. Until the record flood of 1864 occurred most of the lakes got no water, but the dam filled them in 1870, and has since supplied water to them in ten different years. The supply is not, however, permanent, although none of the water is used for irrigation purposes, as all the lakes were dry in 1877 and 1878, and again in 1883, 1884, and 1885. At present they are said to have about twelve months' water in them. Owing to the high level of the off-takes, it would be quite impossible to force water into the Talyawalka Creek, and the supply could only be improved by lowering the bed of the Ten-mile Creek so as to make it run earlier; but it is a question whether it would pay the pastoralists to do this, as wells have been sunk for watering stock when the lakes run dry, in which sweet water has been obtained in drift-sand at a depth of 80 feet.

68. The Great Ana Branch obtains its main supply from the river about 35 miles due south from Menindie, where a cutting was made by the pastoral lessees for a distance of 10 miles, with a maximum depth of 11 feet, into which water is said to flow when the Wilcannia gauge reads 18 feet. The length of the Great Ana Branch channel is said to be 300 miles, and it joins the Murray River about 10 miles in a direct line west of Wentworth: opposite Pooncarie (lat. $33\frac{2}{5}°$, long. $142\frac{3}{5}°$) it is 50 miles to the west of the Darling. There are several lakes along its course which are fed when the channel fills with flood-water, but the soil in most of them is very rotten, and they take a long time to fill. There are also dams which hold up water for stock, and help to feed some of the lakes, but no irrigation is carried on. Sweet water is obtainable from wells in the bed of the Ana Branch, but there are no good wells elsewhere. It does not appear that the supply in the Ana Branch during floods could be materially improved at any reasonable cost, or that there is any prospect of irrigation being carried out in connection with it.

69. Taking the Darling River as a whole, it does not appear probable that public money could be profitably spent on it with a view to irrigation. As a means of cheap carriage through a sparsely-populated country where a railway would not pay, it has its value; but this is discounted by the frequent stoppages of navigation, which are caused by want of water in the river, and at times last for long periods. The experimental weir and lock lately completed at Bourke has stood the test of a flood well, and has proved that such works can be constructed at a reasonable cost, but the difficulty is to get any return for the outlay in a country so thinly populated. The question of conserving water in the hills at the head of the Darling has not been gone into, as the river rarely dries altogether, and storage would be of no practical use at other times.

Basins of the Bogan, Macquarie, and Castlereagh.

70. The basins of these rivers adjoin one another, and when they reach the plain country their flood-waters intermingle largely, there being a slope from east to west at right angles to their courses, which are parallel and northerly. The Bogan is the westernmost of the three, and consequently the lowest, and below the township of Nyngan (lat. $31\frac{2}{3}°$, long. $147\frac{1}{3}°$) receives water from the Macquarie through the Gunningbar, Duck, and other creeks. The Macquarie is the central river, and at some distance above Warren (lat. $31\frac{3}{4}°$, long. $147\frac{5}{6}°$) commences to throw off flood-water from its left (west) bank through the Beleringa, Gunningbar, Marra, and other out-flowing creeks: its waters in high flood spread over the whole country between it and the Bogan, and the river eventually loses itself in the extensive Macquarie marshes, the Marra Creek becoming its principal channel of communication with the Barwon (or Darling) River, which it joins about 30 miles in a direct line above the township of Brewarrina (lat. $34\frac{5}{6}°$, long. $146\frac{5}{6}°$). The Castlereagh is the easternmost river, and all its principal tributaries join its right (east) bank: on the left bank its floods spill over the country between it and the Macquarie through the Marthaguy, Merri Merri, and other outflowing creeks, but do not appear to feed that river until it has reached the Macquarie marshes: it joins the Barwon River not far above the junction of the Marra Creek.

71. The Bogan River has an effective catchment of about 5,000 square miles with an average rainfall of 20 inches, its sources being in the spur of hills which extends for 50 miles southwards from the town of Dubbo (lat. $32\frac{1}{3}°$, long. $148\frac{1}{2}°$), and in the main range which runs north of west from Molong (lat. $33\frac{1}{10}°$, long. $148\frac{9}{10}°$) to

Nymagee

Nymagee (lat. 32$\frac{1}{10}$°, long. 146$\frac{1}{3}$°), and divides the basins of the Lachlan and Bogan Rivers. Even in its upper course it flows through comparatively level country, and there are no sites where water could be stored in any considerable quantity. Its flow is very intermittent, and it is only by means of numerous dams across its channel that water can be conserved for pastoral purposes: after heavy rain, and with the aid of flood-water from the Macquarie, its waters reach the Barwon (or Darling) River, which it joins about 25 miles, in a direct line, above the town of Bourke (lat. 30°, long. 146°). An old channel of the Bogan starts from near the present junction and falls into the Darling much nearer to Bourke: it is known as the Dry Bogan, and flood-water might perhaps be stored in it for pastoral purposes, but it does not appear possible to utilise the Bogan for purposes of irrigation.

72. The Macquarie River has an effective catchment of nearly 10,500 square miles, with a mean rainfall of nearly 27$\frac{1}{2}$ inches, the whole of which is in more or less hilly country. The catchment area is bounded on the east by the coastal range from lat. 34° long. 150° to lat. 31$\frac{2}{3}$° long. 150°; on the west by the divide between its basin and those of the Lachlan and the Bogan; and on the north by the spur of the Liverpool Range, which divides the Talbragar River (an affluent of the Macquarie, joining its right bank below Dubbo) from the Castlereagh River. Notwithstanding the size of the catchment, its hilly features, and the comparatively good rainfall over it, the supply of the Macquarie is extremely irregular, and in dry seasons practically fails altogether. It was hoped that in such a country some good sites for storage reservoirs might be found, but the officer (Mr. Campbell) detailed to inspect it was unable to discover any that would be of real service in maintaining the supply of the river. Neither have the investigations of the Water Conservation Department into the possibility of storing and utilising water for irrigation purposes proved more successful. It was thought at first that a considerable area of suitable land near the township of Narromine (lat. 32$\frac{1}{3}$°, long. 148$\frac{1}{3}$°) might have been supplied with water by gravitation, but it was found that the cost would have been excessive and the supply uncertain. Two weirs have been constructed by the Government with the object of improving the supply of water for pastoral purposes in the creeks, one being situated about 3 miles above the town of Warren, and the other about 30 miles above it; but there is no hope of irrigation being developed to any extent on this river.

73. The Castlereagh River has an effective catchment of about 3,000 square miles, with a mean rainfall of 26$\frac{1}{4}$ inches. It is bounded on the north and east by the Liverpool Range, and on the south and west by the Macquarie catchment. The country is undulating rather than mountainous, and does not contain any sites suitable for storage purposes. Its supply is far more intermittent than that of the Macquarie, and no irrigation can be expected from it; but good supplies of artesian water have been struck along its course from Galargambone (about lat. 31$\frac{1}{3}$°, long. 148$\frac{1}{2}$°) downwards.

Basin of the Namoi.

74. The Namoi River has an effective catchment of about 9,500 square miles, with a mean rainfall of nearly 27 inches. It is bounded on the east and south by the coastal range; on the west by the Liverpool Range; and on the north by an offshoot of the coastal range, which terminates about 20 miles to the north-east of the township of Narrabri (lat. 30$\frac{1}{3}$°, long. 149$\frac{3}{4}$°). The principal tributary is the Peel River, which joins it about 20 miles above Gunnedah (lat. 31°, long. 150$\frac{1}{4}$°), and above the confluence there are low hills near the river; below the junction the country for some distance on either side of the river is comparatively level, and from Narrabri to its junction with the Barwon (Darling) River at Walgett—a direct distance of about 100 miles—the course lies through open plains. When inspected in April, 1897, the river at Gunnedah was nearly dry, but it was said to be unusually low then: in ordinary years it is understood that the supply suffices for pastoral purposes. A site suggested for a storage dam was also inspected: it is about 3 miles in a direct line above the junction of the Peel River, and about the same distance from the Tulcumbah Pastoral Station. At this point the river passes through a ridge of conglomerate rock, but the rock on either side is a good deal broken up: none was visible in the bed, but borings taken later show that it would be met with at a depth of about 24 feet. On the right bank there is broad mass of rock rising somewhat abruptly; but on the left bank the ridge is narrower, and rises more gradually to

about

about 140 feet above the river-bed, a saddle further on being about 20 feet lower. If the rock is proved to be sound, a considerable volume of water might be stored here; but a large area of occupied land, a church, and other buildings would be submerged, and water could not be cheaply conveyed to any extensive area of land suitable to irrigation. The rainfall is also good in these parts, the average of nineteen years at Tulcumbah being over 25 inches at the end of 1895, and a steady demand for water could not be looked for, so it appears very doubtful whether a remunerative project would result from a further outlay on detailed surveys. If the water were to be utilised in supplying the waterholes in the river-bed during seasons of drought, for pastoral or irrigation purposes, there would be still less chance of the project proving remunerative. The soil in the Namoi Valley is said to be very fertile, and the average rainfall at Gunnedah and Narrabri being over 27 inches, there should be no difficulty in raising good crops without irrigation, in all but very dry years. The plains between Narrabri and Walgett appear also to be within the limits of artesian water supply.

Yantara Drainage Areas.

75. These areas are in the north-west corner of the Colony, and lie outside of the catchment of the Darling River. The rainfall is light, and the supply of water from the creeks and the Bulloo River, which drains a large area in Queensland, is uncertain. On the rare occasions when the floods of the Bulloo River cross the Border, they flow into a large swamp, which has no outlet. Both flowing and pumping supplies of artesian water have been obtained in parts of those areas, and this appears to be the only means of improving the water supply.

Tara County Drainage Area.

76. This is a small area in the south-west corner of New South Wales, situated to the north of the Murray, and to the west of the Great Ana Branch of the Darling. There is no information to hand regarding it, and it is presumably only used for pastoral purposes.

Lake George Basin.

77. This is an isolated basin on the western side of the Dividing Range, between the catchments of the Hawkesbury, Shoalhaven, Murrumbidgee, and Lachlan Rivers. The catchment area is said to be about 400 square miles, and is encircled by low hills; in the lowest point of it is Lake George (lat. $35\frac{1}{5}°$, long. $149\frac{1}{2}°$), the recipient of all the drainage-water. When at its highest level, this lake covers an area of about 39,000 acres; the maximum depth is 24 feet, but this extends over a very small area; when at its highest, the elevation of the lake above the sea may be taken as 2,230 feet. According to information collected by Mr. H. C. Russell, Government Astronomer, the lake was perfectly dry in 1838, 1839, and 1845 to 1849 inclusive, and practically so in 1850 and 1859, while it rose to its greatest height in November, 1874. In February, 1885, Mr. Russell established a self-registering gauge with a view to measuring the amount of evaporation on a large sheet of water, and up to the end of 1895 the greatest variations had been 1 ft. 3 in. below the zero of the gauge in February, 1890, and 3 ft. $0\frac{1}{2}$in. above in October, 1894. In January, 1897, when the lake was inspected, the reading was 1 ft. 6 in. below zero, the reduced level of which is 2,218·58. The observations show that in some years the lake does not receive more than the rain which falls on its own area, the creeks not bringing water into it until the soil has been soaked by continuous rain, and that the average loss in such dry years is 46·50 inches, the average rainfall for the same years being 23·83 inches. A large proportion of the loss is attributed to the effect of strong winds. The water of the lake is brackish, but stock drink it readily.

78. The lowest point in the hills surrounding the catchment area is at a point called Geary's Gap, in the range which bounds the western side of the lake. Here, at about a third of a mile from the lake, is a saddle about 100 feet above the lake, from the further (western) side of which drainage flows to one of the head creeks of the Yass River, a tributary of the Murrumbidgee River. In order to take water out

of

of the lake, a long tunnel through the range would be required, and if drawn on to any extent the lake would soon run dry. It was suggested some years back that flood-water might be led into the lake from the Murrumbidgee River near Umaralla (lat. 36⅛°, long. 149⅓), but a journey along the railway from Queanbeyan to Cooma was quite enough to show that the difficulties to be encountered would be enormous, even if the levels allowed it, which appears open to doubt; in any case, a tunnel would be required into the lake as well as out of it. It does not appear, therefore, that the lake can be utilised in any way.

Artesian Water Supply.

79. During the last ten years considerable progress has been made in the matter of artesian water supply, both by Government and private agency. On the part of the Government, the work has hitherto been confined, as a rule, to providing a supply of water for stock-routes, and according to figures supplied in April last the total number of bores put in hand was 71, of which 34 were flowing, 14 yielded a pumping supply only, 6 were failures, and 17 were in progress. The total depth of the completed bores was 83,791 feet, and the cost £148,380; the aggregate supply obtained was 23,344,705 gallons per diem, or 43·23 cubic feet per second. The average depth of each completed bore has been 1,552 feet, the cost £27,480, and the rate per foot £1 15s. 5d. The cost of supplying 1 cubic foot per second works out to £3,432, and after allowing for distributing-channels, &c., would not be less than £3,600, interest on which at 3½ per cent. would amount to £126 per annum. If a duty of 300 acres be taken, a water-rate of 8s. 5d. per acre per annum would be required to cover the interest. The number of private bores is 106, the total depth bored 125,864 feet, and the aggregate supply 37,360,900 gallons per diem—the cost is not known.

80. The tract of country in which a flow of artesian water has been obtained in New South Wales is very extensive, covering about 14 square degrees. On the north its boundary is the Queensland Border, between 142° and 150° of longitude; on the south, the 31st parallel of latitude from 143° of longitude to the Darling, then that river to the juction of the Macquarie River with it, and the Macquarie River to above Warren; on the east, the foot of the western slopes from above Warren; on the west, the road running north from Wilcannia through Milparinka and Tibbooburra. Bores have also been put down on the lines of road between Hay, on the Murrumbidgee River, and the Darling River, but no flow has yet been obtained to the south of the hills which are traceable westward from Cobar through Wilcannia, or south of the Darling up to the junction of the Macquarie River.

81. There are a large number of bores to the north of the Darling between the Culgoa and Paroo Rivers, and a tour of inspection was made northwards from Bourke, embracing 11 Government and 8 private bores. Amongst them was the Pera (Government) bore,with a flow of 610,000 gallons per diem, about 7 miles from Bourke, where 640 acres of land have been marked out in 20-acre blocks as an irrigation settlement, after setting apart about 50 acres as a Government Experimental Farm. Out of the 20 blocks offered, 11 had been taken up, and some of the lessees were doing well; but the rent was light, 5s. per acre (to be increased to 10s. after five years) being charged per annum for the land and water. They have also the advantage of being near the town of Bourke, where there is a fair market, and of having the Superintendent of the farm at hand to assist with advice when needed. As is usual in the case of those new to irrigation, water was being used far too lavishly, and too little attention was being paid to cultivation; but these errors will doubtless be discontinued in time under the guidance of the Superintendent, and with the example set in the Government farm. As the soil cakes on the surface after irrigation, and the water from this and all other bores contains alkali, the necessity for keeping the surface broken up and for using the water sparingly is obvious. At the other Government bores visited the land set apart for the bore was generally let to a tenant, who received the fees for watering stock, &c., and was at liberty to cultivate. Fruit-trees had been planted by Government at most of them, and lucerne, vegetables, and melons were being cultivated, but the tenants were, as a rule, inexperienced, and the bores far from a market.

82. Among the private bores visited were some with reputed flows of 3 to 4 millions of gallons per diem, but they had not been properly gauged, and did not appear to discharge so much. In some cases they were being well utilised, water being led about in small channels for watering stock and applied to the irrigation of wheat for hay, &c, but in other cases the water was flowing uncontrolled into large hollows. As a rule, sufficient attention had not been paid, either in the case of the Government or private bores, to the selection of the site, the ground at the bore being frequently much lower than the adjacent ground, or than the general level of the country which might be served by the water, and the difficulty and expense of taking the water about was much enhanced in consequence.

83. Hitherto no Government bores appear to have been put down for the sole purpose of irrigation. The supply of water for travelling stock has been the first object, but as the really successful bores yield far more water than is required for that purpose the surplus is available for irrigation. Many of the public watering-places where there are bores are, however, far from railways or markets, and can be of little use as irrigation settlements. Unless a more keen demand for irrigation blocks arises than has hitherto been manifested at the Pera Bore, the necessity for special irrigation bores may not be felt for some time to come, as there are still several bores near towns or railways where settlers would have a fair chance of succeeding. When, however, the necessity does arise, or indeed in any case where a new bore is required, it will be well to make a careful preliminary investigation regarding the nature of the surface and sub-soils, the facilities for drainage, and the best lines for the irrigation channels, before selecting the block of land to be irrigated and fixing the site of the bore. The drainage question is of importance where irrigation is likely to be carried on continuously, and should on no account be neglected. Judging from the cost at which artesian water has hitherto been delivered on the surface, the irrigation of ordinary crops would not be remunerative, and the more valuable products would have to be raised. The question of the permanence of the artesian supply is one which time alone can solve. So far, it is understood that in properly cased wells a steady supply is maintained, and that where the supply has fallen off it has generally been due to the flow being checked by the sides of the bore falling in. As far as this Colony is concerned, the wells are scattered over such a wide area there appears to be no fear of exhausting the supply.

Summary.

84. The conclusion arrived at is that the flow of nearly all the rivers to the west of the Dividing Range is too irregular to allow of irrigation being practised from them on anything but a small scale, and that sites where water in any volume can be stored at a reasonable cost are extremely rare. The only two rivers which can be depended on for water during a portion of the year are the Murray and the Murrumbidgee, which are fed by the snow on the Australian Alps; but these rivers frequently fall so low during the first half of the year that they would not supply a moderate-sized canal without the aid of storage.

85. In these circumstances it is only possible to make recommendations in connection with these two rivers, and the two projects which have been selected as most likely to prove successful are :—

(1.) A canal taking out from the left bank of the Murrumbidgee River below the off-take of the Yanko Creek.

(2.) A canal taking out from the right bank of the Murray River at Bhungowannah, 7 miles from Albury.

These are projects which were originated by Mr. H. G. McKinney, Principal Assistant Engineer for Water Conservation; but in the case of (1) the off-take has been shifted further down the river, and in both cases it has been found necessary to recommend storage reservoirs in order to ensure a sufficient supply being maintained in the canals at all times.

86. In neither of these cases are the surveys sufficiently complete to allow of a trustworthy estimate of cost being prepared; but it is considered that the canal from the Murrumbidgee River promises the better results, owing to the facility with which water can be brought to the surface of the country and the small rainfall

rainfall of the tract commanded; as it has also the advantage of being entirely within the limits of the Colony, it is recommended that the surveys for this canal should be completed in sufficient detail to permit of a full and trustworthy estimate of cost being got out, and of a report being prepared showing the financial prospects of the project.

87. In connection with the financial prospects of irrigation projects, it may be mentioned that the development of irrigation is a comparatively slow process, and that it is not reasonable to expect that a canal should pay as soon as it is completed. This is fully recognised in India, where a canal is classed as remunerative, and carried out with borrowed money, if the forecast statements show that it will pay maintenance and interest charges within ten years after completion, and at the end of twenty years will pay the prescribed rate of interest on the sum at charge of the project, which is the capital cost plus the balance, if any, of maintenance and interest charges over receipts from revenue.

88. If the prospects of the Murrumbidgee canal should be considered sufficiently promising to warrant its being undertaken, it would appear desirable to allow the irrigation to develop itself before taking up the investigation of the Murray canal project. The experience gained on the older canal would be of the greatest value in preparing the project for the new canal, and in judging of its financial prospects, and it is quite possible that one canal will be found sufficient to meet the requirements of the Colony for some years to come. Irrigation is a new industry here, and a little caution in expanding it can do no harm, and may save a good deal of money and trouble.

89. The only irrigation works at present in hand are those at Hay, on the Murrumbidgee River, and at Wentworth, on the Murray, where provision is being made for pumping water from the rivers to irrigate land in the neighbourhood of the townships. There appears to be a fair prospect of these works proving successful, and if this should be the case, it is hoped that works of a similar kind may be carried out at other towns (such as Balranald, on the Murrumbidgee River) where there is a permanent supply of water and other conditions are favourable; such works should help to popularise irrigation and to introduce improved methods of cultivation, if only a market can be found for the produce.

90. In conclusion, it is desired to acknowledge the courteous assistance received from many sources in the course of the inquiries connected with this Report. Mr. H. G. McKinney, the Principal Assistant Engineer for Water Conservation, in particular, has been most helpful, and has spared no trouble in meeting all demands for information.

FREDERICK J. HOME,
Colonel,
Royal Engineers (Retired).

Sydney, 8th October, 1897.

TO ACCOMPANY THIS REPORT:—

Four appendices, A to D.

One book of diagrams.

One map of the Colony.

One contoured map of country between the Murray and Lachlan Rivers.

One map of proposed storage reservoir at Tantangara.

One map of lakes at Coolagumparma and Mejum.

APPENDIX A.

MURRAY RIVER, 1880 TO 1886 INCLUSIVE.

DEFICIENCIES in discharge required for River below Canal Head (700) and for Canal (up to 1,300 cubic feet per second).

Month.	1882.		1883.		1884.		1885.		1886.		1888.		1892.		1893.		(a) 1897.		Remarks.
	Average daily discharge.	Total for month.	Average daily discharge.	Total for month.	Average daily discharge.	Total for month.	Average daily discharge.	Total for month.	Average daily discharge.	Total for month.	Average daily discharge.	Total for month.	Average daily discharge.	Total for month.	Average daily discharge.	Total for month.	Average daily discharge.	Total for month.	
	cubic ft. per sec.	cubic ft. per sec.	cubic ft. per sec.	cubic ft. per sec.	cubic ft. per sec.	cubic ft. per sec.	cubic ft. per sec.	cubic ft. per sec.	cubic ft. per sec.	cubic ft. per sec.	cubic ft. per sec.	cubic ft. per sec.	cubic ft. per sec.	cubic ft. per sec.	cubic ft. per sec.	cubic ft. per sec.	cubic ft. per sec.	cubic ft. per sec.	
January	131	4,061	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	(a) The deficiencies up to the 20th June, 1897, when good rain fell for the first time since January, are given in order to show that total would be less than in 1882. There is not likely to be any deficiency during the remainder of the year.
February	1,468	41,104	12	336	143	4,147	21	588	...	...	...	...	428	12,412	285	7,980	...	...	
March	1,511	46,841	387	11,997	605	18,755	518	16,058	431	13,361	...	...	1,004	31,124	...	...	212	6,572	
April	.....	...	665	19,950	919	27,570	...	...	1,107	33,210	385	11,550	309	9,270	...	...	824	24,720	
May	.....	...	88	2,728	...	...	...	...	182	5,642	...	...	...	...	...	...	792	24,552	
																	20 days.		
June	.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	634	12,680	
July	.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
August	.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
September	.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
October...	.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
November	.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
December	.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
Totals daily ...	.....	92,006	...	35,011	...	50,472	...	16,646	...	52,213	...	11,550	...	52,806	...	7,980	...	68,524	
Millions of cubic feet...	(b) 7,949·3184		3,024·9504		4,360·7808		1,438·2144		4,511·2032		997·9200		4,562·4384		689·4720		5,920·4736		Totals multiplied by 86,400, the number of seconds in a day.

NOTE.—There would have been no deficiencies during the years 1880, 1881, 1887, 1889, 1890, 1891, 1894, 1895, and 1896.

(b) If the volumes actually in the river had been passed on in February and March, instead of 700 cubic feet, the deficiency would have been reduced to 7,000 millions.

FREDERICK J. HOME, Col., R.E. (Retired).

APPENDIX B.

MURRUMBIDGEE RIVER, 1880 TO 1886 INCLUSIVE.

DEFICIENCIES in discharge required for River below Canal Head (500) and for Canal (up to 1,000 cubic feet per second).

Month.	1881.		1882.		1883.		1884.		1885.		1886.		1888.		1892.		1895.		1896.		1897.		Remarks.
	Average daily discharge.	Total for month.	Average daily discharge.	Total for month.	Average daily discharge.	Total for month.	Averag daily discharge.	Total for month.	Average daily discharge.	Total for month.	Average daily discharge.	Total for month.	Average daily discharge.	Total for month.	Average daily discharge.	Total for month.	Average daily discharge.	Total for month.	Average daily discharge.	Total for month.	Average daily discharge.	Total for month.	
	cubic ft. per sec.	cubic ft. per sec.	cubic ft. per sec.	cubic ft. per sec.	cubic ft. per sec.	cubic ft. per sec.	cubic ft. per sec.	cubic ft. per sec.	cubic ft. per sec.	cubic ft. per sec.	cubic ft. per sec.	cubic ft. per sec.	cubic ft. per sec.	cubic ft. per sec.	cubic ft. per sec.	cubic ft. per sec.	cubic ft. per sec.	cubic ft. per sec.	cubic ft. per sec.	cubic ft. per sec.	cubic ft. per sec.	cubic ft. per sec.	
January ...	631	19,561	857	26,567	...	...	324	10,044	...	...	...	...	...	...	...	...	...	...	748	23,188	202	6,262	
February ...	244	6,832	955	26,740	36	1,008	614	17,806	...	...	340	9,520	...	...	590	17,110	...	...	...	...	317	8,876	
March ...	...	...	910	28,210	393	12,183	950	29,450	249	7,719	951	29,481	143	4,433	515	15,965	...	...	...	...	533	16,523	
April ...	...	...	...	...	683	20,490	864	25,920	...	...	975	29,250	665	19,950	596	18,476	...	...	...	...	816	24,480	
May ...	...	...	...	...	...	...	291	9,021	275	8,525	555	17,205	...	...	...	...	...	...	...	...	849	26,319 (7 days)	
June ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	686	4,802	
July ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
August ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
September...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
October ...	...	...	...	...	...	...	...	...	...	...	...	...	10	310	...	...	...	...	...	...	...	...	
November...	...	...	...	...	...	...	...	...	44	1,320	...	...	617	18,510	...	...	...	...	...	...	...	...	
December...	...	...	...	...	...	...	...	...	...	...	...	...	496	15,376	...	...	143	4,433	...	...	...	...	
Totals daily	...	26,393	...	81,517	...	33,681	...	92,241	...	17,564	...	85,456	...	58,579	...	51,551	...	4,433	...	23,188	...	87,262	
Millions of cubic feet.	2,280·3552		7,043·0688		2,190·0384		7,969·6224		1,517·5296		7,383·3984		5,061·2256		4,454·0064		383·0112		2,003·4432		7,539·4368		The figures for 1897 are up to the date on which the rain fell and the river rose. There is not likely to be any deficiency during the latter half the year.

NOTE.—There would have been no deficiencies in the years 1880, 1887, 1889, 1890, 1891, 1893, and 1894.

FREDERICK J. HOME, Col., R.E. (Retired).

APPENDIX C.

North Murrumbidgee Canal—Coola Gum Parma Reservoir.

Statement showing Volumes available in the River, when discharge is between 2,500 and 3,500 cubic feet per second, during the seventeen years ending with 1896.

Month.	Monthly totals of daily discharges available, in cubic feet per second.																
	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.	1893.	1894.	1895.	1896.
	cubic feet per sec.	cubic feet per sec.	cubic feet per sec.	cubic feet per sec.	cubic feet per sec.	cubic feet per sec.	cubic feet per sec.	cubic feet per sec.	cubic feet per sec.	cubic feet per sec.	cubic feet per sec.	cubic feet per sec.	cubic feet per sec.	cubic feet per sec.	cubic feet per sec.	cubic feet per sec.	cubic feet per sec.
January	.....	.....	.....	.....	.....	6,791	.....	9,000	17,455	10,585	.....	26,790	4,000	.....	21,455	4,525	.....
February	.....	.....	.....	.....	.....	2,788	.....	9,198	.....	.....	2,455	10,624	.....	.....	12,965	855	.....
March	.....	.....	.....	.....	.....	.....	.....	25,415	....	.....	8,930	.....	.....	5,587	18,280	.....	.....
April	10,725	.....	.....	.....	.....	.....	.....	14,682	.....	.....	4,043	3,803	.....	.....	29,374	.....	.....
May	17,310	.....	.....	.....	.....	.....	.....	.....	.....	18,836	.....	.....	1,000	7,460	30,720	.....	12,081
June	14,084	14,292	3,770	5,000	.....	7,761	.....	24,315	10,683	22,855	27,367	17,427	18,316	29,720	30,000	8,000	12,154
July	27,747	.....	10,761	14,999	.....	399	.....	31,000	11,883	24,771	31,000	31,000	20,937	31,000	31,000	11,591	19,273
August	31,000	7,395	20,066	16,555	.....	13,385	27,164	31,000	7,290	30,300	31,000	31,000	15,470	31,000	31,000	19,150	2,000
September	30,000	10,877	30,000	26,921	23,181	20,937	30,000	31,000	29,236	30,000	31,000	30,000	30,000	30,000	31,000	29,860	29,511
October	24,703	16,043	25,811	28,282	846	8,051	28,026	31,000	6,542	31,000	31,000	31,000	31,000	30,860	31,000	20,827	1,190
November	8,840	7,613	7,711	26,397	9,275	.....	14,896	29,720	.....	29,860	30,000	29,650	30,000	26,718	25,054	462	.....
December	.....	1,508	17,738	2,791	.....	.....	20,575	25,182	12,723	15,040	12,793	7,701	7,340	3,609	6,400	.....	.....
Yearly Totals ...	164,409	57,728	115,857	120,945	33,302	60,112	120,661	261,512	95,812	213,247	209,588	218,995	158,063	195,954	298,248	95,270	76,209
Loss in Canal, 25 per cent. ...	41,102	14,432	28,964	30,236	8,325	15,028	30,165	65,378	23,957	53,312	52,397	54,749	39,516	48,988	74,562	23,817	19,052
Available at Reservoir	123,307	43,296	86,893	90,709	24,977	45,084	90,496	196,134	71,859	159,935	157,191	164,246	118,547	146,966	223,686	71,453	57,157

Note.—The unit adopted here is 1 cubic foot per second, flowing for one day (twenty-four hours), which is equivalent to a storage of 86,400 cubic feet.

FREDERICK J. HOME, Col., R.E. (Retired).

APPENDIX D.

North Murrumbidgee Canal.

Statement showing roughly the probable working of the Coola Gum Parma Reservoir during the seven years ending with 1886, supposing it to feed a canal for eight months in the year (240 days) with a maximum discharge of 450 cubic feet per second.

Year.	Brought forward.	Receipts.			Total Available.	Issues.				Balance in hand.	Remarks.
		First half of Year.	Second half of Year.	Total.		First half of Year.	Second half of Year.	Loss in Reservoir, $\frac{1}{10}$ of Total available.	Total.		
	cubic feet per sec.	cubic feet per sec.	cubic feet per sec.	cubic feet per sec.	cubic feet per sec.	cubic feet per sec. *a*	cubic feet per sec. *a*	cubic feet per sec.	cubic feet per sec.	cubic feet per sec.	
1880	Nil.	31,589	91,718	123,307	123,307	.....	43,200	12,331	55,531	67,776	(*a*) The figures in these columns are based on the figures for demand given in the rainfall and discharge diagrams of the South Murrumbidgee Canal.
1881	67,776	10,719	32,577	43,296	111,072	21,600	37,800	11,107	70,507	40,565	
1882	40,565	2,828	84,065	86,893	127,458	37,800	5,400	12,746	55,946	71,512	
1883	71,512	3,750	86,959	90,709	162,221	32,400	10,800	16,222	59,422	102,799	The maximum storage required would have been about 9,000 millions of cubic feet in 1883, and the lake would have been filled up to about 521 feet contour.
1884	102,799	.....	24,977	24,977	127,770	43,200	43,200	12,778	99,178	28,598	
1885	28,598	13,005	32,079	45,084	73,682	16,200	5,400	7,368	28,968	44,714	
1886	44,714	.....	90,496	90,496	135,210	48,600	16,200	13,521	78,321	56,889	

Note.—The unit adopted here is 1 cubic foot per second flowing for one day (twenty-four hours), which is equivalent to a storage of 86,400 cubic feet.

FREDERICK J. HOME, Col., R.E. (Retired).

DIAGRAMS

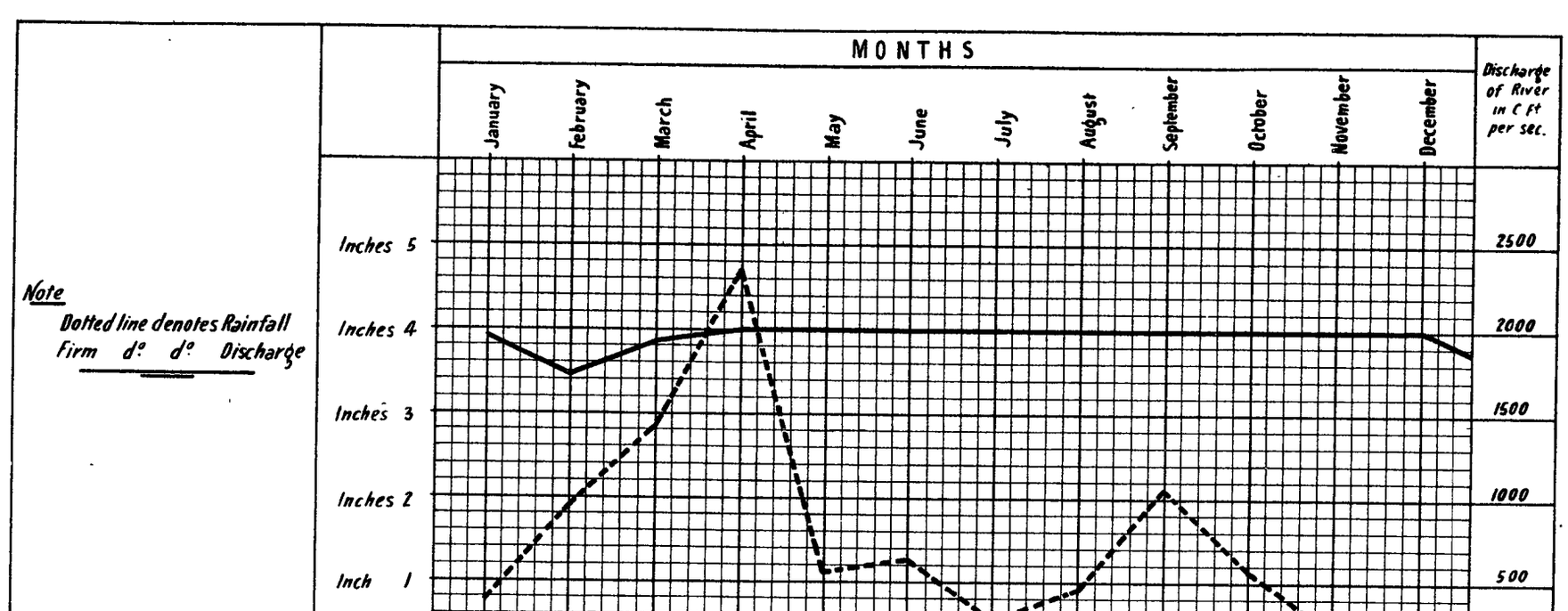
showing Particulars of Rainfall and Discharge in connection with Proposed Canals from the Murray and Murrumbidgee Rivers.

MURRAY RIVER.

DIAGRAMS showing monthly, for the years 1880 to 1896 inclusive, the Discharge in the river, to meet the requirements of Proposed Canal, and the Rainfall over the tract which it would irrigate.

MURRAY RIVER

1880

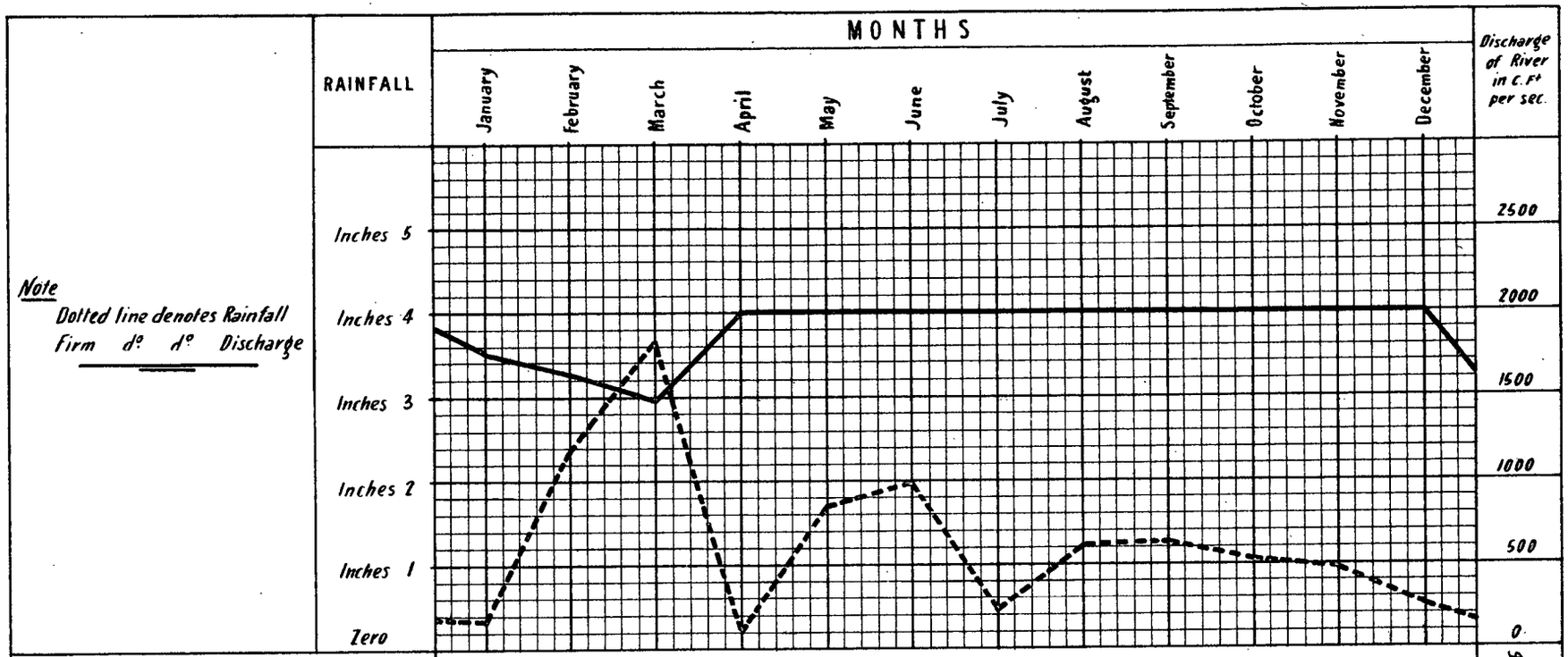


Note
Dotted line denotes Rainfall
Firm d° d° Discharge

	January	February	March	April	May	June	July	August	September	October	November	December	
Mean rainfall in inches over tract to be irrigated	0.78	1.87	2.81	4.63	1.11	1.25	0.53	0.91	2.10	1.13	0.40	0.37	17.95
Discharge required for River (700) and Canal (up to 1300 c. ft per. sec).	700	700	700	700	700	700	700	700	700	700	1000	1200	
Mean discharge available in River 2000 c ft per sec. and under.	1956	1737	1921	2000	2000	2000	2000	2000	2000	2000	2000	2000	
" Deficiency	Nil	"	"	"	"	"	"	"	"	"	"	"	Total mean Rainfall

MURRAY RIVER

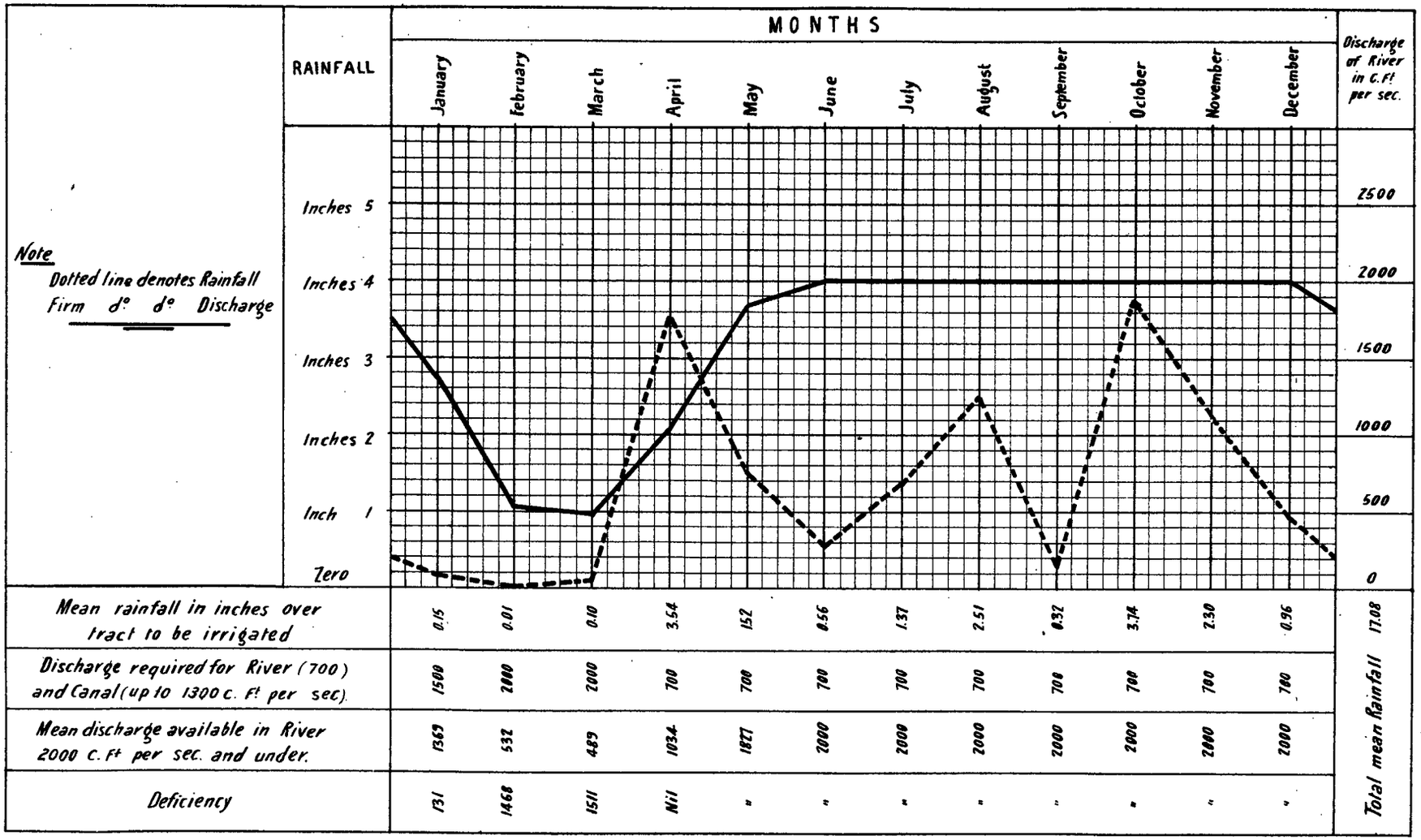
1881



	January	February	March	April	May	June	July	August	September	October	November	December	Total mean Rainfall 15.66
Mean rainfall in inches over tract to be irrigated	0.34	2.36	3.64	0.21	1.70	1.96	0.47	1.21	1.24	1.05	0.96	0.52	
Discharge required for River (700) and Canal (up to 1300 c. Ft per. sec).	1200	700	700	700	700	700	700	700	1500	2000	2000	1500	
Mean discharge available in River 2000 c. Ft per sec. and under.	1756	1631	1493	2000	2000	2000	2000	2000	2000	2000	2000	2000	
Deficiency	Nil	"	"	"	"	"	"	"	"	"	"	"	

MURRAY RIVER

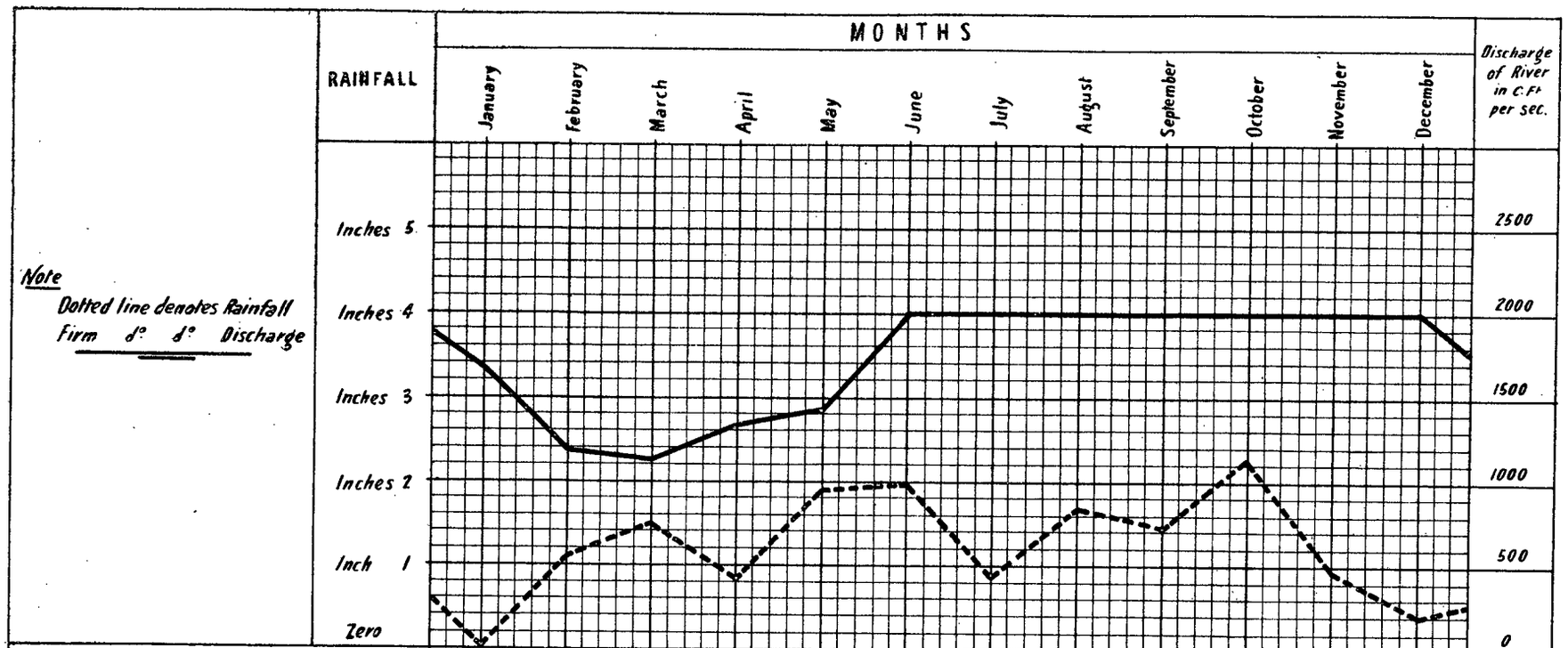
1882



	January	February	March	April	May	June	July	August	September	October	November	December	
Mean rainfall in inches over tract to be irrigated	0.15	0.01	0.10	3.54	1.52	0.56	1.37	2.51	0.32	3.14	2.30	0.96	17.08
Discharge required for River (700) and Canal (up to 1300 c. Ft per sec)	1500	2000	2000	700	700	700	700	700	700	700	700	700	
Mean discharge available in River 2000 C. Ft per sec. and under.	1369	532	489	1034	1827	2000	2000	2000	2000	2000	2000	2000	
Deficiency	131	1468	1511	Nil	"	"	"	"	"	"	"	"	Total mean Rainfall

MURRAY RIVER

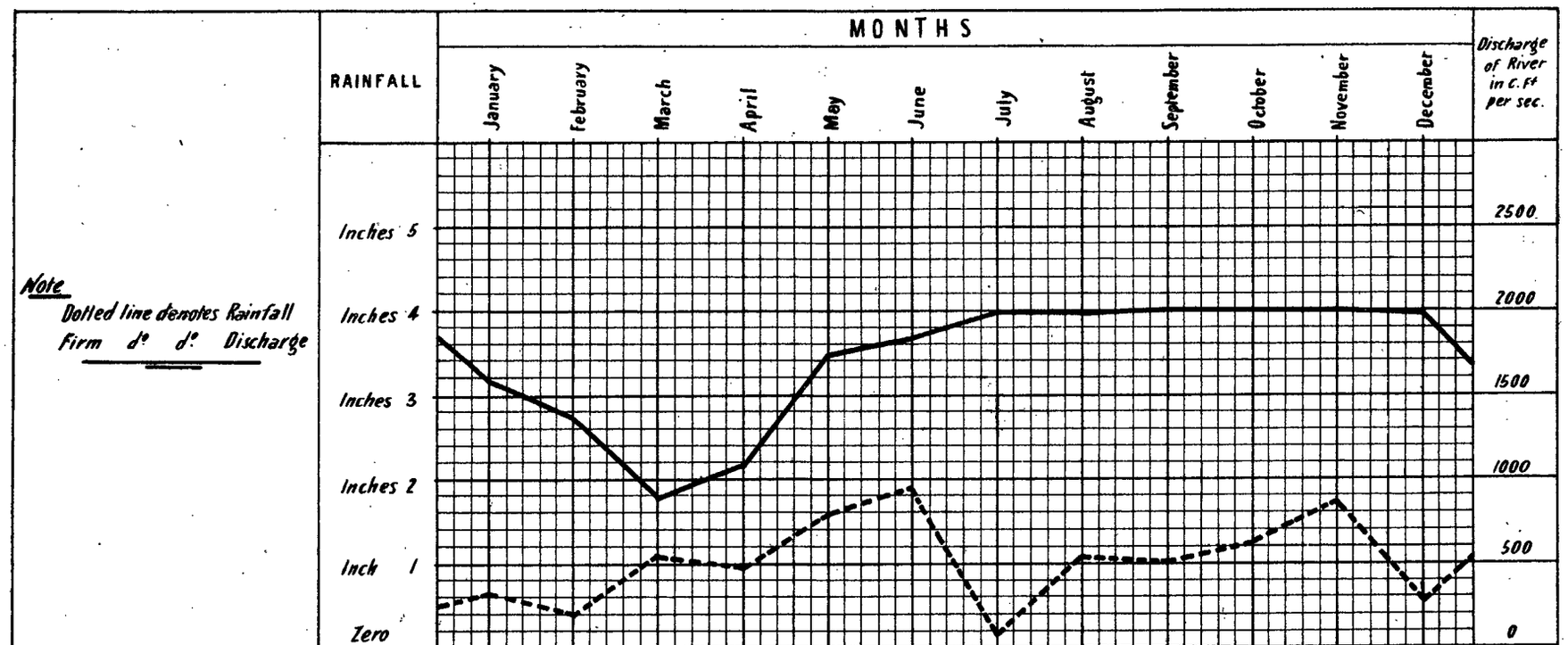
1883



	January	February	March	April	May	June	July	August	September	October	November	December	Total mean Rainfall 14.83
Mean rainfall in inches over tract to be irrigated	0.03	1.08	1.46	0.82	1.88	1.97	0.87	1.68	1.44	2.14	0.96	0.40	
Discharge required for River (700) and Canal (up to 1300 C. Ft per sec).	1000	1200	1500	2000	1500	700	700	700	1200	1000	1200	1200	
Mean discharge available in River 2000 C. Ft per sec. and under.	1662	1188	1113	1335	1412	2000	2000	2000	2000	2000	2000	2000	
Deficiency	Nil	12	387	665	88	Nil	"	"	"	"	"	"	

MURRAY RIVER

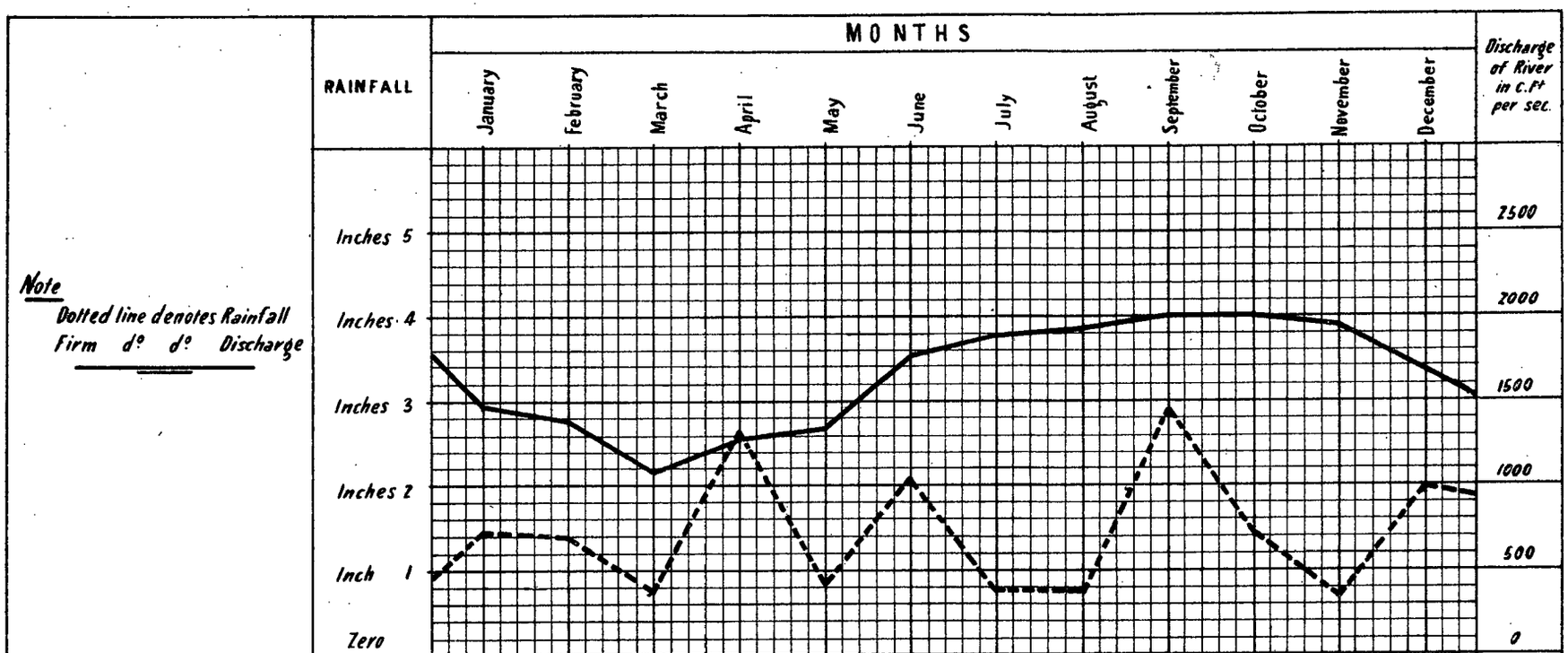
1884



	January	February	March	April	May	June	July	August	September	October	November	December	
Mean rainfall in inches over tract to be irrigated	0.63	0.40	1.10	0.97	1.57	1.86	0.18	1.06	1.01	1.21	1.73	0.55	Total mean Rainfall 12.27
Discharge required for River (700) and Canal (up to 1300 C. Ft per. sec).	1500	1500	1500	2000	1500	700	700	700	2000	2000	1500	1200	
Mean discharge available in River 2000 C. Ft per sec. and under.	1593	1357	895	1081	1723	1821	1998	1994	2000	2000	2000	1983	
Deficiency	Nil	143	605	919	Nil	"	"	"	"	"	"	"	

MURRAY RIVER

1885

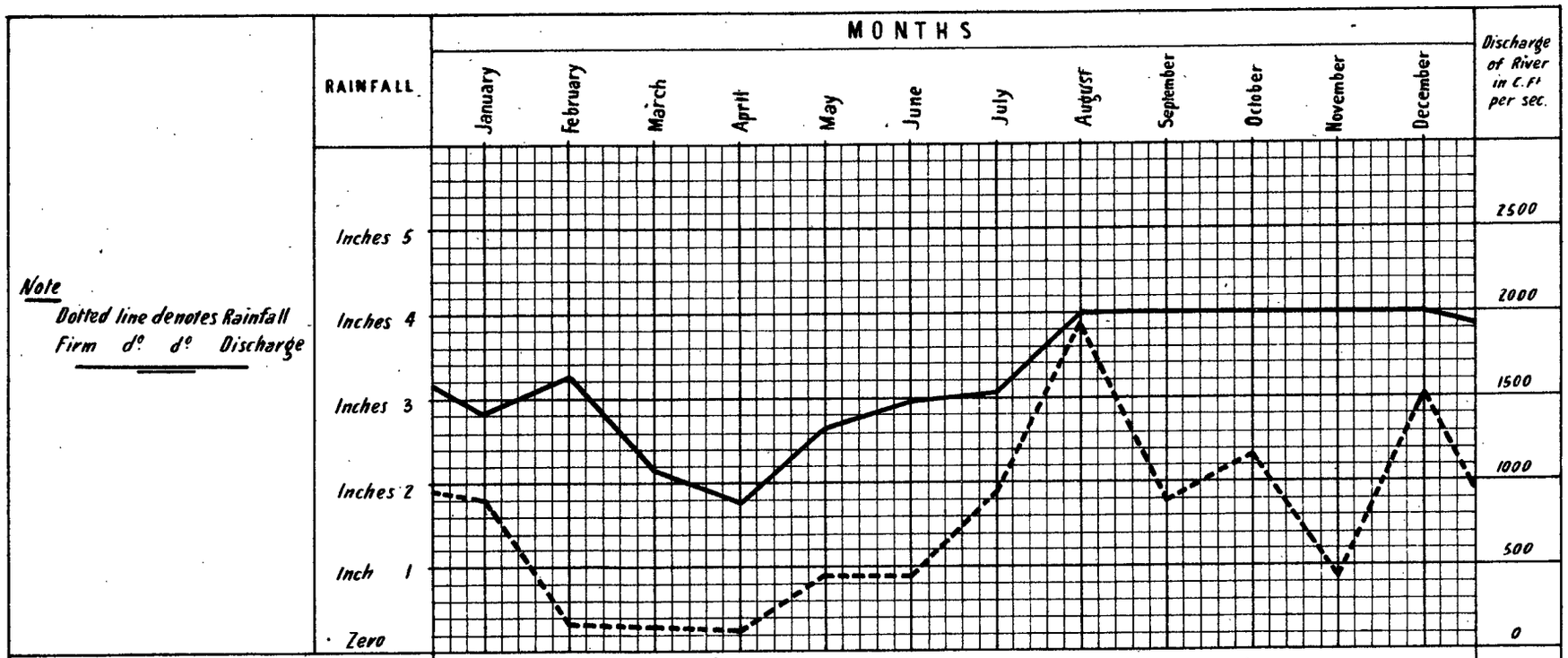


Note
Dotted line denotes Rainfall
Firm d° d° Discharge

	January	February	March	April	May	June	July	August	September	October	November	December	Total mean Rainfall
Mean rainfall in inches over tract to be irrigated	1.43	1.39	0.76	2.65	0.83	2.07	0.78	0.77	2.88	1.42	0.70	1.96	17.64
Discharge required for River (700) and Canal (up to 1300 C. Ft per. sec).	1400	1400	1600	1200	1200	700	700	700	700	700	1200	700	
Mean discharge available in River 2000 C. Ft per. sec. and under.	1458	1379	1082	1277	1342	1767	1894	1928	2000	2000	1951	1673	
Deficiency	Nil	21	518	Nil	"	"	"	"	"	"	"	"	

MURRAY RIVER

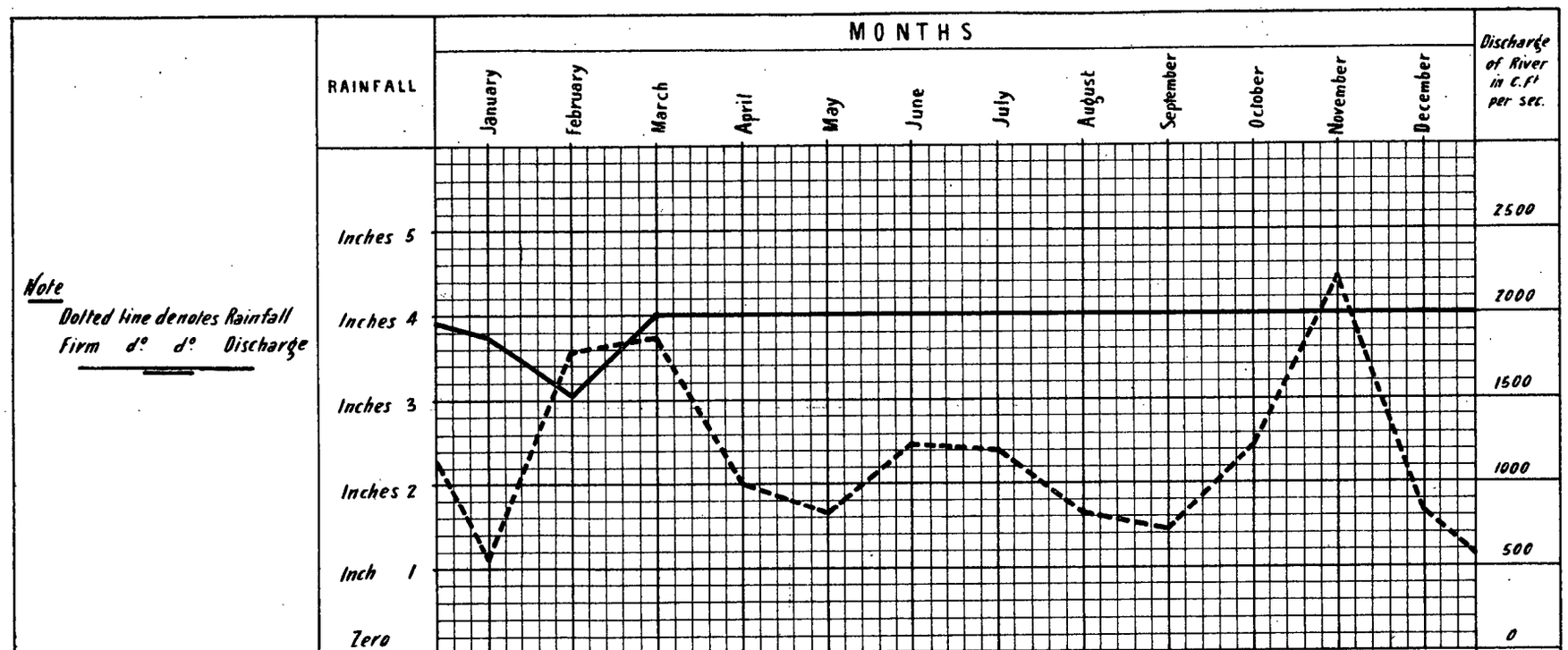
1886



	January	February	March	April	May	June	July	August	September	October	November	December	
Mean rainfall in inches over tract to be irrigated	1.80	0.33	0.29	0.24	0.90	0.90	1.87	3.85	1.79	2.31	0.85	3.01	18.14
Discharge required for River (700) and Canal (up to 1300 c. ft per sec).	700	1200	1500	2000	1500	700	700	700	700	700	1000	700	
Mean discharge available in River 2000 c. ft per sec. and under.	1410	1612	1069	893	1318	1437	1527	2000	2000	2000	2000	2000	
Deficiency	Nil	"	431	1107	182	Nil	"	"	"	"	"	"	Total mean Rainfall

MURRAY RIVER

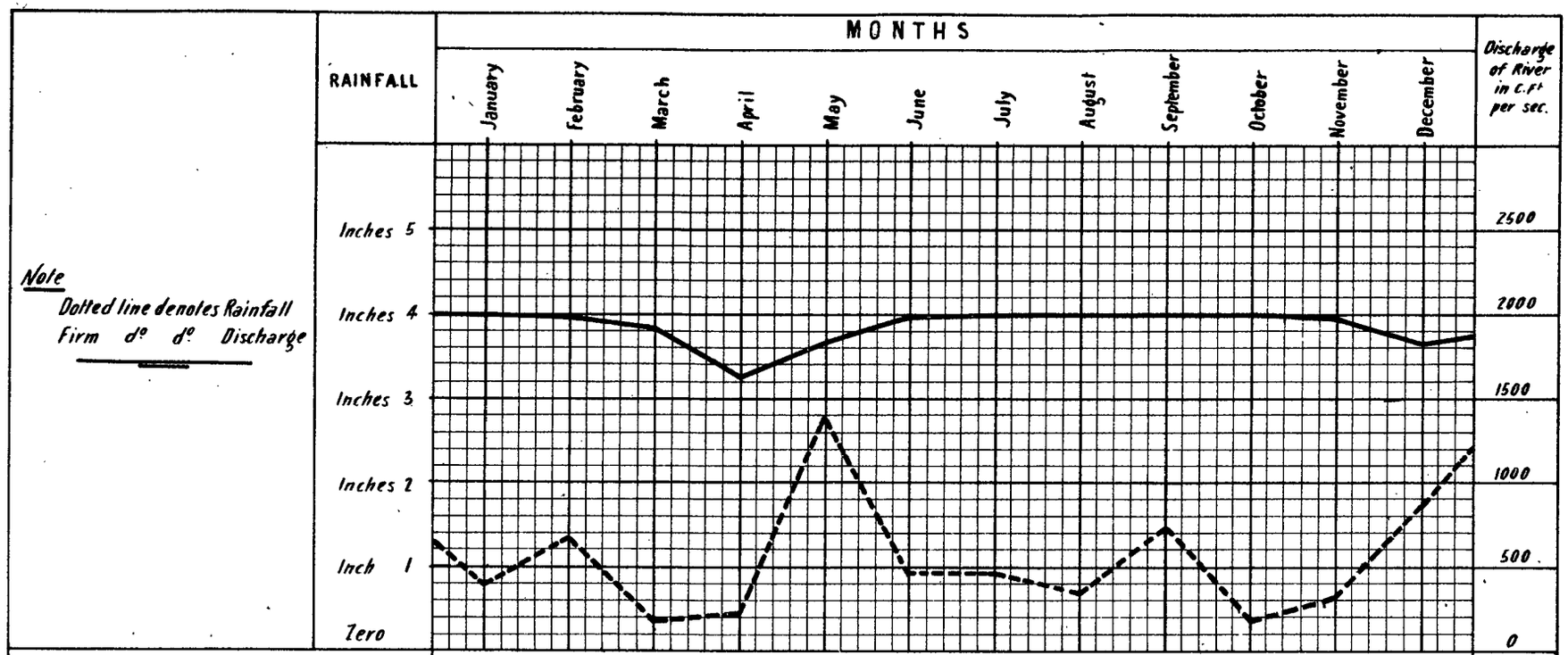
1887



	January	February	March	April	May	June	July	August	September	October	November	December	
Mean rainfall in inches over tract to be irrigated	1.11	3.58	3.74	2.00	1.66	2.47	2.40	1.62	1.43	2.45	4.45	1.66	Total mean Rainfall 28.57
Discharge required for River (700) and Canal (up to 1300 C. Ft per sec).	700	700	700	700	700	700	700	700	700	700	700	700	
Mean discharge available in River 2000 C. Ft per sec. and under.	1872	1515	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	
Deficiency	Nil	"	"	"	"	"	"	"	"	"	"	"	

MURRAY RIVER

1888

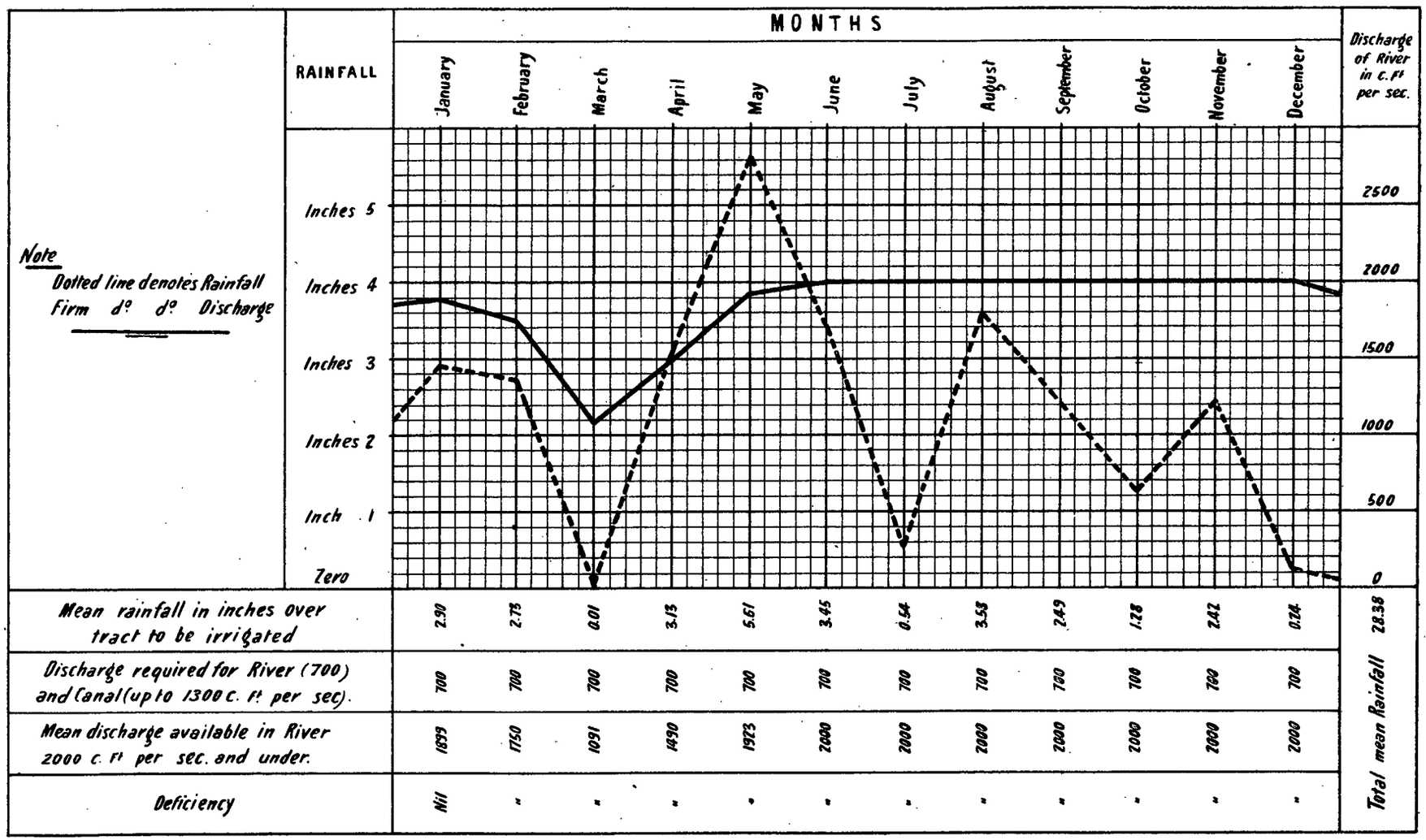


Note
Dotted line denotes Rainfall
Firm do do Discharge

	January	February	March	April	May	June	July	August	September	October	November	December	
Mean rainfall in inches over tract to be irrigated	0.80	1.35	0.36	0.43	2.74	0.93	0.93	0.78	1.43	0.37	0.63	1.71	Total mean Rainfall 12.38
Discharge required for River (700) and Canal (up to 1300 C. Ft per sec).	700	700	1500	2000	700	700	700	700	1500	2000	1900	1200	
Mean discharge available in River 2000 C. Ft per sec. and under.	2000	1996	1904	1615	1833	1991	2000	2000	2000	2000	1957	1821	
Deficiency	Nil	"	"	385	Nil	"	"	"	"	"	"	"	

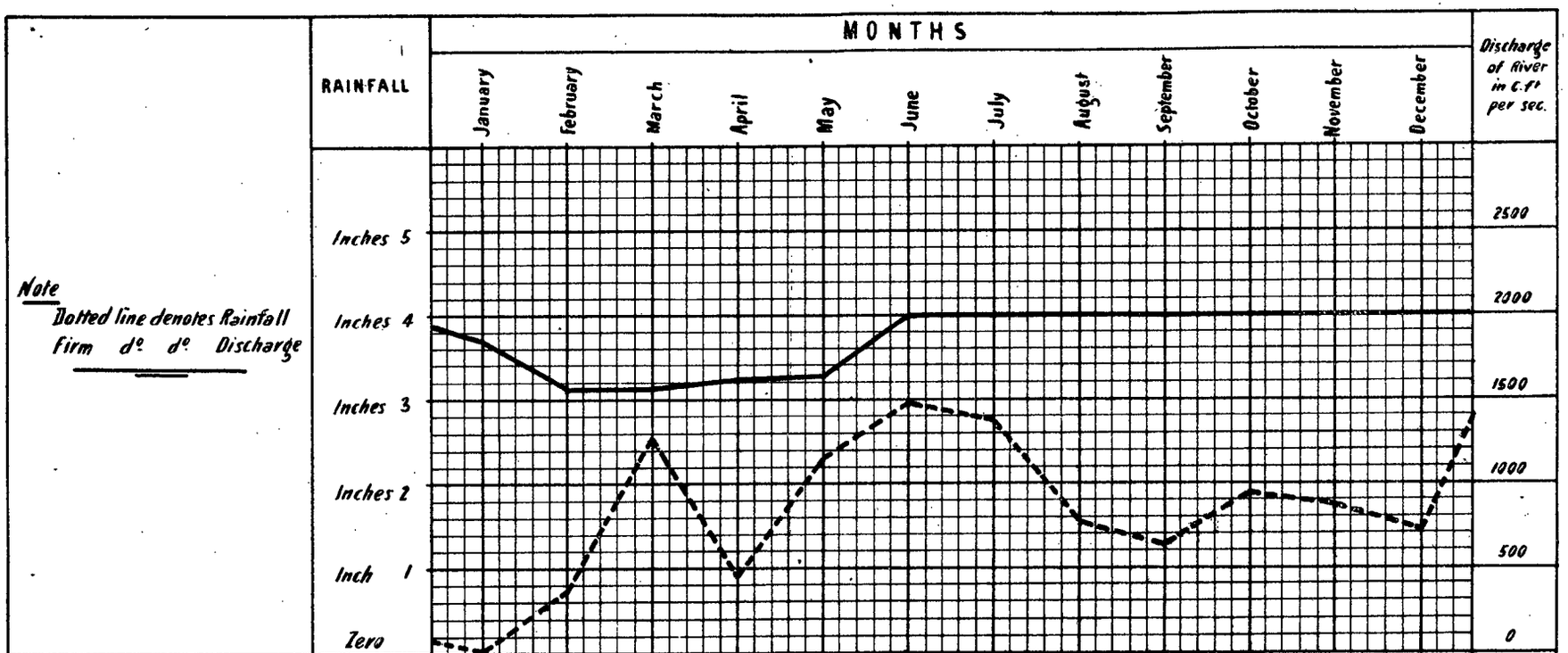
MURRAY RIVER

1889



MURRAY RIVER

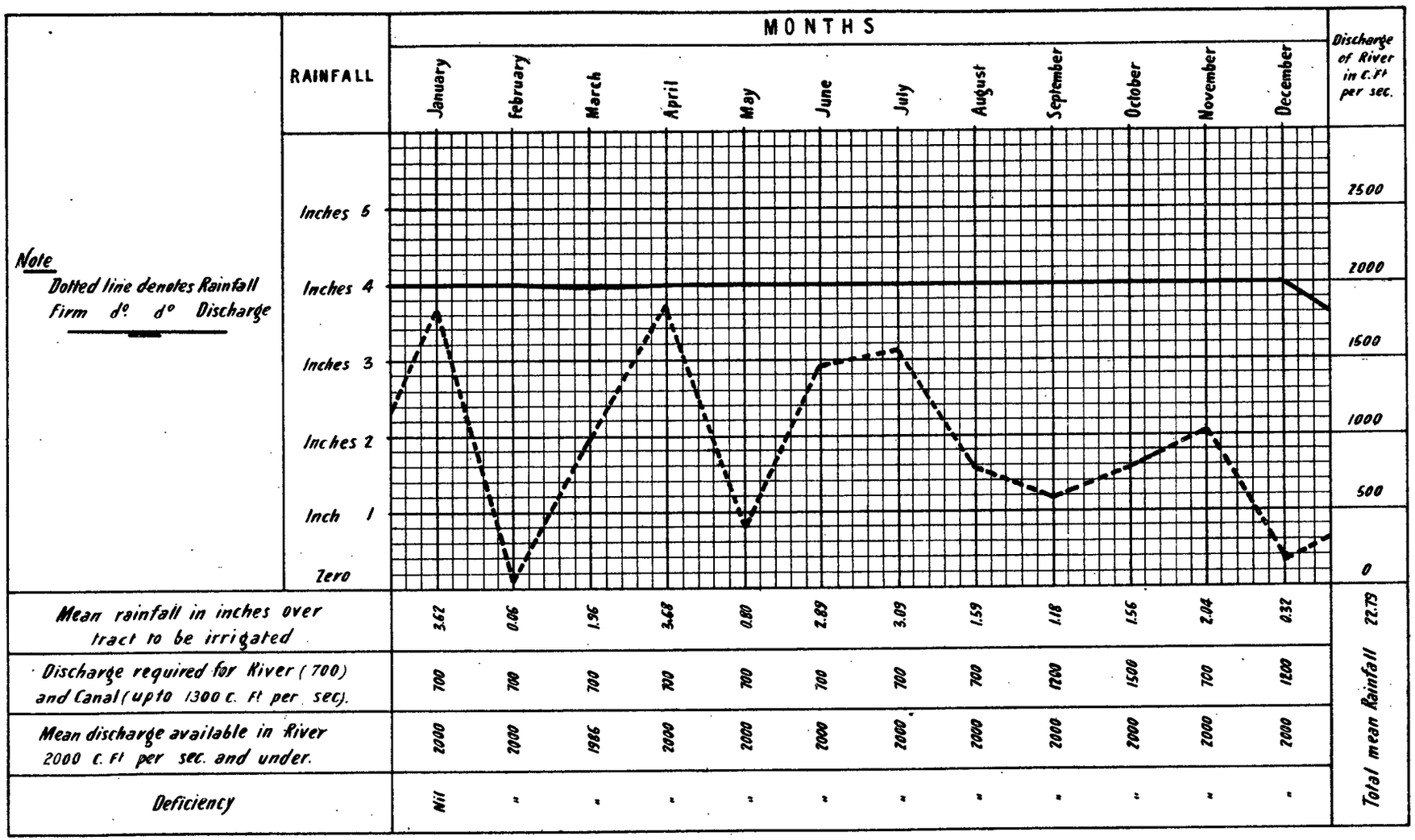
1890



	January	February	March	April	May	June	July	August	September	October	November	December	Total mean Rainfall
Mean rainfall in inches over tract to be irrigated.	0.01	0.71	2.57	0.88	2.27	2.95	2.76	1.56	1.28	1.87	1.75	1.44	20.05
Discharge required for River (700) and Canal (up to 1300 C. ft per sec).	1200	1200	700	700	700	700	700	700	700	700	700	700	
Mean discharge available in River 2000 C. ft per sec. and under	1856	1568	1562	1602	1627	2000	2000	2000	2000	2000	2000	2000	
Deficiency	Nil	"	"	"	"	"	"	"	"	"	"	"	

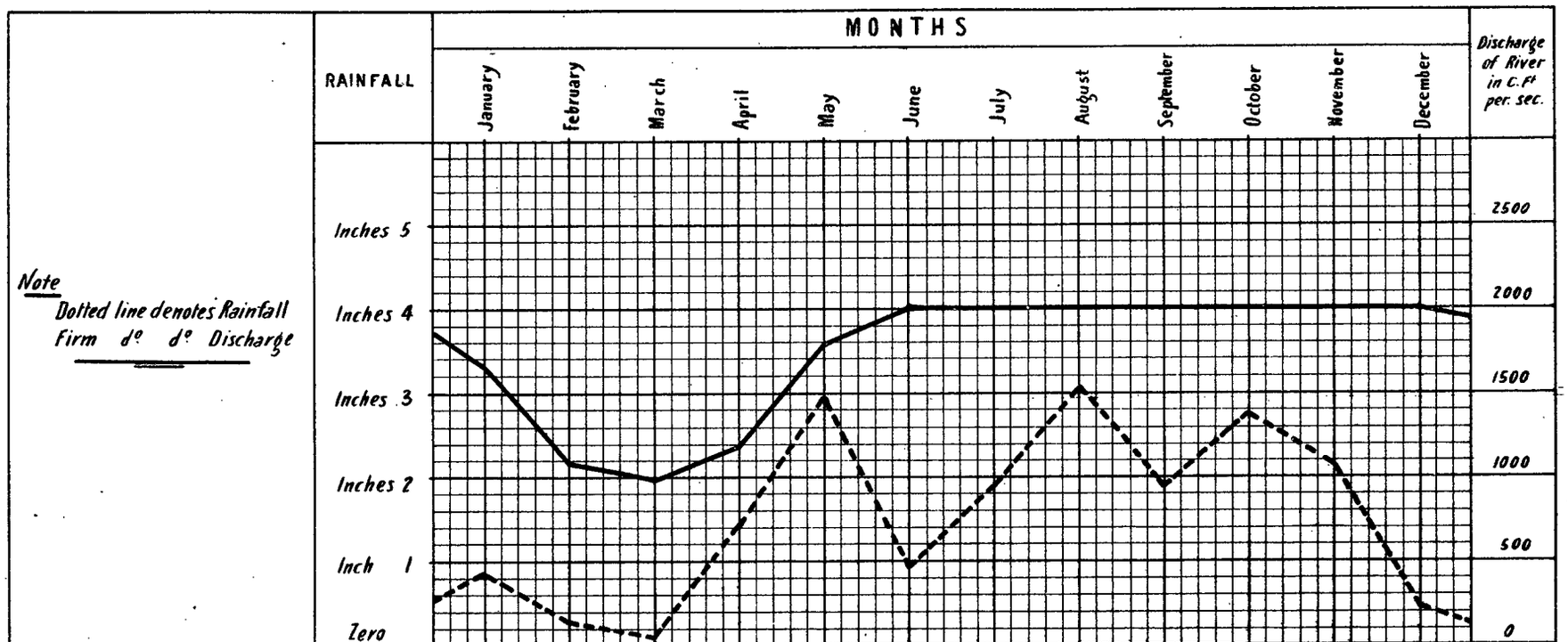
MURRAY RIVER

1891



MURRAY RIVER

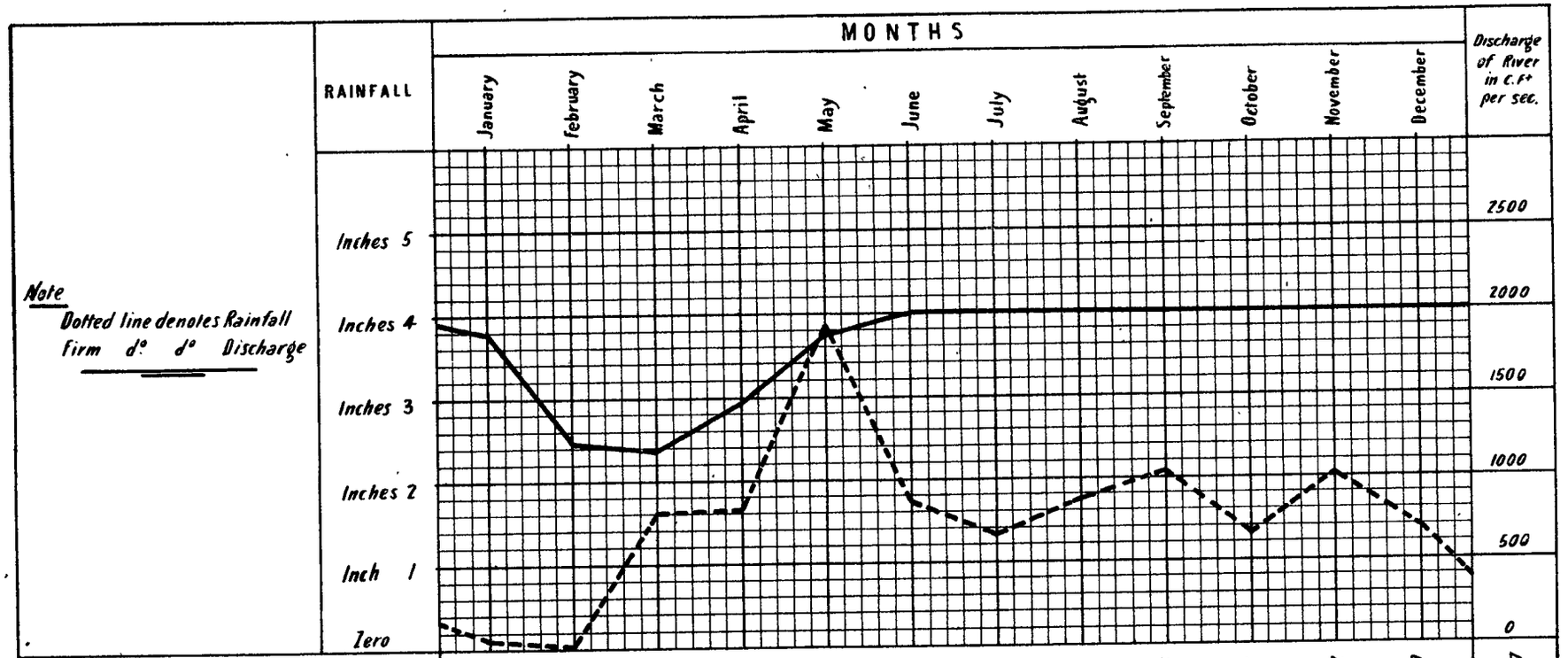
1892



	January	February	March	April	May	June	July	August	September	October	November	December	Total mean Rainfall
Mean rainfall in inches over tract to be irrigated	0.85	0.30	0.09	1.41	2.34	0.93	1.86	3.03	1.90	2.77	2.15	0.45	18.68
Discharge required for River (700) and Canal (up to 1300 c. ft per. sec).	1500	1500	2000	1500	700	700	700	700	700	700	700	700	
Mean discharge available in River 2000 c. ft per sec and under.	1652	1072	936	1191	1793	2000	2000	2000	2000	2000	2000	2000	
Deficiency	Nil	428	1004	309	Nil	"	"	"	"	"	"	"	

MURRAY RIVER

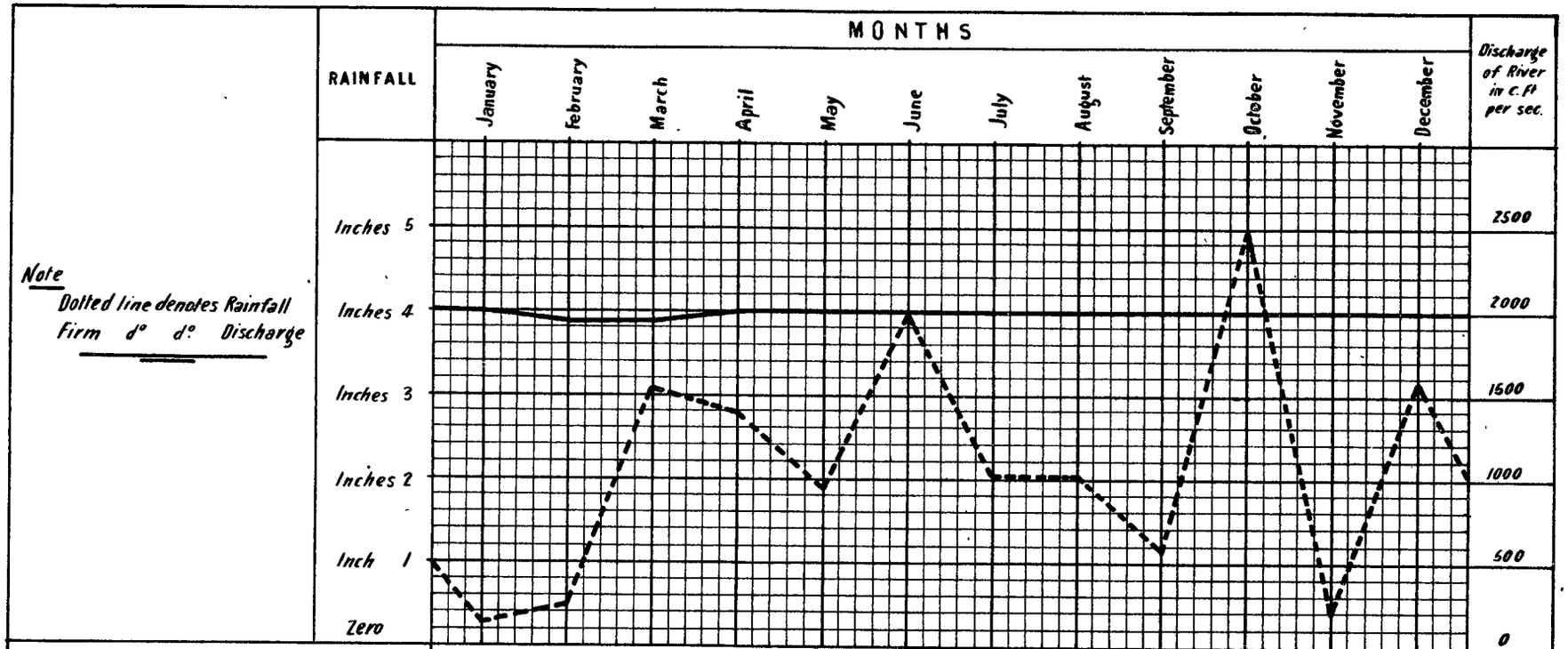
1893



Mean rainfall in inches over tract to be irrigated.	0.10	0.02	1.60	1.62	3.85	1.73	1.32	1.74	2.06	1.32	2.02	1.39	Total mean Rainfall 18.77
Discharge required for River (700) and Canal (up to 1300 c. ft per sec).	1200	1500	1100	1100	700	700	700	700	700	1500	1200	100	
Mean discharge available in River 2000 c. Ft per sec. and under.	1859	1715	1186	1459	1871	2000	2000	2000	2000	2000	2000	2000	
Deficiency	Nil	285	Nil	"	"	"	"	"	"	"	"	"	

MURRAY RIVER

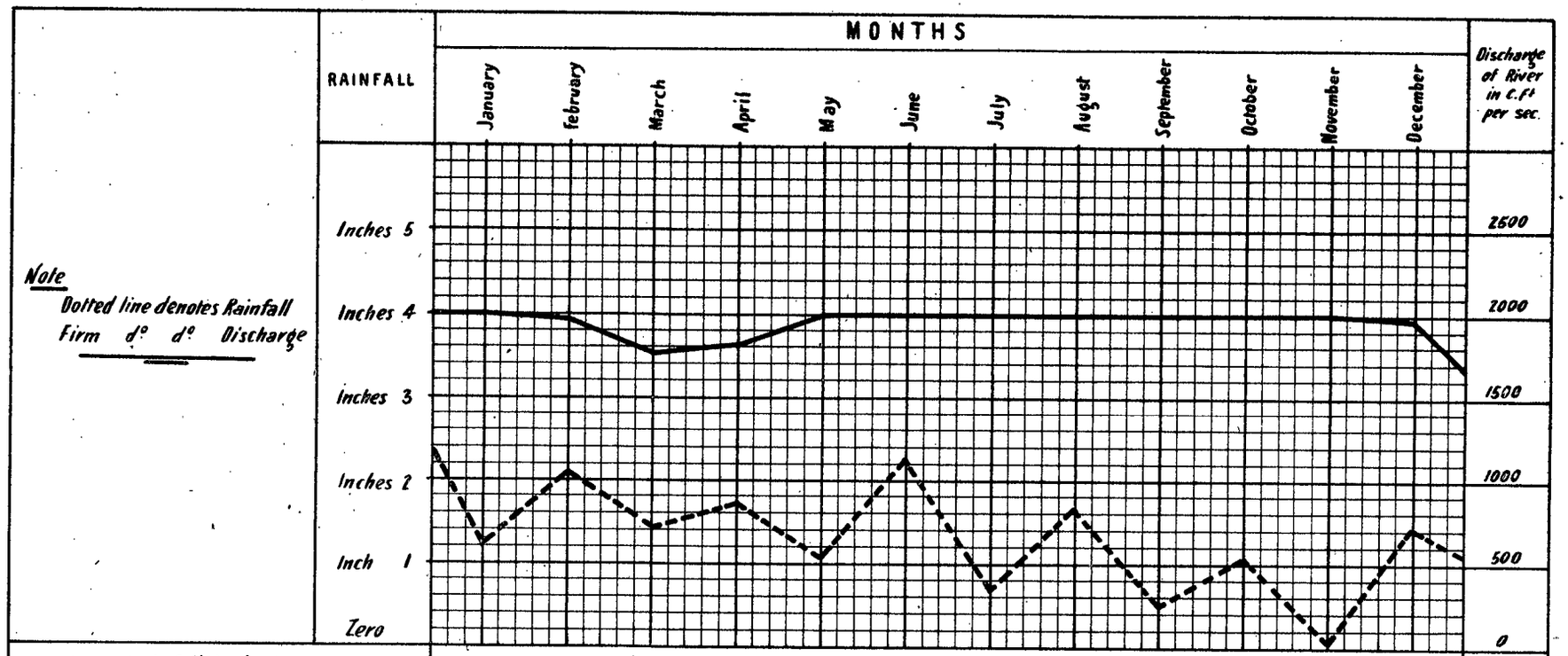
1894



	January	February	March	April	May	June	July	August	September	October	November	December	Total mean Rainfall 26.22
Mean rainfall in inches over tract to be irrigated	0.30	0.48	3.06	2.79	1.90	3.97	2.03	2.03	1.17	4.96	0.40	3.13	
Discharge required for River (700) and Canal (up to 1300 C. ft per. sec).	1200	1500	700	700	700	700	700	700	700	700	700	700	
Mean discharge available in River 2000 C. ft per sec. and under.	2000	1935	1939	2000	2000	2000	2000	2000	2000	2000	2000	1900	
Deficiency	Nil	"	"	"	"	"	"	"	"	"	"	"	

MURRAY RIVER

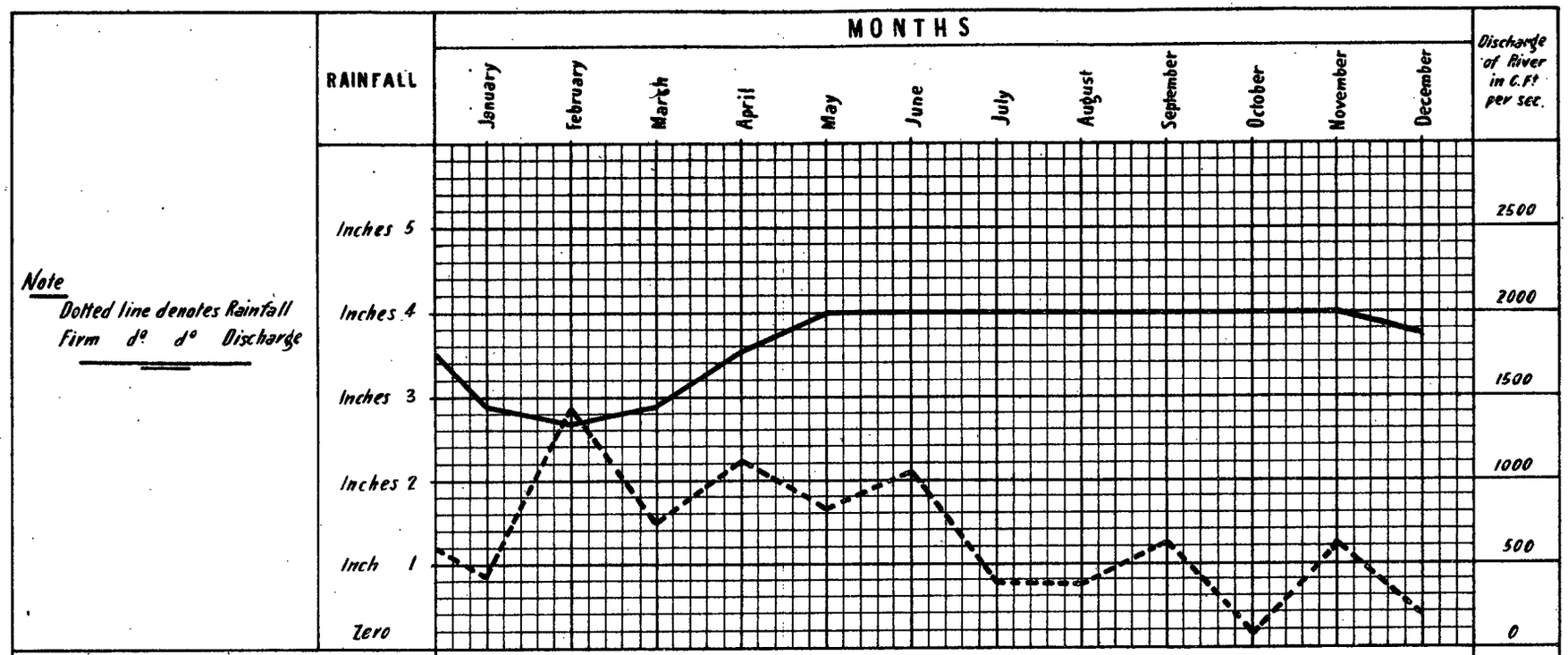
1895.



	January	February	March	April	May	June	July	August	September	October	November	December	Total mean Rainfall 15.19
Mean rainfall in inches over tract to be irrigated	1.22	2.10	1.42	1.71	1.09	2.73	0.70	1.65	0.51	1.07	0.07	1.42	
Discharge required for River (700) and Canal (up to 1300 C. Ft per sec).	700	700	1200	1200	1200	700	700	700	2000	2000	2000	1200	
Mean discharge available in River 2000 C. Ft per sec. and under	2000	1360	1759	1805	2000	2000	2000	2000	2000	2000	2000	1957	
Deficiency	Nil	"	"	"	"	"	"	"	"	"	"	"	

MURRAY RIVER

1896



	January	February	March	April	May	June	July	August	September	October	November	December	Total mean Rainfall 15.71
Mean rainfall in inches over tract to be irrigated	0.86	2.85	1.50	2.21	1.65	2.08	0.78	0.75	1.25	0.17	1.22	0.39	
Discharge required for River (700) and Canal (up to 1300 c. ft per sec).	1400	700	700	780	700	700	700	700	2000	2000	2000	1800	
Mean discharge available in River 2000 c. ft per sec. and under.	1431	1347	1431	1756	2000	2000	2000	2000	2000	2000	2000	1863	
Deficiency	Nil	"	"	"	"	"	"	"	"	"	"	"	

MURRAY RIVER

Diagram shewing for each month the mean rainfall and the mean discharge available for the proposed Canal for the 17 years ending with 1896

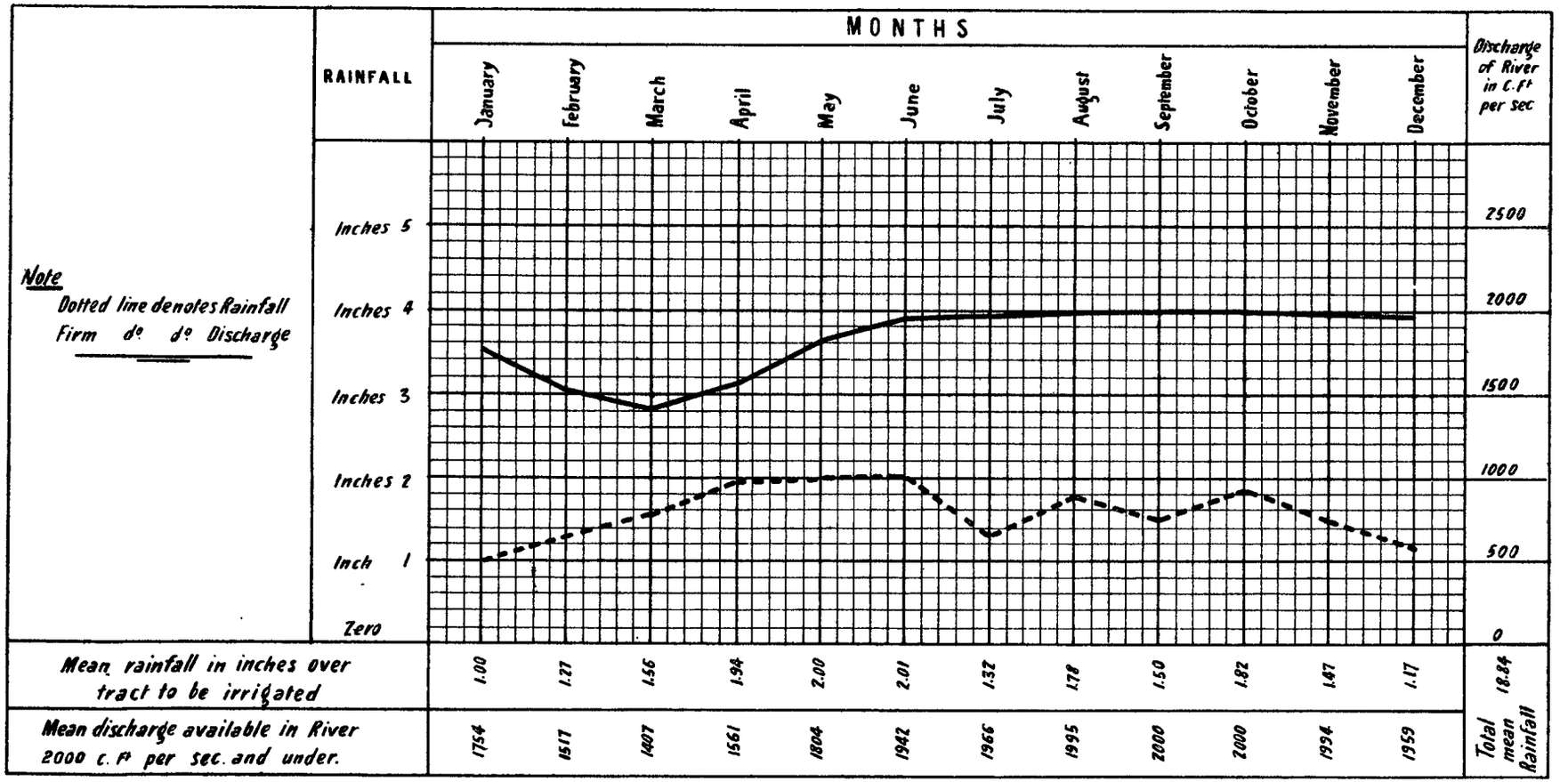


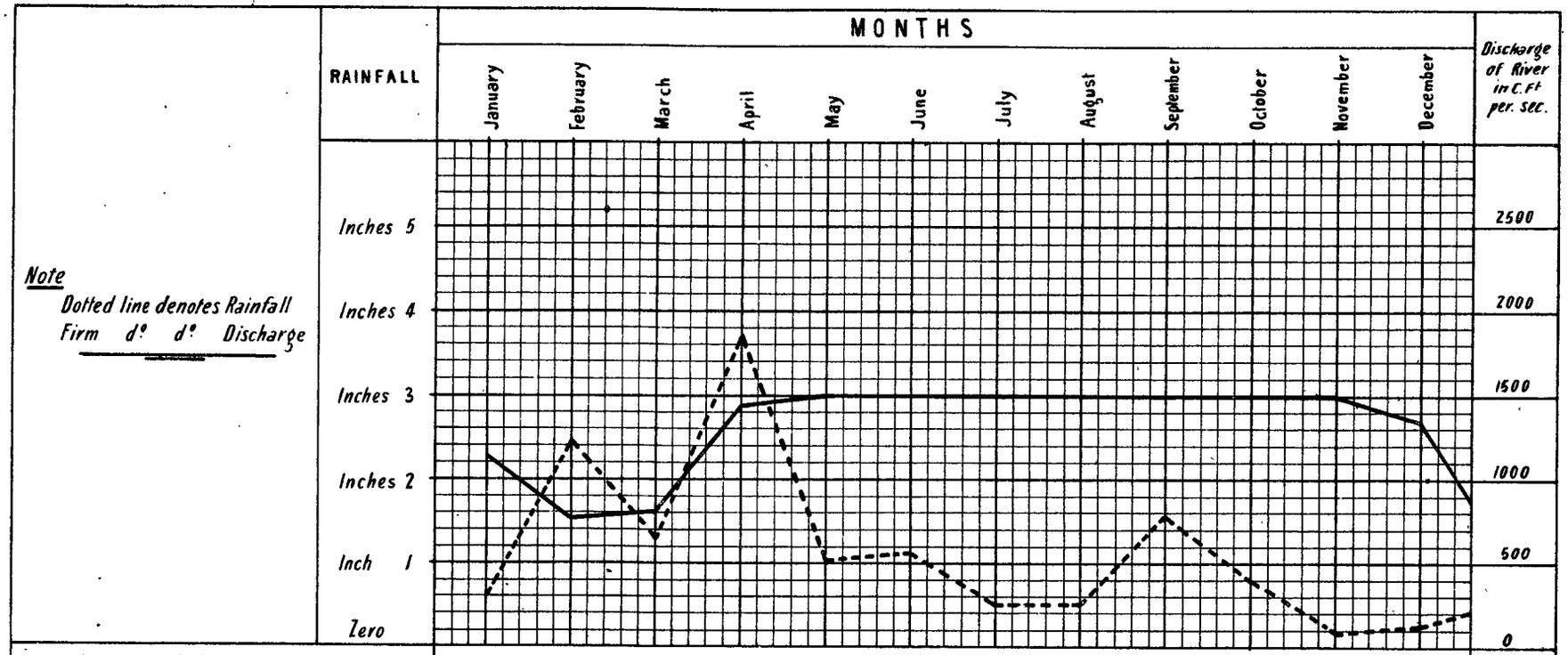
PHOTO-LITHOGRAPHED AT THE GOVT. PRINTING OFFICE,
SYDNEY, NEW SOUTH WALES.

MURRUMBIDGEE RIVER.

DIAGRAMS showing monthly, for the years 1880 to 1896 inclusive, the Discharge in the river, to meet the requirements of Proposed Canal, and the Rainfall over the tract which it would irrigate.

MURRUMBIDGEE RIVER

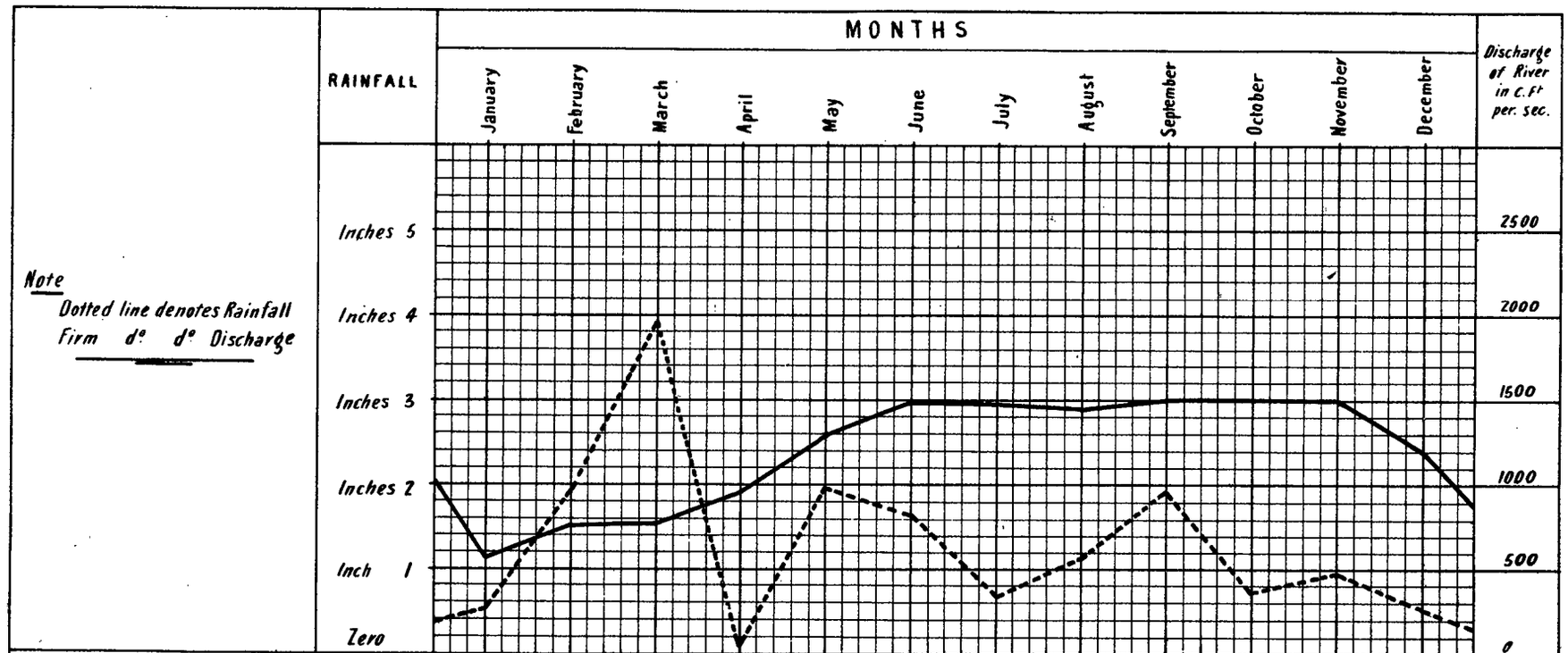
1880



Mean rainfall in inches over tract to be irrigated	0.60	2.45	1.31	3.66	1.83	1.12	0.51	0.51	1.56	0.79	0.18	0.23	Total mean Rainfall 13.96
Discharge required for River (500) and Canal (up to 1000 c. Ft per. sec).	1100	500	500	500	500	500	500	500	1200	1500	1500	1300	
Mean discharge available in River 1500 c. Ft per sec and under	1125	761	805	1429	1500	1500	1500	1500	1500	1500	1500	1339	
Deficiency	Nil	"	"	"	"	"	"	"	"	"	"	"	

MURRUMBIDGEE RIVER

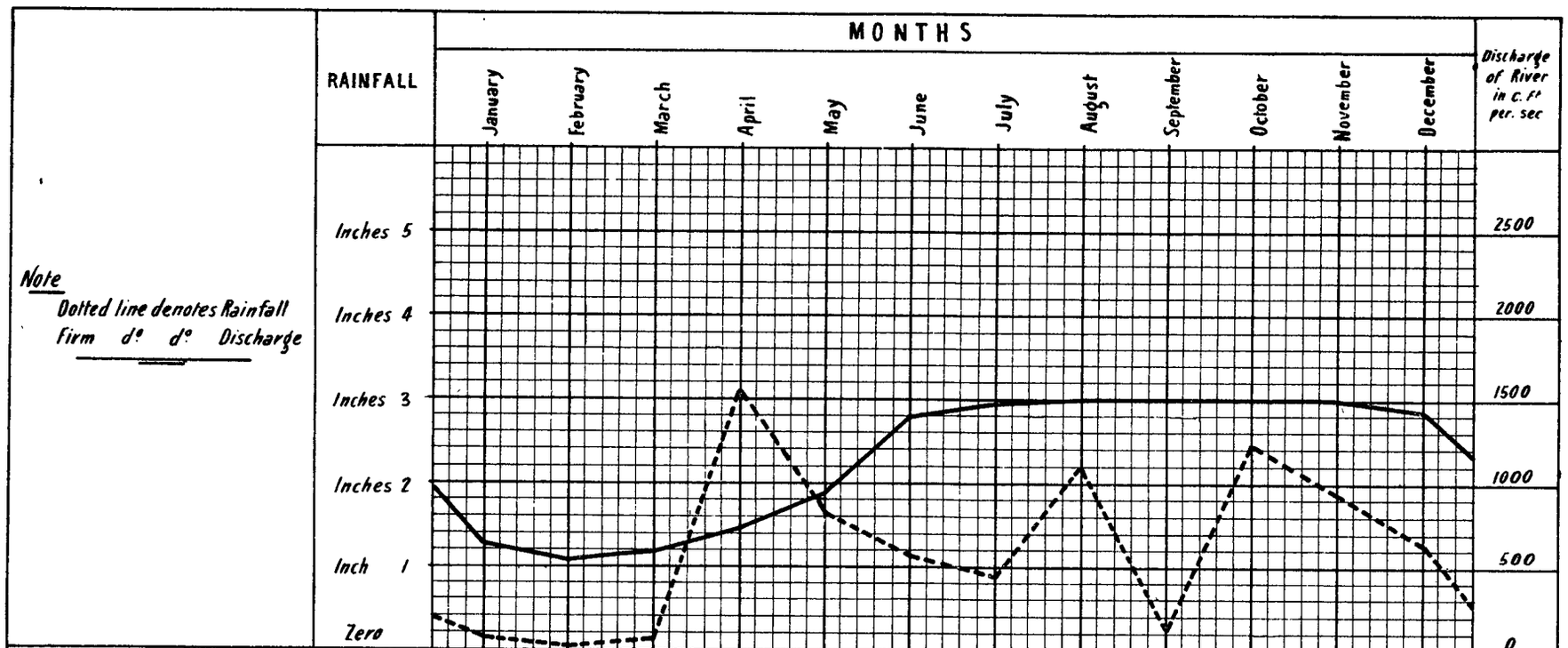
1881



Mean rainfall in inches over tract to be irrigated	0.55	1.91	3.89	0.09	1.98	1.64	0.69	1.12	1.32	0.72	0.94	0.54	Total mean Rainfall 15.99
Discharge required for River (500) and Canal up to 1000 c. Ft per. sec.	1200	1000	500	500	500	500	500	500	900	1500	1500	1200	
Mean discharge available in River 1500 c. Ft per. sec. and under	569	756	783	948	1296	1485	1475	1450	1500	1500	1500	1199	
Deficiency	631	244	Nil	"	"	"	"	"	"	"	"	"	

MURRUMBIDGEE RIVER

1882

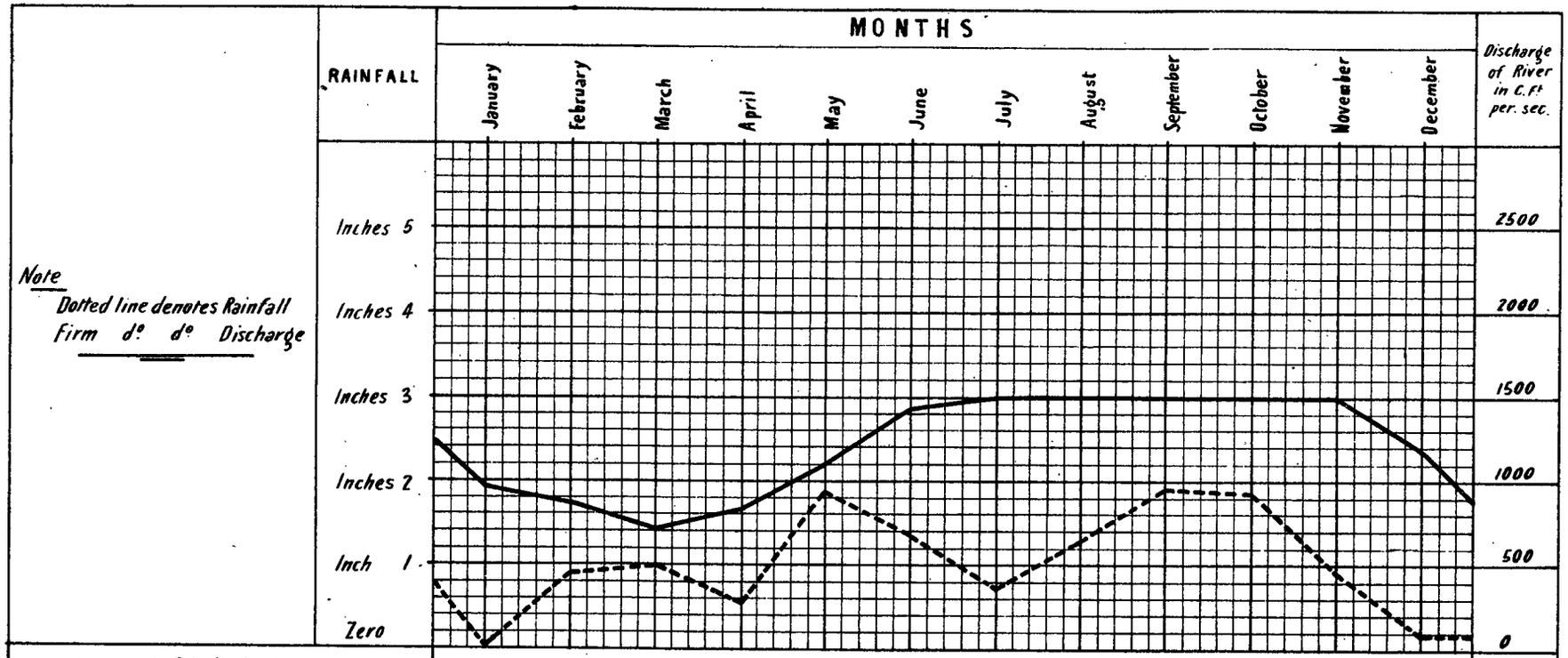


Note
Dotted line denotes Rainfall
Firm d° d° Discharge

	January	February	March	April	May	June	July	August	September	October	November	December	
Mean rainfall in inches over tract to be irrigated	0.15	0.06	0.13	3.07	1.62	1.13	0.86	2.19	0.24	2.42	1.86	1.26	Total mean Rainfall 14.99
Discharge required for River (500) and Canal (up to 1000 c. ft per. sec).	1500	1500	1500	500	500	500	500	500	1000	500	500	500	
Mean discharge available in River 1500 c. ft per sec. and under.	643	545	590	732	934	1391	1478	1500	1500	1500	1500	1425	
Deficiency	857	955	910	Nil	"	"	"	"	"	"	"	"	

MURRUMBIDGEE RIVER

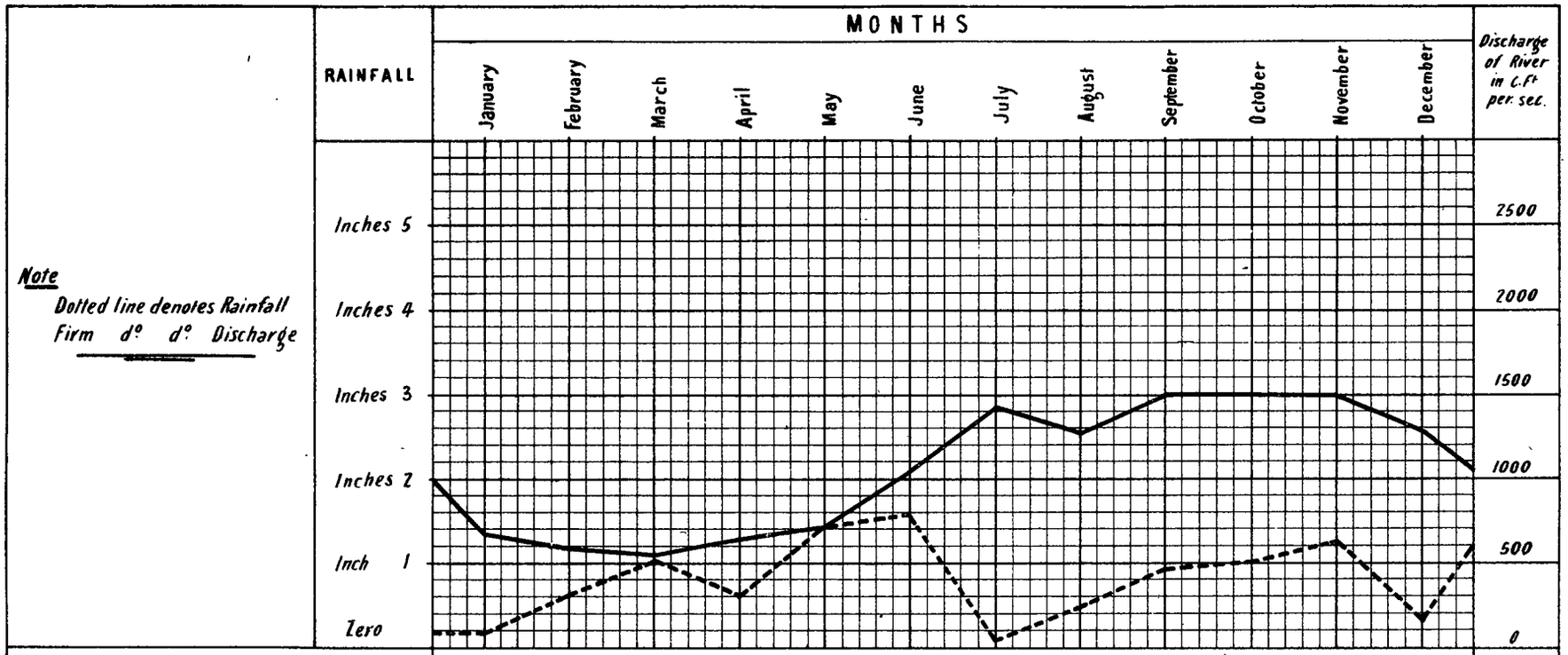
1883



	January	February	March	April	May	June	July	August	September	October	November	December	
Mean rainfall in inches over tract to be irrigated	0.03	0.85	0.38	0.55	1.85	1.36	0.72	1.27	1.90	1.85	0.88	0.18	Total mean Rainfall 12.42
Discharge required for River (500) and Canal (up to 1000 c. Ft per. sec).	900	900	1100	1500	1100	500	500	500	500	500	1000	1000	
Mean discharge available in River 1500 C. Ft per sec. and under.	982	864	707	817	1101	1420	1500	1500	1500	1500	1500	1178	
Deficiency	Nil	36	393	683	Nil	"	"	"	"	"	"	"	

MURRUMBIDGEE RIVER

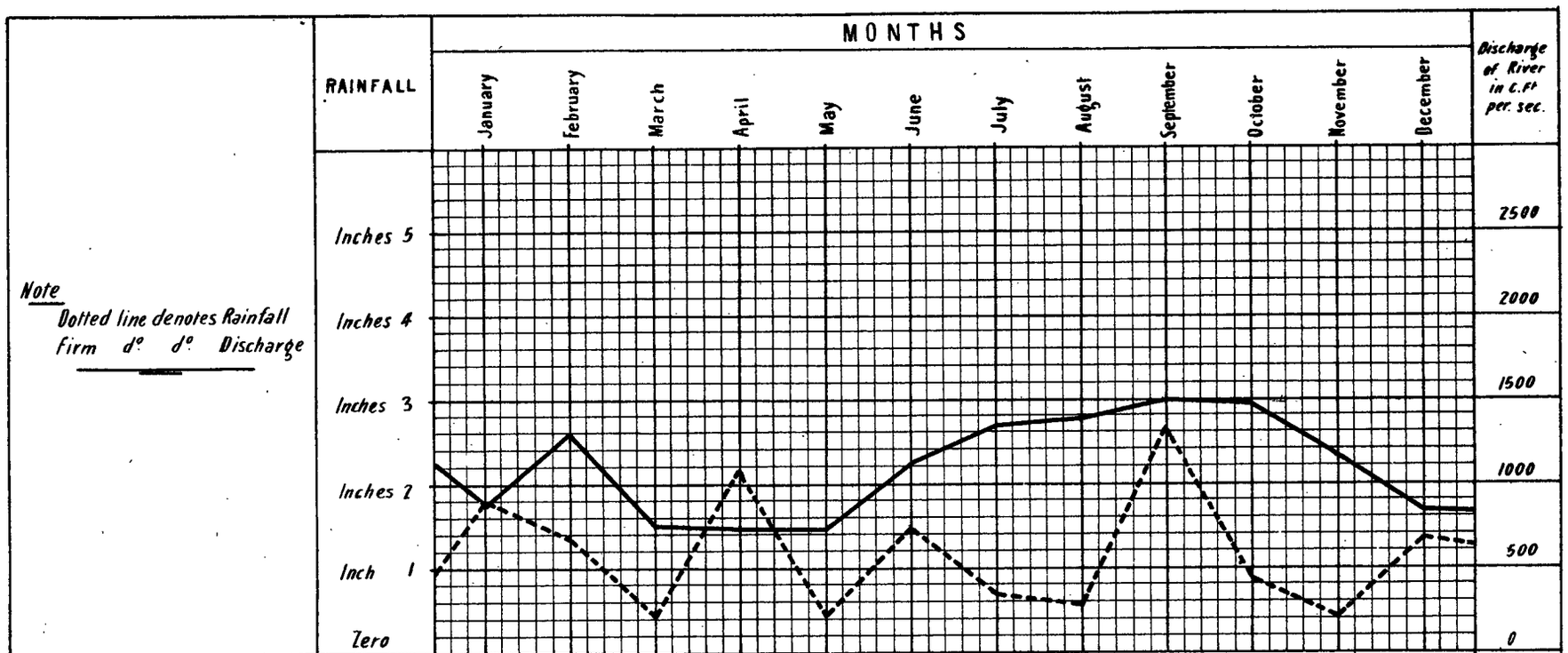
1884



	January	February	March	April	May	June	July	August	September	October	November	December	
Mean rainfall in inches over tract to be irrigated	0.17	0.61	1.22	0.60	1.42	1.58	0.09	0.47	0.93	1.01	1.26	0.34	Total mean Rainfall 9.50
Discharge required for River (500) and Canal up to 1000 c. Ft per. sec.	1000	1200	1500	1500	1000	500	500	500	1500	1500	1500	1000	
Mean discharge available in River 1500 c. Ft per sec. and under	676	586	550	636	709	1041	1412	1276	1500	1500	1500	1280	
Deficiency	324	614	950	864	291	Nil	"	"	"	"	"	"	

MURRUMBIDGEE RIVER

1885

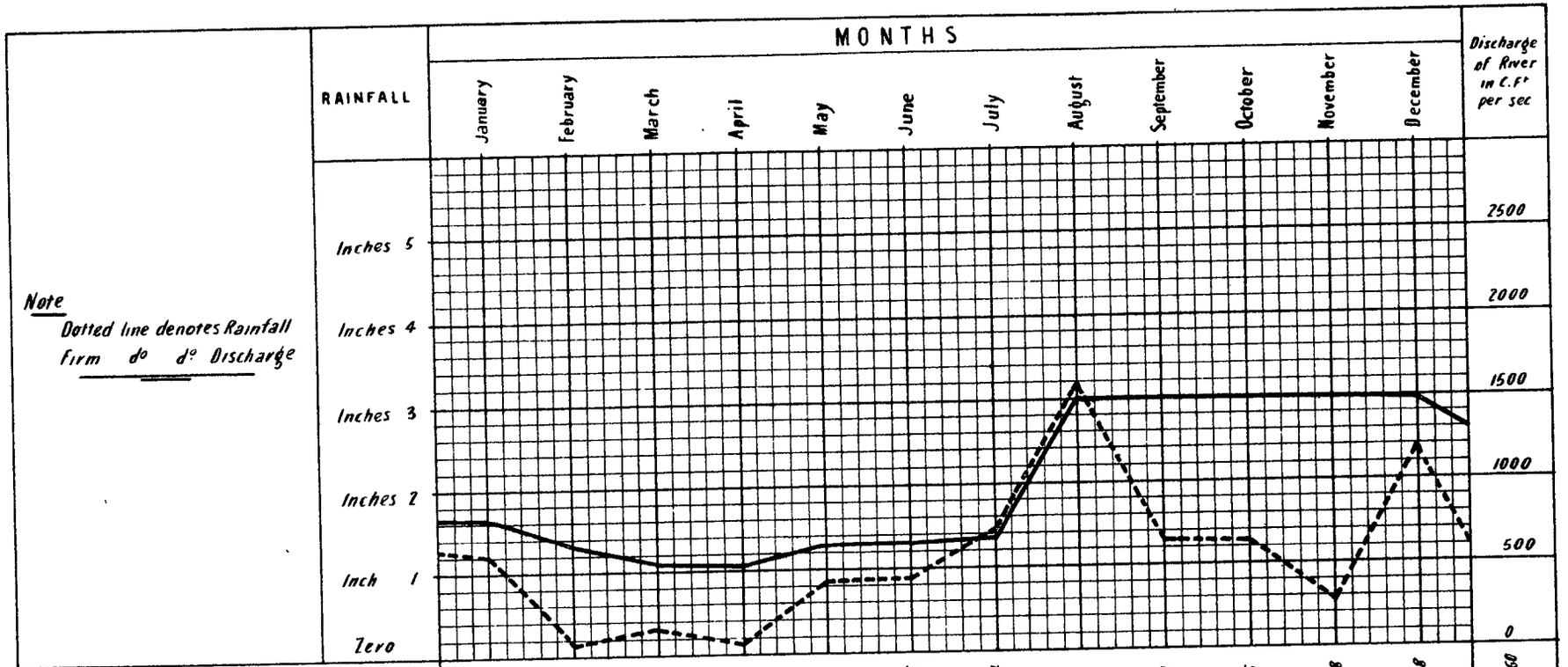


Note
Dotted line denotes Rainfall
Firm d° d° Discharge

	January	February	March	April	May	June	July	August	September	October	November	December	Total mean Rainfall 14.10
Mean rainfall in inches over tract to be irrigated	1.80	1.35	0.44	2.14	0.45	1.43	0.68	0.56	2.61	0.88	0.43	1.33	
Discharge required for River (500) and Canal up to 1000 C. Ft per. sec.	800	1000	1000	500	1000	500	500	500	500	1000	1200	500	
Mean discharge available in River 1500 C. Ft per sec. and under	888	1291	751	728	725	1112	1330	1368	1500	1474	1156	835	
Deficiency	Nil	"	249	Nil	275	Nil	"	"	"	"	44	Nil	

MURRUMBIDGEE RIVER

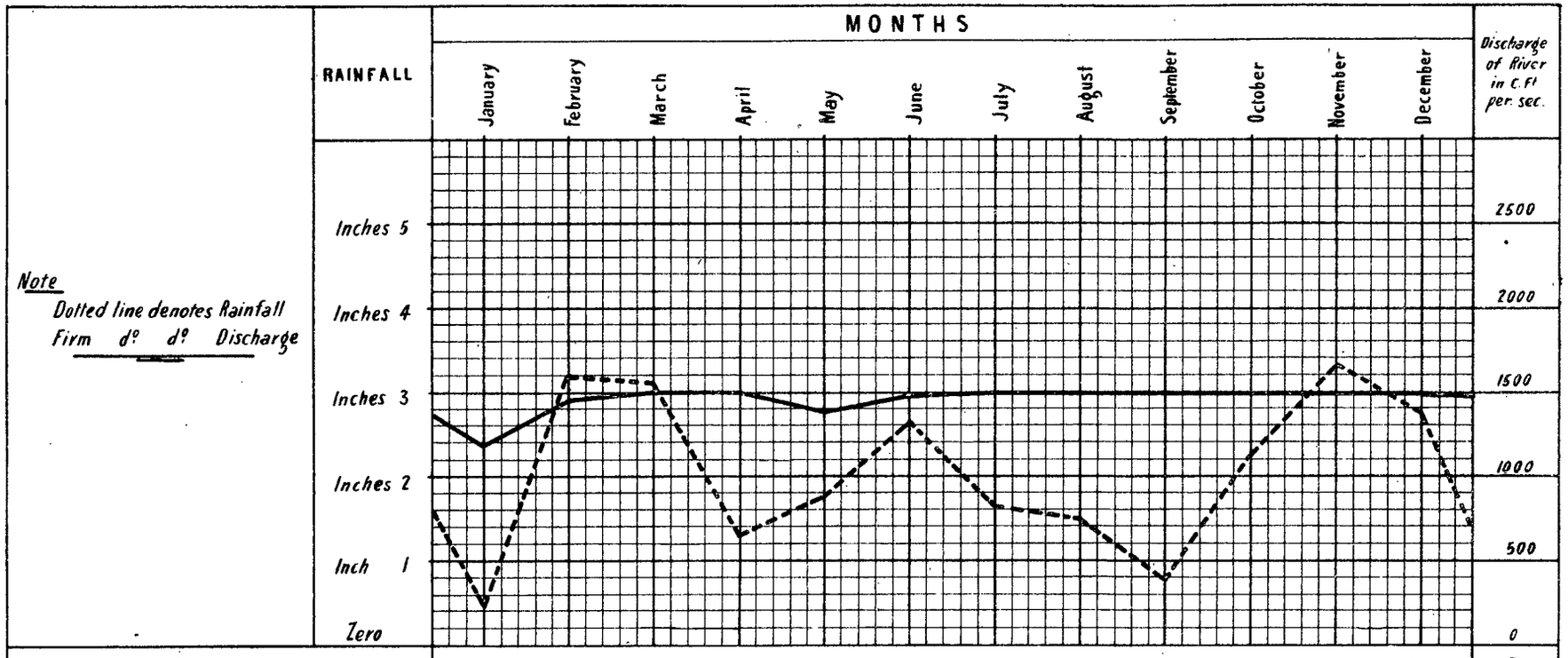
1886



	January	February	March	April	May	June	July	August	September	October	November	December	
Mean rainfall in inches over tract to be irrigated	1.20	0.16	0.29	0.17	0.84	0.86	1.44	3.18	1.29	1.26	0.58	2.38	13.60
Discharge required for River (500) and Canal up to 1000 c ft per sec	800	1000	1500	1500	1200	500	500	500	1000	1000	1200	500	
Mean discharge available in River 1500 c ft per. sec and under	820	660	549	525	645	650	676	1500	1500	1500	1500	1488	
Deficiency	Nil	340	951	975	555	Nil	"	"	"	"	"		Total mean Rainfall

MURRUMBIDGEE RIVER

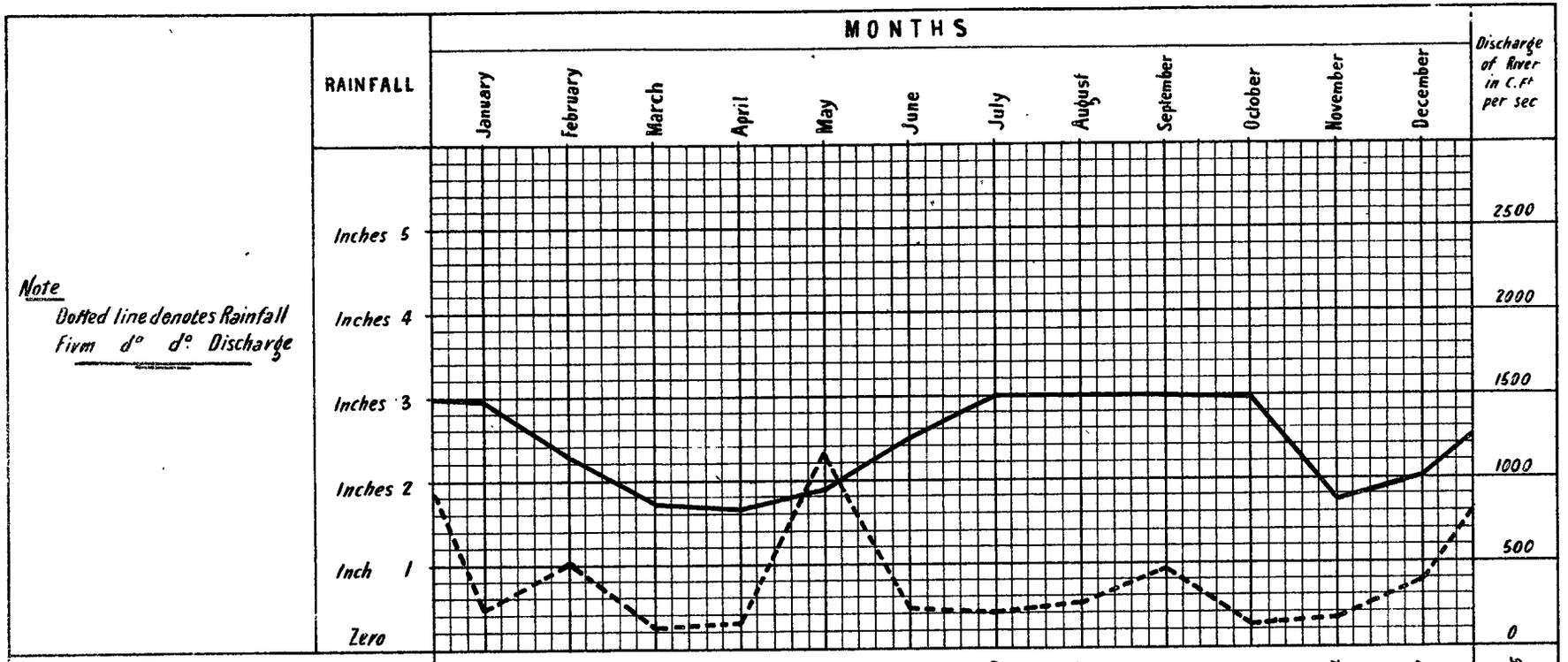
1887



Mean rainfall in inches over tract to be irrigated	0.45	3.13	3.11	1.29	1.75	2.61	1.63	1.50	0.79	2.24	3.29	2.75	Total mean Rainfall 24.60
Discharge required for River (500) and Canal up to 1000 C. Ft per. sec.	500	500	500	500	500	500	500	500	500	500	500	500	
Mean discharge available in River 1500 C. Ft per sec. and under	1182	1451	1500	1500	1382	1476	1500	1500	1500	1500	1500	1500	
Deficiency	Nil	"	"	"	"	"	"	"	"	"	"		

MURRUMBIDGEE RIVER

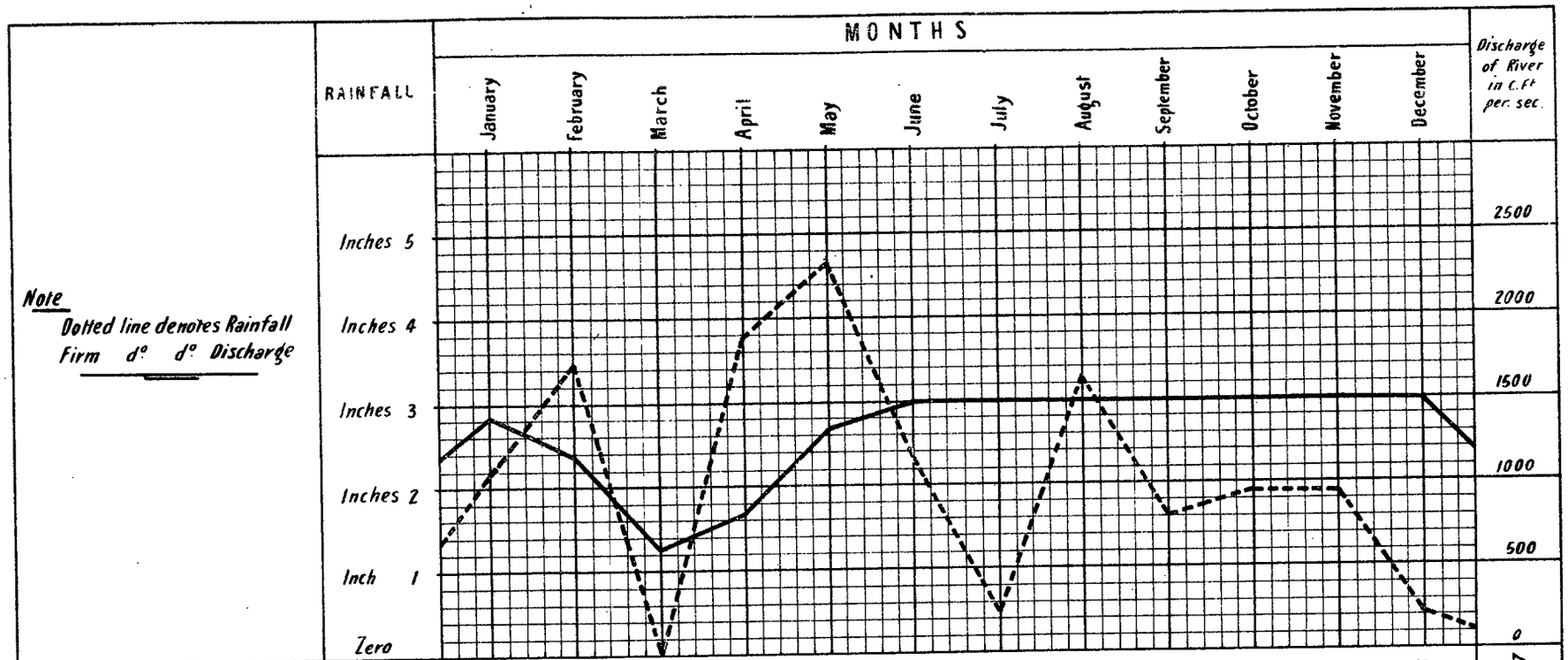
1888



	January	February	March	April	May	June	July	August	September	October	November	December	
Mean rainfall in inches over tract to be irrigated	0.50	1.02	0.23	0.30	2.31	0.47	0.40	0.52	0.94	0.26	0.34	0.77	8.06
Discharge required for River (500) and Canal (up to 1000 c Ft per. sec.)	500	500	1000	1500	500	500	500	500	1500	1500	1500	1500	
Mean discharge available in River 1500 c Ft per sec and under.	1471	1140	857	835	940	1741	1500	1500	1500	1490	883	1004	
Deficiency	Nil	"	1.43	665	Nil	"	"	"	"	10	617	496	Total mean Rainfall

MURRUMBIDGEE RIVER

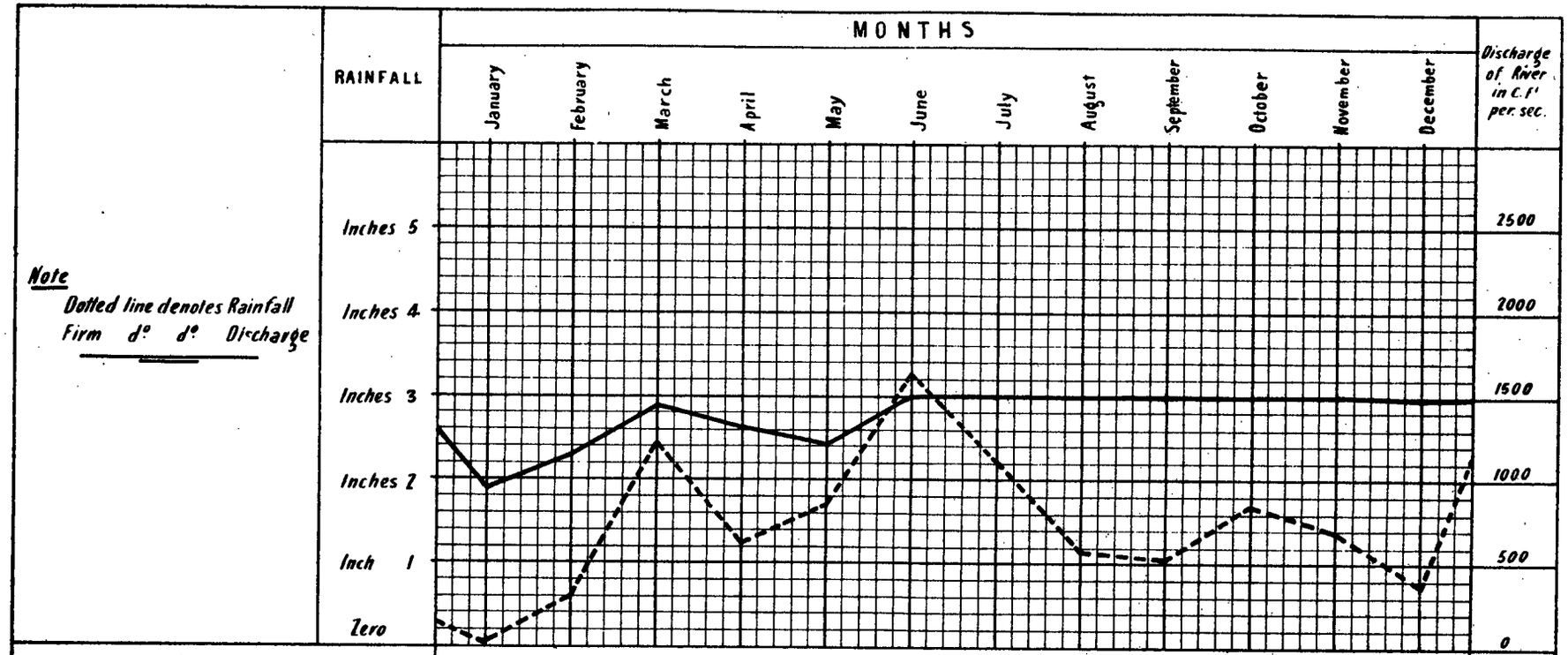
1889



Mean rainfall in inches over tract to be irrigated	2.15	3.42	0.01	3.76	4.63	2.36	0.50	3.25	1.61	1.88	1.87	0.43	Total mean Rainfall 25.87
Discharge required for River (500) and Canal up to 1000 c. ft per. sec.	500	500	500	500	500	500	500	500	500	500	500	800	
Mean discharge available in River 1500 c. ft per. sec. and under	1409	1182	641	827	1330	1500	1500	1500	1500	1500	1500	1497	
Deficiency	Nil	"	"	"	"	"	"	"	"	"	"	"	

MURRUMBIDGEE RIVER

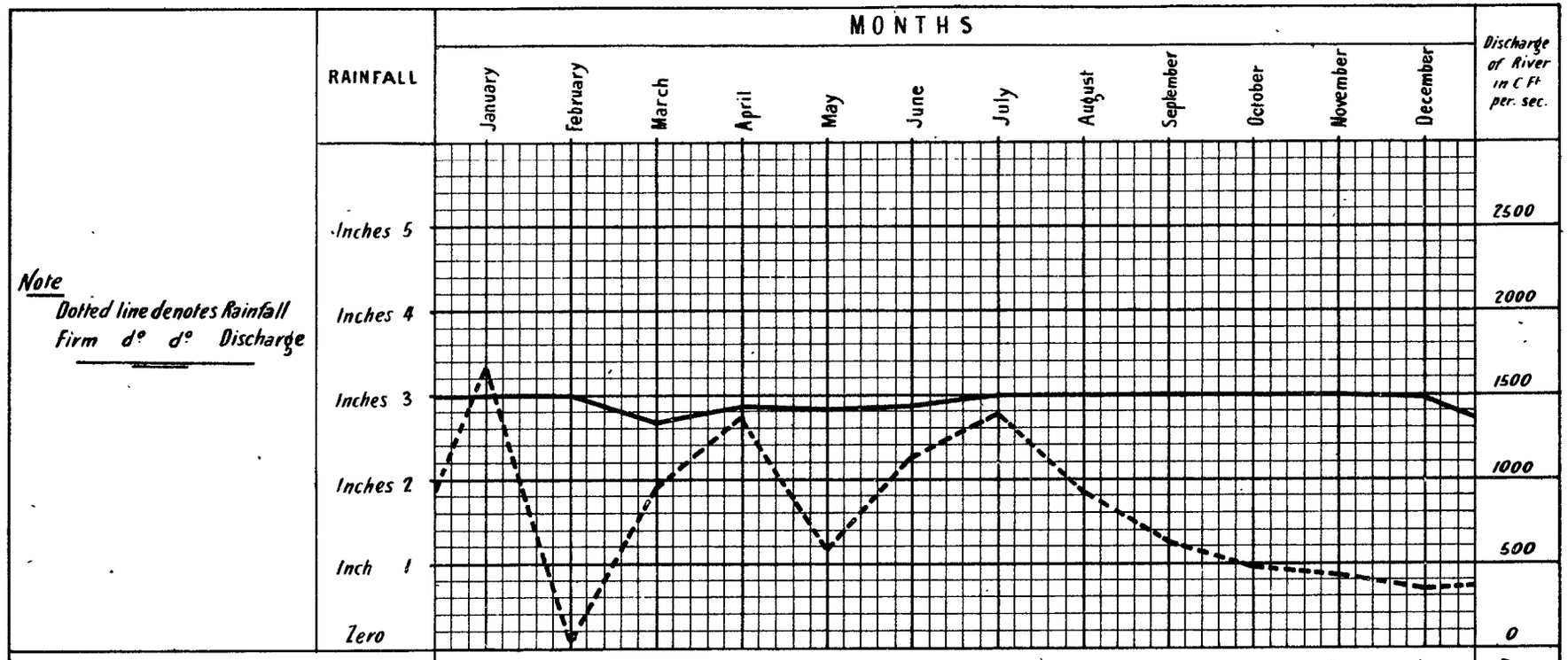
1890



	January	February	March	April	May	June	July	August	September	October	November	December	
Mean rainfall in inches over tract to be irrigated	0.07	0.60	2.41	1.24	1.71	3.25	2.21	1.16	1.04	1.72	1.39	0.75	Total mean Rainfall 17.55
Discharge required for River (500) and Canal up to 1000 c. Ft per. sec.	950	1000	500	500	500	500	500	500	1000	500	500	500	
Mean discharge available in River 1500 c. Ft per sec. and under	361	1147	1444	1311	1209	1500	1500	1500	1500	1500	1500	1494	
Deficiency	Nil	"	"	"	"	"	"	"	"	"	"	"	

MURRUMBIDGEE RIVER

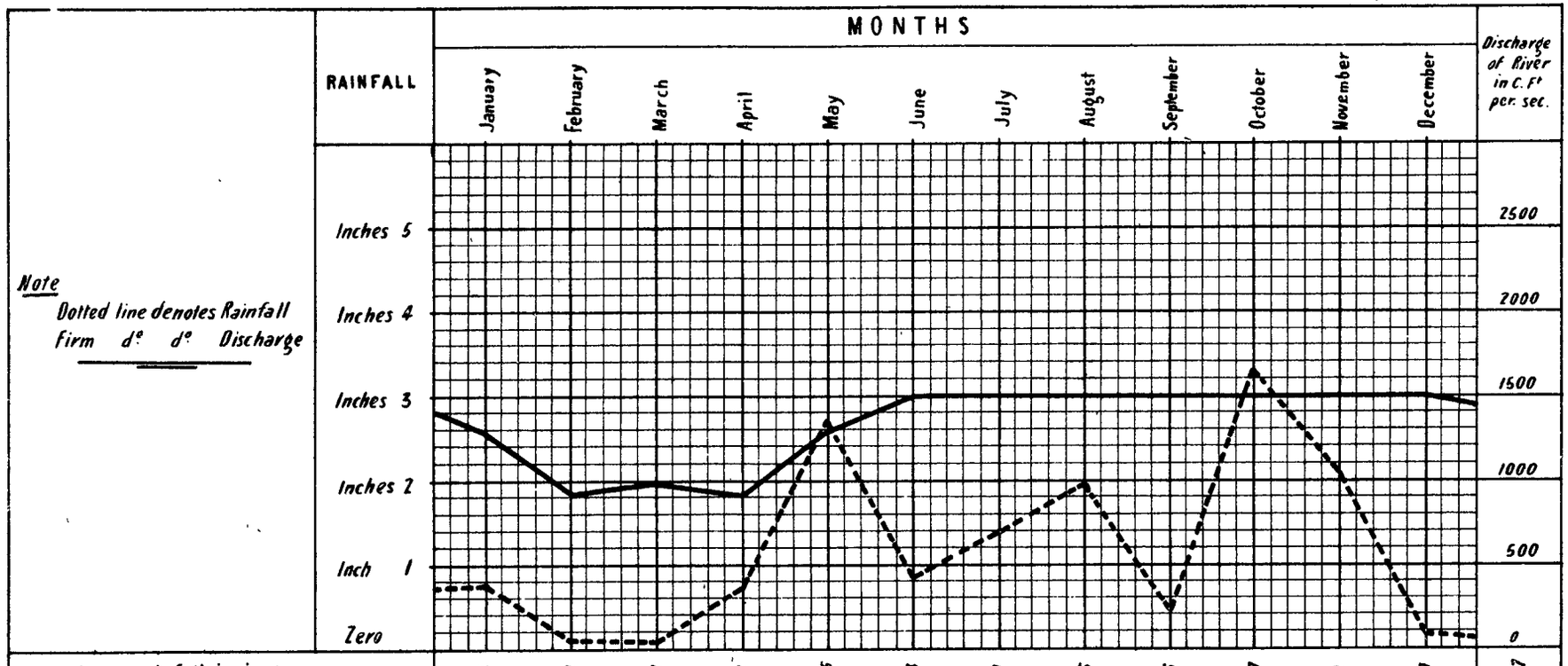
1891



	January	February	March	April	May	June	July	August	September	October	November	December	
Mean rainfall in inches over tract to be irrigated	3.31	0.10	1.91	2.71	1.19	2.74	2.76	1.83	1.22	.97	0.87	0.68	Total mean Rainfall 19.79
Discharge required for River (500) and Canal (up to 1000 c. Ft per sec):	500	500	500	500	500	500	500	500	1000	1500	1500	1200	
Mean discharge available in River, 1500 c. Ft. per sec. and under	1500	1500	1331	1415	1401	1434	1500	1500	1500	1500	1500	1480	
Deficiency	Nil	"	"	"	"	"	"	"	"	"	"	"	

MURRUMBIDGEE RIVER

1892

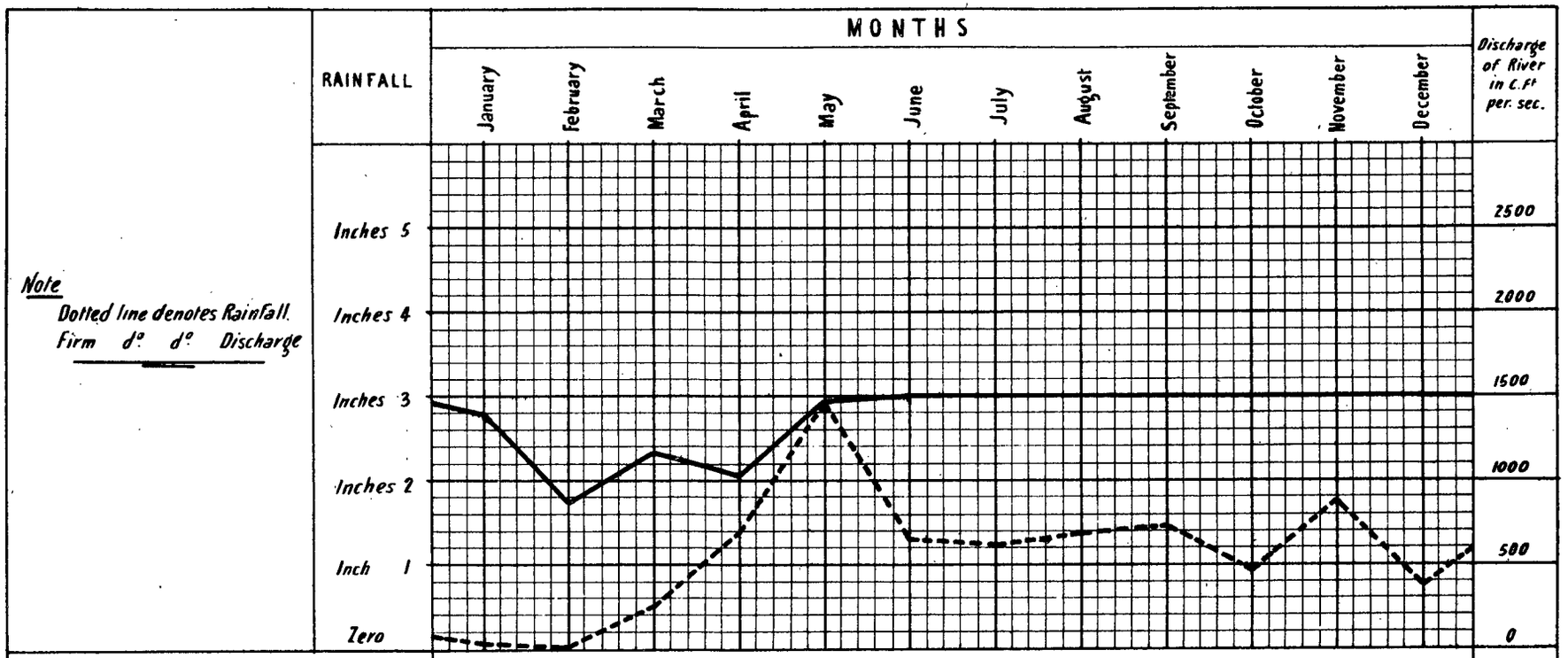


Note
Dotted line denotes Rainfall
Firm d° d° Discharge

	January	February	March	April	May	June	July	August	September	October	November	December	Total mean Rainfall 15.17
Mean rainfall in inches over tract to be irrigated	0.74	0.10	0.08	0.71	2.66	0.83	1.39	1.96	1.26	3.27	2.09	0.19	
Discharge required for River (500) and Canal up to 1000 c ft per. sec	1200	1600	1500	1500	500	500	500	500	1000	500	500	500	
Mean discharge available in River 1500 c. ft per sec. and under	1279	910	985	904	1289	1500	1500	1500	1500	1500	1500	1500	
Deficiency	Nil	590	515	596	Nil	"	"	"	"	"	"	"	

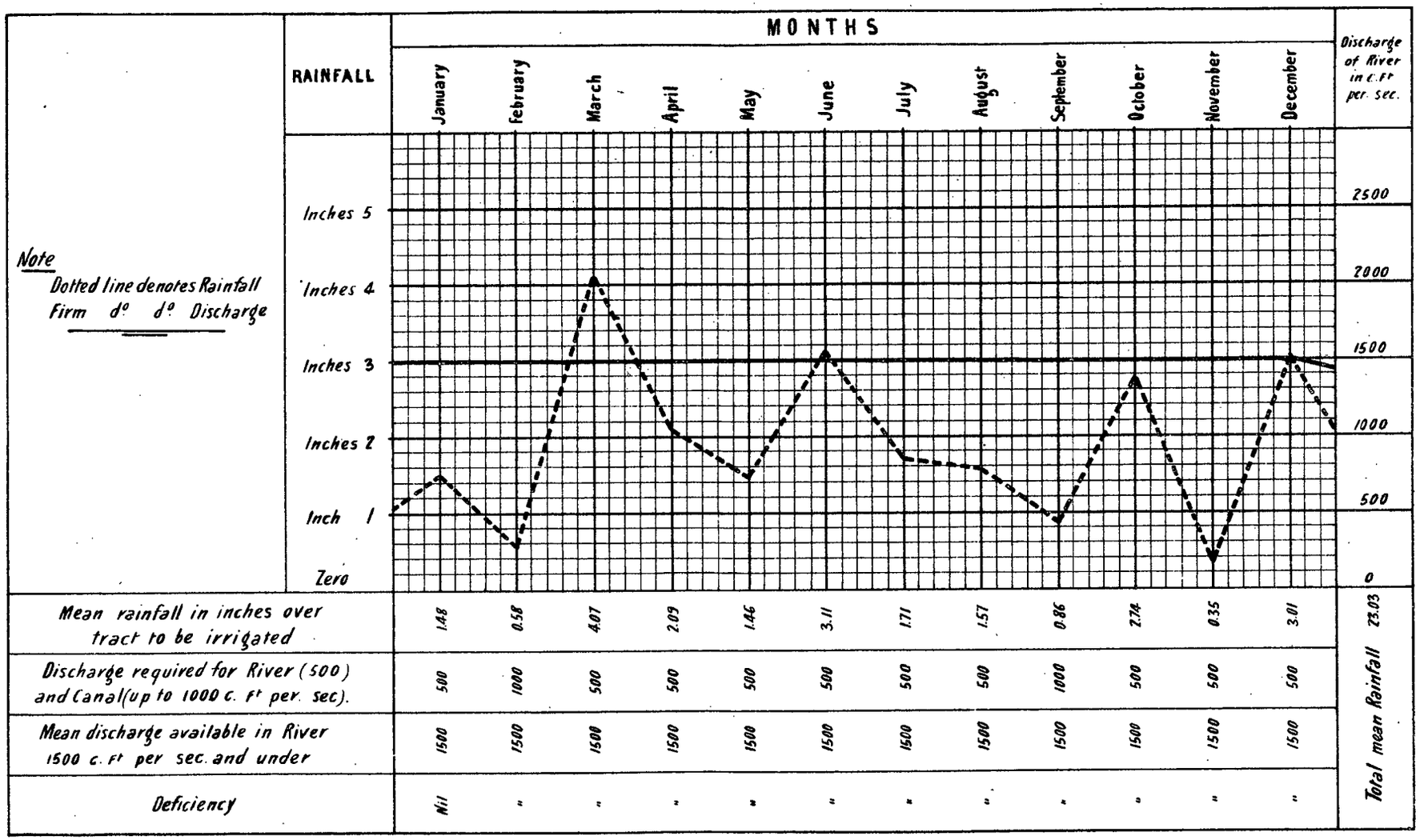
MURRUMBIDGEE RIVER

1893



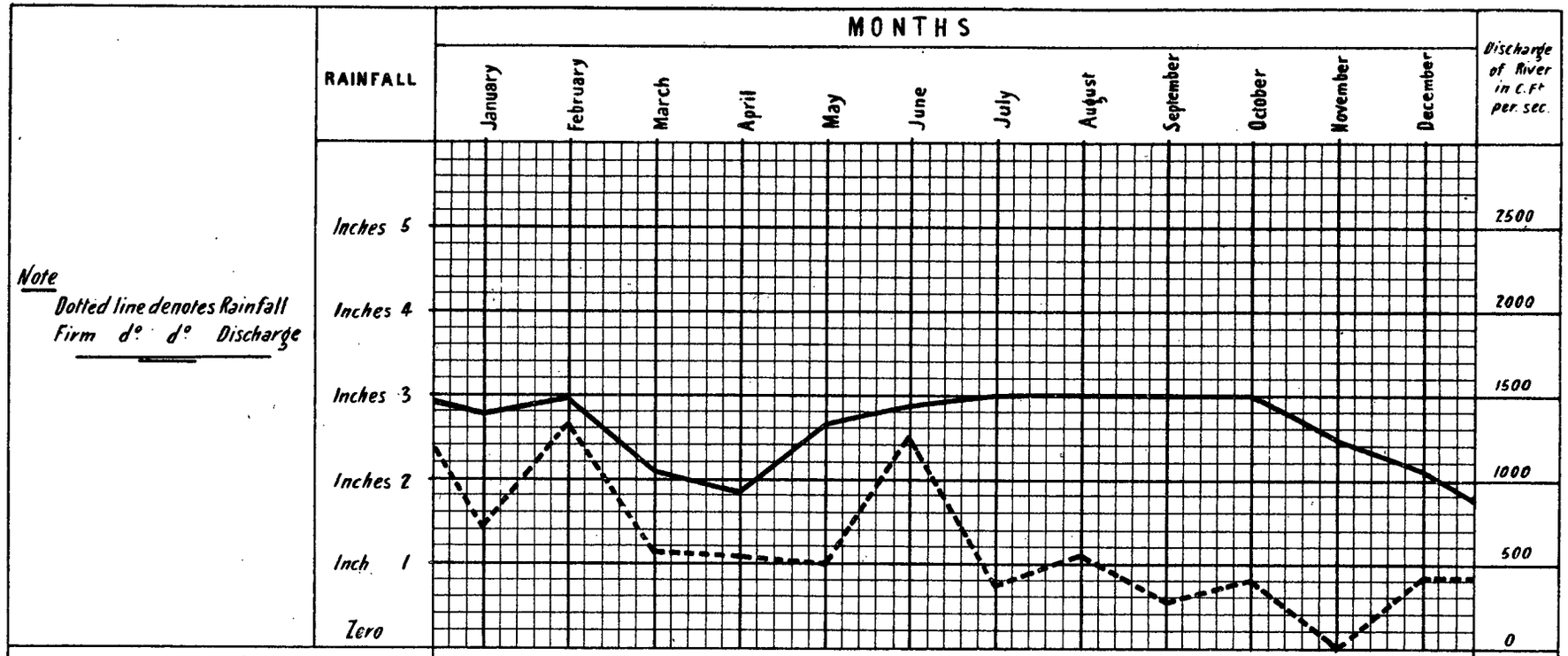
MURRUMBIDGEE RIVER

1894



MURRUMBIDGEE RIVER

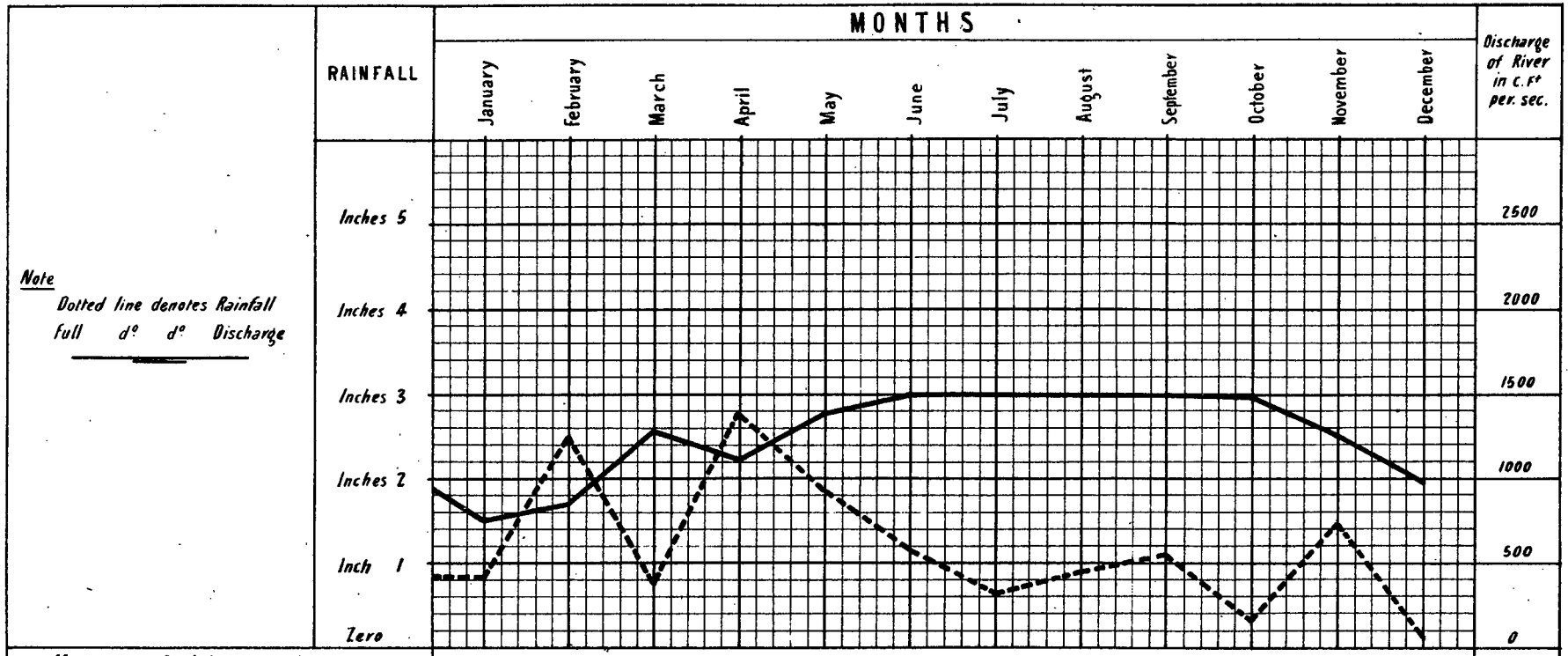
1895



	January	February	March	April	May	June	July	August	September	October	November	December	
Mean rainfall in inches over tract to be irrigated	1.41	2.61	1.16	1.07	1.00	2.49	0.76	1.09	0.55	0.80	0.00	0.82	Total mean Rainfall 13.76
Discharge required for River (500) and Canal (up to 1000 c. ft per. sec).	500	500	500	900	1000	500	500	500	1500	1500	1200	1200	
Mean discharge available in River 1500 c. ft per sec. and under.	1395	1492	1050	911	1312	1435	1500	1500	1500	1500	1242	1057	
Deficiency	Nil	"	"	"	"	"	"	"	"	"	"	143	

MURRUMBIDGEE RIVER

1896



	January	February	March	April	May	June	July	August	September	October	November	December	
Mean rainfall in inches over tract to be irrigated	0.81	2.49	0.77	2.77	1.85	1.17	0.62	0.88	1.06	0.31	1.45	0.15	Total mean Rainfall 14.33
Discharge required for River (500) and Canal up to 1000 c. Ft per. sec.	1500	500	500	500	500	500	500	500	1500	1500	1250	980	
Mean discharge available in River 1500 c. Ft per. sec. and under	752	845	1232	1103	1391	1500	1500	1500	1500	1497	1250	986	
Deficiency	748	Nil	"	"	"	"	"	"	"	"	"	"	

MURRUMBIDGEE RIVER

Diagram shewing for each month the mean rainfall and the mean discharge available for the proposed Canal for the 17 years ending with 1896

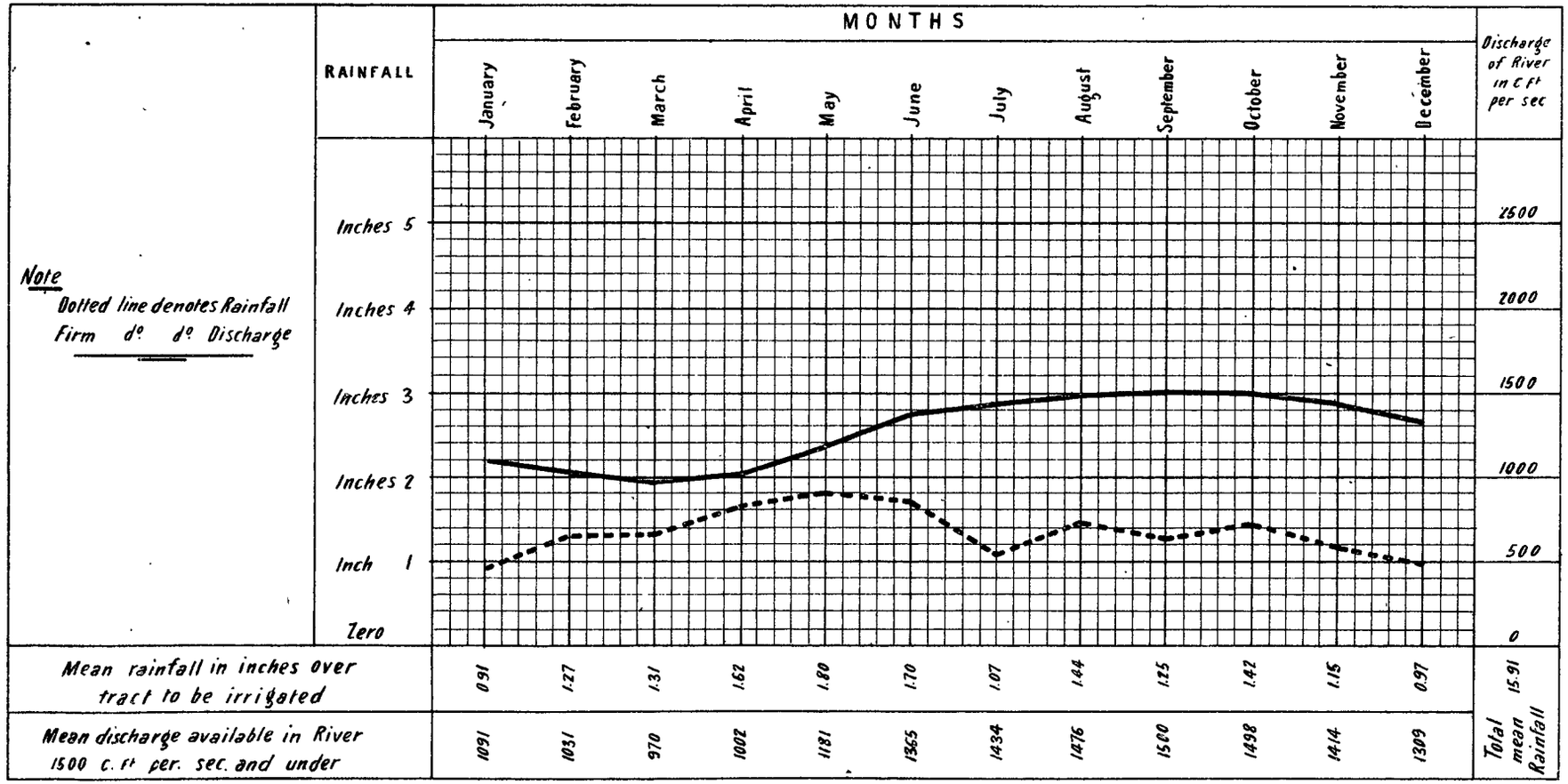


PHOTO-LITHOGRAPHED AT THE GOVT. PRINTING OFFICE,
SYDNEY, NEW SOUTH WALES

MAP
SHEWING THE
DRAINAGE AREAS
OF THE
RIVER SYSTEMS
OF
NEW SOUTH WALES

To accompany Report of Colonel Home, R.E. 24/9/97.

QUEENSLAND

NEW SOUTH WALES

VICTORIA

SOUTH AUSTRALIA

PACIFIC OCEAN

Murray River Canal

Proposed Murray River Canal

REFERENCE
TO
— PROPOSED STORAGE RESERVOIR SITES —

1. "Keepit" on Namoi River near Carroll.
2. "Cookish Gun-Parma" near Narrandera.
3. "Barren Jack" near junction of Murrumbidgee and Goodradigbee Rivers.
4. "The Gulf" near Kiandra.
5. Billilingera, near Cooma.

DRAINAGE AREA OF THE MURRAY RIVER

COLONY	TRIBUTARY RIVER & CATCHMENT AREA	Area in sq. miles	Total Area	Mean Annual Rainfall in inches
Queensland	Macintyre	3961		19.39
	Weir	2981		17.51
	Moonie	2000		
	Condamine	9272		22.45
	Maranoa	7170		18.43
	Warrego	7242		18.55
	Paroo	13365		15.98
	Moungindilla & other streets	1000		15.98
	Total effective Catchment Area in Queensland	47191		19.84
	Balle Land and other non-contributing Areas	7438	54629	18.57
	Total Area in Queensland		54629	19.84
New South Wales	Macintyre and Dumaresq	4286		21.85
	Gwydir	4784		21.85
	Namoi	5412		19.88
	Castlereagh	3662		16.33
	Bogan-Macquarie	7000		17.44
	Lachlan	4563		17.44
	Murrumbidgee	10936		23.78
	Murrumbidgee	7084		22.88
	Billabong Creek	1774		22.70
	Murray	1000		24.96
	Total effective Catchment Area in New South Wales	70496		20.88
	Balle Land and other non-contributing Areas east of the Darling and Darling	2260		21.85
	Balle Land and other non-contributing Areas between the Darling Murrumbidgee Lachlan and Bogan	1480		15.28
	Balle Land and other non-contributing Areas between the Darling and Murray	14369		17.88
	Balle Land and other non-contributing Areas west of the Darling	43840		
		(58209)		14.67
	Total Area in New South Wales	74756		19.75
Victoria	Murray	1500		40.86
	Mitta Mitta and other Upcountry catchments	3000		40.78
	Kiewa	185		40.86
	Ovens	2360		47.88
	Goulburn	3000		29.88
	Campaspe	1125		29.88
	Loddon	1500		29.88
	Total effective Catchment Area in Victoria	10730		34.36
	Balle Land and non-contributing Areas	3473	14203	17.88
	Total Area in Victoria		20973	34.32
South Australia	Non-contributing Areas	34387	34387	8.89
	Total Area in South Australia		34387	10.89
	Total contributing Area here given	128896		21.89
	Total non-contributing	230146		11.8
	Total Basin of Murray River	359042		15.9

Note as The Catchment Areas of the various Rivers as here given are to be regarded as the effective or contributing Areas. The Areas given as non-contributing are those which either contribute nothing to the river systems, or which contribute only during exceptional Floods.

(a) The statement of mean rainfall in the various drainage areas is based on the results of many years observations, but in some instances these observations are approximate, as several areas recently have been kept for only a small number of years. This remark applies particularly to Queensland and South Australia but in a less degree to Victoria, and in some measure to New South Wales

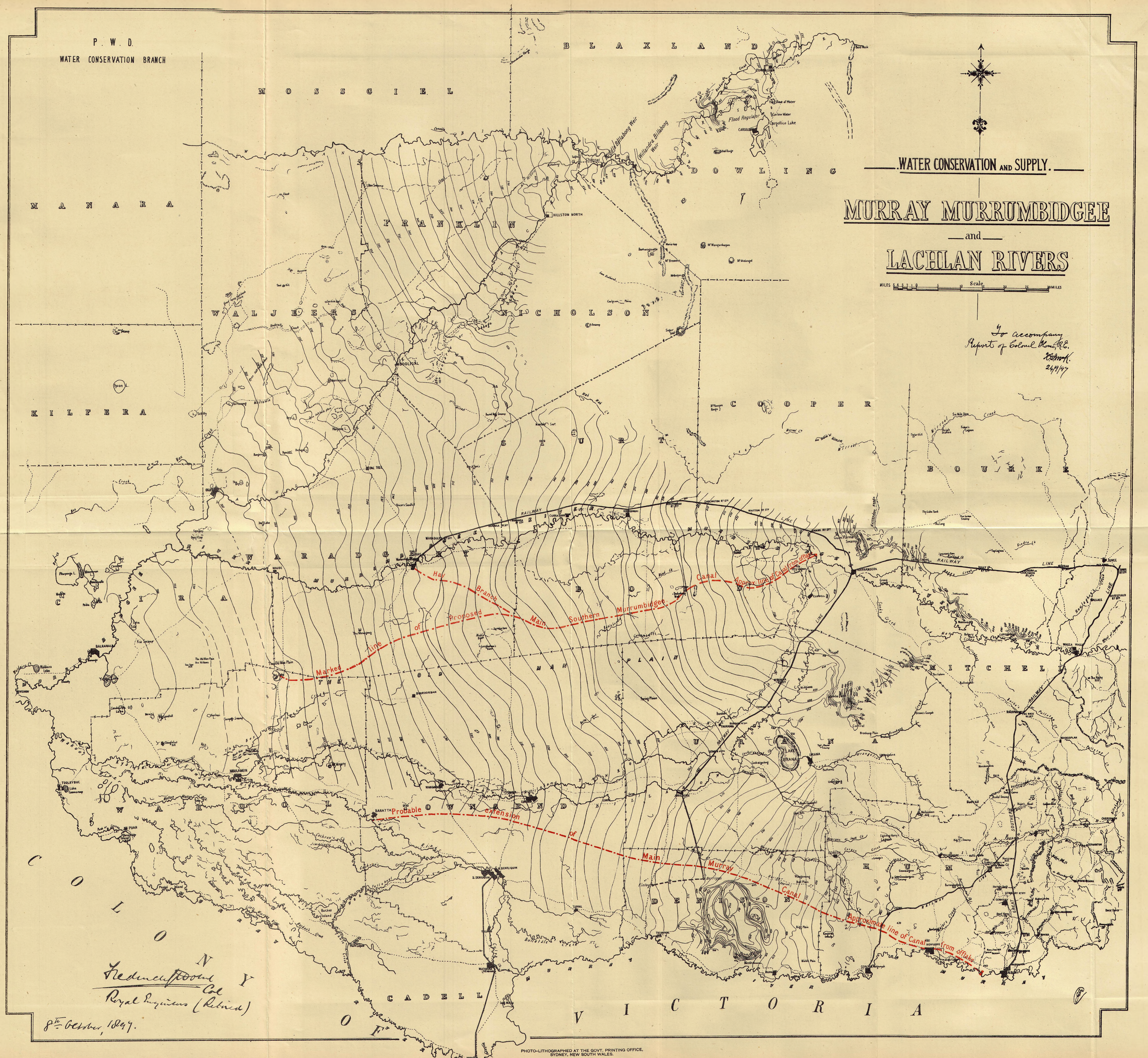
(b) This area includes the Mineral Creek Catchment

REFERENCE
The Boundary of Drainage Area of River Murray shown thus
Boundaries of Catchment Areas
Names
Contributing Areas
County Boundaries
Names

BOGAN
STURT

SCALE OF STATUTE MILES

PHOTOLITHOGRAPHED AT THE GOVT. PRINTING OFFICE, SYDNEY, NEW SOUTH WALES.
11179



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SYDNEY, NEW SOUTH WALES.
11659


PUBLIC WORKS DEPT
WATER CONSERVATION BRANCH
PLAN
SHEWING PROPOSED RESERVOIR SITE AT
TANTANGARA BASIN
MURRUMBIDGEE RIVER
SCALE
To accompany Report of Colonel Home, R.E.
24/9/97
LOCAL SKETCH
PARISH OF NATTUNG
PARISH OF LONG PLAIN
PARISH OF TANTANGARA
PARISH OF GURRANGORA
PARISH OF COOLEMAN
MURRUMBIDGEE RIVER
CURRANGORAMBLA CREEK
Cross Section No 3 at The Gulf - Proposed Site for Dam
Approximate capacity of Tantangara Basin
Approximate area of Crown lands embracing Snow Leases below 125 ft. contour — 4620 acres
Total area — 5170
Base Line 3500 Feet above Datum (Aneroid)
"THE GULF"
Cross Section No 3 (Proposed Site for Dam)
Notified 15th December 1876
Notified 28th November 1881
Notified 22nd October 1892
Notified 27th Sept 30
Ex^rs of the late Wm Bradley
H. T. Edwards
W. T. Edwards
Thomas Brassil
John Sidebotham
James Maitland
Henry T. Whitty
Henry Tarlton Whitty
E. B. Hawkins
Charles H. Barber
Thomas Oldfield
Edward Fisher
Thomas Oldfield
Thomas Oldfield
Royal Engineers (Retired)
8th October 1897

P. W. D
WATER CONSERVATION BRANCH

PLAN

SHEWING PROPOSED RESERVOIR SITE AT

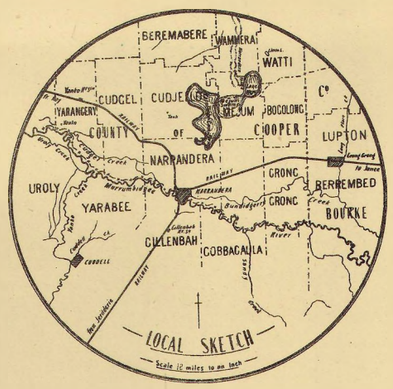
LAKES COOLAH-GUM-PARMA AND MEJUM

MURRUMBIDGEE NORTHERN MAIN CANAL

Scale
Chains 20 10 0 20 40 60 80 100 120 140 160 Chains
Miles 0 ¼ ½ ¾ 1 1¼ 2 Miles

To accompany
Report of Colonel Kenny, R.E.
E.G.M.C.K.
18/9/97





Approximate capacity of Lake Coolah Gum Parma and Mejum Swamp to line A-B

From	497' Contour	to	500' Contour	521,240,000 C.Ft
From	" "		505 "	1,781,520,000 "
From	" "		510 "	3,284,860,000 "
From	" "		515 "	4,981,260,000 "
From	" "		520 "	6,844,580,000 "
From	" "		525 "	8,890,850,000 "
From	" "		530 "	11,154,580,000 "
				11,154,580,000

Approximate capacity of Lake Mejum above line A-B

From	505' Contour	to	510' Contour	153,860,000 C.Ft
From	" "		515 "	624,180,000 "
From	" "		520 "	1,722,080,000 "
From	" "		525 "	3,371,440,000 "
From	" "		530 "	5,765,500,000 "
				5,765,500,000

Total combined capacity from 497' contour to 530' contour 16,920,080,000 C.Ft

Approximate area of Crown lands below 530' contour-7600 ac. including roads.
" " C.P. = 7950 ac.
" " Alienated = 8250 ac.
" " land which would probably have to be resumed
for severance { C.P. = 95 ac.
{ Alienated = 115 ac.

PHOTO-LITHOGRAPHED AT THE GOVT. PRINTING OFFICE
SYDNEY, NEW SOUTH WALES

1897.

LEGISLATIVE ASSEMBLY.

NEW SOUTH WALES.

COUNTRY TOWNS WATER SUPPLY AND SEWERAGE ACT.

(RETURN RESPECTING.)

Printed under No. 3 Report from Printing Committee, 13 May, 1897.

RETURN to an *Order* of the Honorable the Legislative Assembly of New South Wales, dated the 30th September, 1896, That there be laid upon the Table of this House a Return showing,—

"1. The Municipalities which have obtained loans under the Country Towns "Water Supply and Sewerage Act.

"2. The Departmental estimate of cost of several works constructed under "the provisions of the Act referred to.

"3. The actual cost of each of these works.

"4. The Boroughs (if any) in which the revenue from water service is "insufficient to meet expenses, including the annual payment to the "Government."

(*Mr. Millen.*)

COUNTRY TOWNS WATER SUPPLY.

SCHEDULE OF RETURNS.

1. Statement of Cost of Works, Debts as gazetted, and Annual Repayment Instalments.
2. Statement of Loans made to Municipalities, Debts as gazetted, and Annual Repayment Instalments.
3. Statement of Annual Repayment Instalments due to 31st December, 1896, and Balances owing by Municipal Councils at 26th April, 1897.
4. Statement of Expenditure to 31st December, 1896, on Works completed, but not yet gazetted, and on Works in progress.

[605 copies.—Approximate Cost of Printing (labour and material), £5 7s. 9d.]

1.—RETURN showing, *inter alia*—(*a*) Cost of Works, (*b*) Debts as Gazetted, and (*c*) Annual Repayment Instalments.

Municipality.	Departmental Estimate of Cost of Works.	Actual Cost of Works included in Estimate.	Cost of Additional Works asked for by Muncipal Councils.	Interest at 3½ per cent. per annum accrued from date of commencement of works up to date of gazetting Debt.	Total Amount of Cost of Works and Interest.	Repayments made by Municipal Councils in reduction of cost prior to date of gazetting Debt.	Remission on amount of Debt granted by Governor-in-Council.	Debt as gazetted.		Period of Repayment of Debt.	Annual Repayment Instalment.
								Amount.	Date.		
	£	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.			£ s. d.
Albury (*a*)	20,000	25,636 19 10	19,548 13 6	12,058 0 2	57,243 13 6	654 2 6	15,589 11 0	41,000 0 0	31 Dec., 1894	One hundred years.	1,482 11 0
Wagga Wagga	20,000	27,315 14 5	9,956 6 6	11,045 12 3	48,317 13 2	5,109 12 3	4,708 0 11	38,500 0 0	31 ,,		1,392 3 0
Goulburn (*b*)	19,606	32,458 15 4	22,725 3 5	15,850 11 9	71,034 10 6	3,774 4 3	12,260 6 3	55,000 0 0	31 ,,		1,988 16 0
Bathurst (*b*)	31,925	47,868 16 0	6,006 17 4	15,382 7 9	69,258 1 1	238 2 2	14,019 18 11	55,000 0 0	31 ,,		1,988 16 0
Deniliquin (*c*)	15,310	17,222 0 0	945 17 8	5,829 16 7	23,997 14 3	2,259 7 1	3,270 0 0	18,468 7 2	31 ,,		667 16 0
Orange	24,000	26,447 5 4	4,495 1 4	4,769 18 9	35,712 5 5	759 4 10	2,265 0 7	32,688 0 0	31 ,,		1,182 0 0
Bourke	12,400	11,557 3 5	2,778 16 6	2,971 11 8	17,307 11 7	.....	3,871 11 7	13,436 0 0	31 ,,		485 17 0
Wentworth	8,000	8,523 17 1	1,141 13 0	1,873 13 4	11,539 3 5	59 19 0	7,479 4 5	4,000 0 0	31 ,,		144 13 0
Balranald	6,400	7,172 5 1	790 18 1	1,420 6 0	9,383 9 2	.....	3,383 9 2	6,000 0 0	31 ,,		216 19 0
Lismore	7,000	7,296 10 4	2,099 15 6	1,578 13 3	10,974 19 1	684 7 4	274 7 1	10,016 4 8	31 ,,		362 3 6
Manly (*d*)	22,900	26,261 0 0	(*e*) 11,559 9 7	.....	37,820 9 7	.....	.....	37,820 9 7	31 Dec., 1892		1,367 11 6
Cootamundra	7,500	8,291 7 3	3,353 18 4	894 6 8	12,539 12 3	.....	1,643 12 3	10,896 0 0	31 Dec., 1894		394 0 0
Jerilderie	5,000	4,905 0 0	1,499 18 6	175 6 3	6,580 4 9	.....	1,151 10 4	5,428 14 5	31 ,,		196 6 3
Lithgow	15,000	12,068 5 5	.....	681 0 6	12,749 5 11	.....	.....	12,749 5 11	30 June, 1896		461 0 0
Dubbo	14,000	13,519 8 0	466 9 0	1,252 6 4	15,238 3 4	.....	.....	15,238 3 4	30 ,,		551 0 0
Nowra	9,650	9,820 17 3	1,710 10 11	1,061 7 8	12,592 15 10	.....	.....	12,592 15 10	30 ,,		455 7 3
Nyngan	9,000	9,723 5 0	1,007 9 11	1,022 16 8	11,753 11 7	326 6 8	2,427 4 11	9,000 0 0	31 Dec., 1896		325 8 9
Hunter District (*b*)	170,000	390,532 9 5	.....	49,691 16 2	440,224 5 7	22,902 14 6	.....	417,321 11 1½	30 June, 1892		15,090 7 3
	417,691	686,620 19 2	90,086 19 1	127,559 11 9	904,267 10 0	36,768 0 7	72,343 17 5	795,155 12 0			28,752 15 6

(*a*) Design and estimate of cost furnished by Mr. O. Langtree, C.E., of Melbourne.
(*b*) ,, ,, ,, Mr. W. Clarke, C.E., of London.
(*c*) ,, ,, ,, Mr. G. Gordon, C.E., of Melbourne.
(*d*) ,, ,, ,, Messrs. Harper, Harper, and Henderson, of Sydney, and revised by Department.
(*e*) Inclusive of cost of land, £10,000.

2.—Loans advanced on account of Water Supply Works constructed by Municipal Councils, Debts as gazetted, and Annual Repayment Instalments.

Municipality.	Amount of Loan and Incidental Expenses.	Interest at 3½ per cent. accrued from date of Loan up to date of gazetting Debt.	Total amount of Loan and Interest.	Repayments made by Municipal Councils in reduction of Loan prior to date of gazetting Debt.	Debt as gazetted.		Annual Repayment Instalment.	Period of Repayment.
					Amount.	Date.		
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.		£ s. d.	
Hay	7,072 5 9	1,268 14 6	8,341 0 3	649 15 5	7,691 4 10	31 Dec., 1893	278 2 2	One hundred years.
Forbes	8,013 4 6	1,401 16 5	9,415 0 11	1,456 13 9	7,958 7 2	31 Dec., 1893	287 15 3	
Wilcannia	8,000 0 0	1,587 18 11	9,587 18 11	1,207 6 7	8,380 12 4	31 Dec., 1894	303 1 2	
Totals...£	23,085 10 3	4,258 9 10	27,344 0 1	3,313 15 9	24,030 4 4		868 18 7	

3.—Return showing—(*a*) Annual Repayment Instalments due to 31st December, 1896; (*b*) Payments made by Municipal Councils up to 26th April, 1897; (*c*) Balances owing by Municipal Councils at 26th April, 1897.

	Annual Repayment Instalments due to 31st December, 1896.		Payments made by Municipal Councils up to 26th April, 1897.	Balances owing by Municipal Councils at 26th April, 1897.
	No.	£ s. d.	£ s. d.	£ s. d.
Albury	2	2,965 2 0	2,965 2 0	.....
Wagga Wagga	3	4,176 9 0	4,176 9 0	.....
Goulburn	2	3,977 12 0	3,977 12 0	.....
Bathurst	2	3,977 12 0	3,977 12 0	.....
Deniliquin	3	2,003 8 0	2,003 8 0	.....
Orange	3	3,546 0 0	3,546 0 0	.....
Bourke	3	1,457 11 0	1,180 0 0	277 11 0
Wentworth	3	433 19 0	255 3 8	178 15 4
Balranald	3	650 17 0	216 19 0	433 18 0
Lismore	3	1,086 10 6	1,086 10 6	.....
Manly	4	5,470 6 0	4,570 6 0	.....
Cootamundra	2	788 0 0	788 0 0	.....
Jerilderie	2	392 12 6	392 12 6	.....
Hay	3	844 6 6	844 6 6	.....
Forbes	3	863 5 9	863 5 9	.....
Wilcannia	2	606 2 4	606 2 4	.....
Totals ...£	.....	33,239 13 7	32,349 9 3	890 4 4

4.—Expenditure to 31st December, 1896, on (*a*) Works completed but not yet gazetted, and (*b*) Works in progress.

Municipality.	Amount of Expenditure.	Remarks.
	£ s. d.	
Works completed—		
Moama	6,506 12 2	
Parkes	15,875 13 6	Further works proposed.
Moss Vale	15,510 15 8	
Coonamble	5,543 15 3	Exclusive of cost of artesian bore.
Junee	43,014 5 11	Further works proposed.
Works in progress—		
Armidale	34,746 19 8	
Tamworth	14,237 7 10	
Total...£	135,435 10 0	

Sydney: William Applegate Gullick, Government Printer.—1897

[3*d*.]

1897.

LEGISLATIVE ASSEMBLY.

NEW SOUTH WALES.

PROPOSED WEIR ACROSS THE YASS RIVER.

(REPORT ON, FOR THE SUPPLY OF WATER TO THE TOWN OF YASS.)

Printed under No. 10 *Report from Printing Committee*, 8 *July*, 1897.

[*Report laid upon the Table of the House in fulfilment of a promise made on the* 16*th June*, 1897, *in answer to a Question of the Honorable Member for Yass.*]

Question.

10. PROPOSED WEIR ACROSS THE YASS RIVER :—Mr. Affleck asked the Secretary for Public Works,—
(1.) Will he cause an examination of the Yass River, between the bridge in the town of Yass and the one on the Main South Road, near Hume's Crossing, to see if there is any place where a weir could be constructed, so as to conserve the water to supply the town?
(2.) If such is found to exist, will he cause an estimate of the cost of such work to be made?
(3.) Will he lay upon the Table of this House a report of the said examination, with estimated cost of same, when made, for the information of Members?

Answer.

MR. YOUNG answered,—I will refer the Honorable Member's Questions to my responsible officers for consideration and report.

Water Supply for Yass.

A SCHEME for providing a supply of water for the town of Yass was propounded by Mr. E. B. Price, per report dated 30th November, 1892 (a copy of which was supplied to the Member for the district). Mr. Price's proposal provided for the construction of a concrete weir across the Yass River to impound the water. This dam would have conserved sufficient water to not only supply the town, but also provide pumping power to raise the water to an elevated reservoir. From the reservoir the water would have been distributed by reticulation. The population of Yass Municipality was then 1,800, and the works were designed to give 20 gallons per head per diem to a population of 2,000, but North Yass was for the present to be supplied by means of a standpipe.

The cost of the proposed works, inclusive of the expenditure on a previous survey, was estimated at £8,800.

The revenue from all sources was estimated at £490.

The annual charges to be provided for were estimated as under :—

Interest on £8,800 at 4 per cent.	£352
Working expenses	48
	£400

There would therefore have been a surplus of revenue over expenditure of £90.

Since the report referred to was submitted prices have fallen, consequently the scheme could now be carried out for less money.

1897.

LEGISLATIVE ASSEMBLY.

NEW SOUTH WALES.

HAY IRRIGATION TRUST.

(STATEMENT OF RECEIPTS AND EXPENDITURE FOR THE YEAR 1896.)

Printed under No. 2 Report from Printing Committee, 6 May, 1897.

ABSTRACT of Receipts and Expenditure for 1896, Hay Irrigation Trust, in accordance with the 34th section of the Act 55 Victoria No. 25.

I, THOMAS WILLIAM BLANCH, of Hay, in the Colony of New South Wales, hereby solemnly and sincerely declare as follows:—

That the attached exhibit marked "A" is a return showing the mode in which all money borrowed on loan, also the cost of management of the year ending 31st December, 1896, together with a full account of all receipts and expenditure for such year, of the Hay Irrigation Trust.

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."

T. W. BLANCH.

Subscribed and declared at Hay this 22nd day of January, 1897, before me,—

W. TRAVIS, J.P.

HAY IRRIGATION TRUST.

("A.")

STATEMENT of Receipts and Expenditure of the Hay Irrigation Trust, from the 1st January, 1896, to the 31st December, 1896.

RECEIPTS.	£	s.	d.	EXPENDITURE.	£	s.	d.
To Deposits on allotments	9	6	6	By Wages	0	14	0
Rent of grazing dues	111	0	0	Assistant's salary	4	0	0
Cr. balance at Bank last audit	23	12	5	Insurance on buildings, &c.	3	5	0
				Stamps and petty cash	3	5	7
				Telegram sent by Bank	0	5	8
				Cr. balance at Union Bank at 31/12/96	128	15	8
				Cheque presented since last audit	2	13	0
	£142	18	11		£142	18	11

LOAN ACCOUNT.

	£	s.	d.		£	s.	d.
To Advance received from Union Bank on 28th December, 1894, of	3,000	0	0	By Amount due in principal and interest to Union Bank at 31st December, 1896	3,389	18	6
Interest to date	389	18	6				
	£3,389	18	6		£3,389	18	6

We, the undersigned, duly appointed Auditors, do hereby certify that we have examined the books of the Hay Irrigation Trust, and vouchers in support thereof, and find them correct; and the foregoing is a true and correct statement,—

ROBT. F. MAITLAND, } Auditors.
M. ARMYTAGE, }

14th January, 1897.

Exhibit marked "A" referred to,—

WM. TRAVIS, J.P.

LIST

List of Claims against the Hay Irrigation Trust.

Name	Nature of Claim	Amount	Interest	Total	Remarks
		£ s. d.	£ s. d.	£ s. d.	
Aldred, W	Contract for earth work	77 5 0	3 4 6	80 9 6	Interest on order for £23 17s. 6d., from June 10th, 1895.
Baldwin, Thos.	Horses and men	4 15 0		4 15 0	
Blanch, T. W.	Salary as Secretary	57 3 4		57 3 4	
Callanan, M	Firewood	33 16 7		33 16 7	
Chambers, R.	Printing and advertising	1 12 0		1 12 0	
Crouk and Henry	Labour and material	13 9 9		13 9 9	
Cummins, D F	Cleaning and repairs, engineer, and material supplied	3 12 6		3 12 6	
Dale, J. H	Contract for earth work	65 8 0	8 16 7	74 4 7	Interest on order, £65 8s, from June 10th, 1895.
Dixon, G H.	Building engine house	251 18 3	32 17 0	284 15 3	Interest on order, £251 18s. 3d., from July 1st, 1895.
Gibson, R	Cash advanced	10 0 0	1 5 10	11 5 10	Interest from July 3rd, 1895.
Harrison, G H	Timber and stores	6 6 3		6 6 3	
Healey, J.	Contract for earth work	153 17 4	17 16 7	171 13 11	Interest on order, £6 10s., £63, £72 5s. 11d., £4, from August 7th, 1895.
Hoskins, G. and C	Machinery	143 13 11		143 13 11	Interest was promised, but so far has not been claimed.
Johnston, J.	Advertising	1 6 6		1 6 6	
Maclure, H. B	Stores	26 18 7		26 18 7	These creditors claim interest, but no written promise can be found.
Meakes and Wheeler	Stores	14 11 1		14 11 1	
McLean Bros and Rigg	Carriage on iron	15 9 4		15 9 4	
Penfold & Co	Stationery	4 10 6		4 10 6	
Permewan, Wright & Co	Freight, &c	2 14 7		2 14 7	
Risby & Co	Timber	49 2 5		49 2 5	
Robertson, Norton & Co	Law costs	7 2 6		7 2 6	
Travis & Co	Stores	7 16 0		7 16 0	
Webster, W.	Horse hire	1 10 0		1 10 0	
Young, F E	Salary, Assistant Secretary	11 3 4		11 3 4	
York, C. W	Hire of pump and piping	2 0 0		2 0 0	
Union Bank	Loan and interest to Feb 15, 1897	3,419 3 6		3,419 3 6	
		4,386 6 3	64 0 6	4,450 6 9	
Donaldson, John	Erection of fluming and extras				This contractor claims about £186, but as the work was never completed, the Trust is of opinion that the claim should not be recognised.

We hereby certify that the above is a correct statement of the Liabilities of the late Trust so far as can be gathered from the books and documents of the Trust

W G. WALKER, President.
JAMES NEWTON, Hon Secretary.

Sydney William Applegate Gullick, Government Printer, 1897

1897.

LEGISLATIVE ASSEMBLY.

NEW SOUTH WALES.

PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS.

THIRD REPORT

TOGETHER WITH

MINUTES OF EVIDENCE AND APPENDICES

RELATING TO THE

PROPOSED SEWERAGE WORKS FOR PARRAMATTA.

Presented to Parliament in accordance with the provisions of the Public Works Act, 51 Vic. No. 37.

Printed under No. 3 *Report from Printing Committee,* 13 *May,* 1897.

SYDNEY: WILLIAM APPLEGATE GULLICK, GOVERNMENT PRINTER.

1897.

[3*s.* 6*d.*] *24—*a*

MEMBERS OF THE COMMITTEE.

LEGISLATIVE COUNCIL.

The Honorable Frederick Thomas Humphery, Vice-Chairman.
The Honorable James Hoskins.
The Honorable Charles James Roberts, C.M.G.
The Honorable William Joseph Trickett.
The Honorable Daniel O'Connor.

LEGISLATIVE ASSEMBLY.

Thomas Thomson Ewing, Esquire, Chairman.
Henry Clarke, Esquire.
Charles Alfred Lee, Esquire.
John Lionel Fegan, Esquire.
Thomas Henry Hassall, Esquire.
George Black, Esquire.
Francis Augustus Wright, Esquire.
Frank Farnell, Esquire.

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To Evidence of E. J. Love.—Addenda to Evidence by Mr. Love ..... A

PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS.

SEWERAGE WORKS FOR PARRAMATTA.

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, the Public Works Act Amendment Act of 1889, 52 Vic. No. 26, and the Public Works (Committees' Remuneration) Act of 1889, 53 Vic. No. 11, to whom was referred the duty of considering and reporting upon "the expediency of constructing Sewerage Works for the town of Parramatta," have, after due inquiry, resolved that it is expedient the proposed works should be carried out "at a cost not exceeding the Departmental estimate, but subject to a guarantee (by the Municipal Council of Parramatta) of the annual payment required to cover maintenance and interest, and redemption of the principal outlay"; 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:—

INQUIRIES BY PREVIOUS COMMITTEES.

1. The present is the third inquiry made by the Public Works Committee respecting sewerage works for Parramatta, and generally the proposal is the same as those which were previously considered. The chief difference is to be found in a more economical arrangement of the sewers, and a consequent reduction in the estimated cost. In the first instance of the proposal being dealt with—in 1892—the Committee recommended that the sewage of the town should be treated at Clay Cliff Creek, by a system of precipitation and filtration or other effective modern process; and, in the second—in 1894—consequent upon it being shown in the evidence that the municipality was unable to bear the cost, it was decided by the Committee that it was not expedient that the works as proposed should be carried out.

THE SCHEME AS ORIGINALLY PROPOSED.

2. These works, as originally designed and placed before the Committee in 1892 and 1894, were intended ultimately to drain an area of 1,383 acres, 803½ of which are on the north side and 579½ on the south side of the Parramatta River, but practically only 929 acres, 421 on the north side and 508 on the south side of the river, were provided for. From the main outfall sewer, calculated to discharge the sewage of the prospective population of Parramatta upon the area of 1,383 acres, there extended four branch sewers, south-eastern and south-western, north-eastern and north-western. The south-eastern, 60 chains long, left the main sewer at Harris-street, and extended generally in a south-westerly direction along Harris-street, Hassall-street, Wigram-street, Kendall-street, Station street, and Junction-street, to Sydney Road. The south-western branch, 51·15 chains in length, extended from the main sewer at the intersection of Smith-street with Phillip-street, along Phillip-street and Marsden-street to Aird-street.

The

The north-eastern left the main sewer at the same point as the north-western branch, and ran easterly along Pennant-street to Elizabeth-street, a distance of 12 chains; thence along Brickfield-street, a continuation of Elizabeth-street to Albert-street, a further distance of 28 chains. The north-western branch, leaving the main sewer at its northern end, ran westerly along Pennant-street to O'Connell-street, and thence generally northerly along O'Connell-street, Grose-street, Fleet-street, and New-street to its termination at Dunlop-street. The length of this branch was 78·1 chains. In addition to the north-eastern branch sewer proposed in the scheme as it was placed before the Committee, it was intended to provide a junction in the main channel at Harris-street, for a future branch which was to cross the river at Harris-street bridge, and drain an area of 382½ acres on the north-eastern portion of the town. The main outfall sewer commenced at Pennant-street, on the north side of the Parramatta River, and passing along Sorrell-street, crossed the river into Smith-street, by way of which street it proceeded to Phillip-street, and then along Phillip-street to Charles-street, down Charles-street to George-street, and thence along George-street to a point at Clay Cliff Creek, near the tramway, where a pumping station was to be erected. This outfall sewer at the pumping station was oval in shape, 4 ft. x 2 ft. 8 in. in size, internally, and built of brick and concrete. From Harris-street to Smith-street the size of the sewer was reduced to 3 ft. 3 in. x 2 ft. 2 in. From Phillip-street there were 24 inches in diameter iron pipes; the gradient being 1 in 500 to 1 in 750. The total length of these sewers was 2 miles 69·25 chains, and the estimated cost £26,416. For the reticulation of the area drained there was provided 20 miles of 9-inch pipe sewers estimated to cost £20,000. The total lengths of sewers then proposed was therefore 22 miles 69¼ chains, and the estimated cost £46,416. The estimated total cost of the works was £75,926.

Four Schemes Prepared.

3. In 1895, in consequence of representations to the Minister for Public Works as to the condition of the Parramatta River in the vicinity of the town, further consideration was given to the subject by the Department, and four schemes, fully described in the evidence, were prepared, and afterwards submitted to the present Committee. They are—

1. A scheme based upon the partially-separate system, with sewage disposal at Clay Cliff Creek.
2. The same system, utilizing the sewage farm.
3. The separate system, with sewage disposal works at Clay Cliff Creek.
4. The separate system, with the sewage treated on the farm.

The Scheme now Proposed.

4. The scheme which the Department propose should be carried out is No. 2, the estimated cost of which is £60,000, and the annual liability in connection therewith £3,603. These amounts are explained as follows :—

Departmental Estimate of Scheme No. 2.

Partially Separate System with Sewage Farm.

Summary.

Sewers	£24,427
Ventilation	1,000
Building	1,152
Pumps, wells, and machinery, &c.	2,714
Destructor	664
Delivery main	4,200
Farm—effluent drains, carriers, and preparing land	2,746
Storm-water sewers	14,864
Amount spent on farm	6,931
Amount spent on surveys, fees, &c., in connection with former scheme	611
Interest accruing during the construction of the works, say	691
Total	£60,000

Annual Liability.

Annual instalment required to repay the debt of £60,000, principal and interest, in 100 years	£2,170
Working expenses, maintenance, and administration	1,433
Total	£,3603

The

The proposed scheme is based upon the partially-separate system, with a sewage farm on the site at the junction of Duck River with the Parramatta River, recommended in the previous inquiries. It is designed to drain 683 acres, but provision is made for extending the system into a sparsely populated area of 702 acres, as may be required.

The outfall sewer, commencing at the pumping station at Clay Cliff Creek, and terminating at the intersection of Harris and George Streets, has a grade of 1 in 306·7, is 16 inches diameter, and 44·4 chains long. From the intersection of Harris and George Streets there are two sewers, which may be designated the Harris Park and O'Connell-street sewers. The Harris Park sewer, which varies in size from 18 inches to 9 inches in diameter, commences at the intersection of Harris and George Streets, and passes along Harris-street, Wigram-street, Kendall-street, Station-street East, Parkes-street, Wentworth-street, Sydney Road, and Landsdown-street, where it branches into the reticulation pipes, being a length of 1 mile 10·40 chains of earthenware pipes. The O'Connell-street sewer, which is composed of 21-inch and 12-inch earthenware pipes, is 1 mile 13·1 chain long, and commences at the intersection of George and Harris Streets, and passes along George-street to its junction with O'Connell-street, along O'Connell-street to· $5\frac{1}{2}$ chains north of O'Connell-street bridge, at which point it turns into the Park and continues parallel to the existing sewer for 15·7 chains. The sewage from the area traversed by the Windsor Road is intercepted between Lennox Bridge and Pennant Hills Road by a 9-inch and 12-inch earthenware pipe sewer, which leaves the O'Connell-street sewer 1·1 chains north of the bridge, and crossing King's School Grounds, passes thence along Villier's and Market Streets, Windsor Road, Palmer and Sorrell Streets, being a total length of 39 chains.

The length of these sewers is 3 miles 26·90 chains, and the estimated cost £9,101; but as there are 12 miles 23·9 chains of reticulating sewers provided, estimated to cost £15,326, the total length of the sewers would be 15 miles 50·8 chains, and the estimated cost £24,427. It will be seen, therefore, that whereas in the present scheme the main sewers are 37·65 chains longer, the cost has been reduced by £17,315. This difference is due to the provision of overflows at Wentworth-street, Wigram-street, and Harris-street, whereby 1 inch out of every $1\frac{1}{2}$ inch of rainfall will be discharged into the river at these points. These overflows will only come into operation during heavy weather, when there will be a good flush in the river, and, therefore, it is contended that no harm can result from them.

The cost of the pumping station at Clay Cliff Creek is almost the same in this as in the previous scheme; but the pumping main to the sewage farm has been reduced from 21 to 16 inches, with a reduction in cost of £2,895.

A comparison of the estimated total cost of the original scheme—£75,926,—with the estimated cost of the present—£59,309—shows a difference of £16,617; but if the destructor and the additional stormwater channels, which were not included in the original scheme, were omittted from the present proposal, the difference would amount to £24,282. There has also been £1,000 included for ventilation of the sewers, which was not provided in the previous scheme.

The working expenses of the former proposal and of that before the present Committee are practically the same; but the revenue required for maintenance, interest, and repayments has been reduced from £4,268 to £3,603.

Indebtedness of Parramatta.

5. The question which the Committee have had to consider is one of considerable difficulty. That the Parramatta River in the vicinity of the town is in a very objectionable state, and that this condition is due to the discharge of drainage into the stream is undeniable, and it is equally certain that something should be done to remove or abate the nuisance. But the Committee find that the Municipality is very heavily in debt, and that it is doubtful whether the ratepayers are prepared to pay for a comprehensive system of sewerage. From a return supplied to the Committee by the Department of Public Works, it will be seen that

that, including £23,903 expended on storm-water sewers, the resumption of the sewage farm site, and on drainage (charged to the Council by the Government, but so far remaining a book entry merely), the indebtedness of the Borough amounts to £80,503, which, in proportion to the population, compares unfavourably with the indebtedness of other municipalities in the Colony. The debt which the Borough Council appears to recognise is £56,600. On £42,000 of this amount 6 per cent. interest is paid, and on £14,600 5 per cent., the total sum for interest being £3,250. At present the municipal rates (general rate, 1s.; water-rate, 9d.; lighting-rate, 3d.) amount to 2s. in the £, in addition to which the ratepayers are charged 3d. per pan for each removal of nightsoil. This charge would, of course, merge in a sewerage rate when imposed. If the cost of the proposed sewerage system be added to the existing debt, the liabilities become £116,000; but £60,000 of this amount will be represented by the sewerage works.

The Necessary Annual Revenue.

6. The manner in which it is proposed the revenue required to meet the annual liability connected with the scheme shall be provided for is as follows :—

Assessed rate of 1s. in the £ on all lands and buildings (private) within the sewerage area—annual valuation, £52,831—say	£2,640
Public lands and buildings—annual valuation, £3,200	160
Government institutions, charge of 10s. per head on number of inmates—say, 1,580	790
Railway stations (2)—say	25
Total revenue	£3,615

Opinions of the Borough Council.

7. The Mayor of Parramatta states that the Borough Council are not likely to sanction, or the ratepayers to approve, of a rate higher than 9d. He asserts that the sewerage question has been forced upon them, through the nuisance created by the drainage from the Government institutions, and that if this drainage nuisance did not exist Parramatta could do without a sewerage system for the next twenty years; therefore, it is contended the Government should so contribute to the annual cost of the proposed system as to reduce the rate paid by the people to a sum fairly chargeable.

There are reasonable grounds for this contention. Some of the Government Institutions do create a nuisance in the river, and there are included in the estimated cost of the proposed sewerage system some charges to meet excessive expenditure in the past, respecting which the municipality may fairly complain. The amount of £6,391, representing a portion of the cost of the land to be used as the sewage farm, is greatly in excess of the actual value of the site, but it forms part of the total estimate, as does also a sum of nearly £15,000 for storm-water sewers constructed some years ago. These sewers appear to have been made at much unnecessary expense, and, like the cost of the farm site, the expenditure upon them unduly swells the total sewerage estimate.

Sources of River Contamination.

8. The pollution of the river arises from several sources. At the Government asylum near the old Queen's Wharf, there is a drainage discharge, and from the Benevolent Asylum another. A little above the Queen's Wharf a municipal drain comes in, and there is another opposite Harris-street. At Charles-street a pipe drains the Macquarie-street Asylum and the Public School. Just above the flood-gates, there is a drain which serves a considerable area of the town, and between that point and Church-street there are two or three other small discharges. At Church-street, on either side of the bridge, there are drains emptying into the river; and there is a sewer carrying the drainage from the Asylum for Lunatics, the Gaol, the Reformatory, and the King's School, which passes down the bed of the river and discharges just below the flood-gates. This sewer leaks in many places, and in addition to causing a nuisance in this respect, being raised above the river-bed, creates another by intercepting sewage—so that instead of passing away at once, it remains

remains exposed until the return of the tide. Rydalmere Asylum contributes to the flow of sewage into the river by means of a 12-inch pipe; and the discharge from the Sydney Meat-works, on the southern side of the river has a tendency, in the opinion of the President of the Board of Health, to contribute to the contamination. At low tide the bed of the river near the town lies almost bare of water, save in the deep holes, and the drainage deposits which the flow of the tide has not carried away are offensive to sight and smell.

Prior Expenditure.

9. Various methods for disposing of the drainage and cleansing the river have been tried in the past, and in connection therewith much ineffective expenditure on the part of the Government has taken place. In 1874, training-walls were erected in the river, and a drain cut from a point 50 yards below Lennox Bridge, to within 100 yards of the gas works, a distance of ½ a mile. The cost is not stated, but it must have been considerable. Eight years afterwards the top of the retaining-walls was taken down for 100 yards, and in 1894 the Parramatta Council were paid £300 to remove the material. In 1889, with the object of impounding the water at high tide, and sluicing the river when the tide turned, flood-gates, with a stone and concrete dam on either side, and training-walls for creating the necessary scour, were erected in the river, but the gates were so constructed that at first they could not be opened, and when this defect was to some extent remedied, it was found that they were unworkable without machinery, the cost of which—about £250—the Borough Council have not been disposed to incur. Consequently the flood-gates have never been properly used.

The Government Contribution to the Cost of the Scheme.

10. Part of the sum required to meet the annual cost of the sewerage scheme proposed must be defrayed by the Government, since the inmates of the asylums in Parramatta represent approximately a third of the population of the borough, and are responsible, to a large extent, for the nuisance in the river. The annual cost of the scheme being £3,600, the Government contribution should be £1,200, leaving £2,400 to be found by the Parramatta Council. It should not be necessary for this special Government contribution to be continued indefinitely. If the Macquarie and George street benevolent asylums should be removed, the number of asylum inmates near Parramatta will be reduced to about 1,500; but as this removal cannot take place for some little time, the payment of one-third of the annual cost might be undertaken for a fixed period of ten years. This, in the opinion of the Committee, should be done; and then, at the expiration of the ten years, a uniform rate could be struck to affect the asylum inmates in common with the townspeople, by which proceeding the Government would from that time be protected from what, through any reduction in the number of asylums in the town, might rightly be regarded as an overcharge. The Mayor expressed himself to the Committee as satisfied if the Government would pay on the basis of 3,000 asylum inmates for that period. If Rydalmere be brought into the scheme it may be done at a cost of £1,500, producing an estimated annual return of £263. In addition to the suggested concession that the Government pay one-third of the annual cost for ten years, the charge to the Parramatta Council on account of the sewage farm should not exceed the proportion of the total purchase cost represented by the area actually used for the sewage of the borough, and the cost of raising that portion of the land above high-water mark as proposed. This will amount to about £7,000, which is the total cost stated of the whole resumed area up to date. Therefore, the sum of the Departmental estimates will not be appreciably altered. These matters should assist the Borough Council in deciding to accept the scheme, but, notwithstanding these concessions, it would be misleading to permit the ratepayers of Parramatta to enter into any guarantee upon the assumption that less than a shilling rate will be required.

Objections to the Sewage Farm.

11. Objections have been raised by the Mayor of Granville and by the managing director of the Stock-owners' Meat Company of New South Wales, and the manager of the Australian Kerosene Oil and Mineral Company, to the sewage farm. On behalf of the Borough Council of Granville, the Mayor protests against the establishment of the farm, on the grounds that the site is within the municipal boundaries of Granville, that the soil is unsuitable for the purposes intended, and that during the prevalence of north-east winds the farm would prove a great nuisance to residents of Granville. The objections on the part of the two companies arise from a fear that as the farm will be close to their works it will be offensive to the workmen—especially those residing near the works,—and, in the case of the meat company, detrimental to its business.

But though the land proposed for the sewage farm is, at present, in a very incomplete state, much of it being at high-tide under water, it is intended by deposits of silt or sand to raise the surface 5 feet above high-water mark, and then to divide the land into filter-beds and deal with the sewage as at Webb's Grant, Botany. It may here be stated that it is essential for the satisfactory filtration of the sewage that suitable sand, and not river silt, should be used above the high-water level. Carelessly attended to a sewage farm may prove a nuisance, but properly managed it need not be objectionable. As to the fear that its proximity to the Meat Company's Works may prove injurious to the Company's business, the President of the Board of Health considers there is no ground for apprehension that the farm operations will affect the meat by a dissemination of either germs or offensive odours.

A Modified Plan of dealing with the Nuisance.

12. If the guarantee required in the resolution passed by the Committee be not forthcoming a scheme which will mitigate to an appreciable extent the nuisance in the river, and yet cost very little, has been suggested. The pipe, which at present conducts the drainage from the asylum for lunatics, the Gaol, and King's School, along the bed of the river, should be removed, and another laid down on the southern bank of the river to intercept the drainage which now flows through the existing pipe, and to pick up the drainage from the town on the southern side of the river, conducting both into the channel between the concrete training-walls below the flood-gates. On the northern riverside there should be a pipe to catch and carry away the discharge from the storm-water channel, which in that locality is not yet completed. The defective sewer in the river-bed should be taken up in order to prevent the interception and leakage of sewage which occurs at low tide. If the flood-gates were closed at high tide an area of river-bed, which now for a considerable time lies bare, would remain covered with water, and by opening the gates as the tide recedes a current would pass down between the concrete walls at the rate of fully 6 miles an hour carrying with it to open water the drainage which had flowed from the pipes into the stream. This current would gradually decrease in rapidity, ceasing to operate as a means of conducting the sewage at a distance of about 30 chains from the flood-gates, but its flow, and the method recommended of using the gates, would have two important results. Instead of the river-bed above the flood-gates lying bare for a considerable part of the day, between the tides, it would be exposed for only a very short period each day, and while no sewage or drainage would enter the river above the flood-gates, the drainage, where it did flow into the stream, could be subjected twice a day to a current which would carry away the nuisance some distance below the town, where it would be diluted sufficiently to make it inoffensive. If this method were adopted, Parramatta would be, with regard to sewerage, no worse off than any other town of similar size, and would be able, before entering into a more expensive scheme, to await developments, either in respect of an increase of population or of practical science in the disposal and treatment of sewage. The modified scheme suggested could be carried out, the evidence shows, for from £2,000 to £3,000. It should, however, be borne in mind that the £23,000 which forms a portion of the Departmental scheme, and is included in the estimated

estimated cost of £60,000, will be increased by any sum so expended. It has been suggested, as an alternative to the above scheme, that the Government should intercept and treat the sewage from the Government asylums, and leave the Council to deal with the nuisance that may be contributed by the borough.

Possible Important Developments in Sewage Treatment.

13. With regard to developments in the methods adopted for dealing with sewage, experiments are now being made by sanitary engineers in England which may change the elaborate and expensive systems at present in use for one both simple and cheap. This new plan, reference to which may be found in the evidence of the President of the Board of Health, the Government Analyst, and the Engineer for Sewerage Construction, is the alternate treatment of sewage by different micro-organisms, the process being based upon the principle that fæcal matter, when deposited upon the soil, is rapidly disintegrated by the action of such organisms, and it is carried out by conveying the sewage into tanks, and then introducing into the tanks the microbes necessary to produce the desired results.

Parramatta and Contiguous Municipalities.

14. In relation to the sewerage requirements of Parramatta, a comprehensive scheme embracing other municipalities contiguous to that borough suggests itself as possible, but it cannot at present be recommended because of the sparseness of population over the area which these municipalities comprise. This scheme proposes to convey the drainage of Parramatta, and of Granville, Auburn, Rookwood, Ermington, and Rydalmere, to which may be added portions of Concord, Strathfield, Dundas, Prospect, and Sherwood, by means of one pumping station on to one sewage farm, the situation of the farm to be vacant and isolated land obtainable on the point at Homebush Bay. A scheme of this nature might not only lessen the expense to the boroughs individually, but would certainly reduce the possibility in the future of nuisance or inconvenience from having within a comparatively limited area a number of different sites for sewage disposal.

Parramatta Water Supply.

15. As the question of water supply is closely associated with that of sewerage, attention was given during the course of this inquiry to the water supply of Parramatta. Much information was elicited; but it is important in relation to the proposed sewerage scheme only so far as its adequacy, or otherwise, for meeting sewerage requirements, and its bearing upon the subject of rates paid, or which may have to be paid by the townspeople. The water supply is a limited one obtained from a catchment area unprotected from contamination, and it is not sufficient to provide what is wanted by the residents and what would be required to flush the sewers. The dam which impounds the present supply might be raised at a cost of £1,700, so as to increase its impounding capacity by apparently one-half.

The water may be made unobjectionable for household consumption by care in keeping the impounding reservoir free from contamination, and by a judicious extension of the present system of filter-beds.

Resolution passed by the Committee.

16. The resolution passed by the Committee is shown in the following extracts from their Minutes of Proceedings :—

WEDNESDAY, 31 *MARCH*, 1897.

Mr. Humphery moved,—

"That in the opinion of the Committee it is expedient the proposed sewerage works for Parramatta, as referred to the Committee by the Legislative Assembly, be carried out, at a cost not exceeding the Departmental estimate, but subject to a guarantee (by the Municipal Council of Parramatta) of the annual payment required to cover maintenance and interest, and redemption of the principal outlay," was resumed.

Mr. Fegan seconded the motion.

Mr. Lee moved,—

"That the motion be amended by the insertion of the word 'not' between the words 'is' and 'expedient' and the omission of all the words after the word 'out.'"

The Committee divided upon the question,—

"That the motion as moved by Mr. Humphery be passed," with the following result:—

Ayes, 7.	Noes, 6.
Mr. Humphery,	Mr. Ewing,
Mr. Trickett,	Mr. Hoskins,
Mr. Roberts,	Mr. Lee,
Mr. O'Connor,	Mr. Clarke,
Mr. Wright,	Mr. Hassall,
Mr. Fegan,	Mr. Farnell.
Mr. Black.	

The motion was therefore passed.

THOS. EWING,
Chairman.

Office of the Parliamentary Standing Committee on Public Works,
Sydney, 13th April, 1897.

PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS.

MINUTES OF EVIDENCE.

SEWERAGE WORKS FOR PARRAMATTA.

[*THIRD REFERENCE.*]

THURSDAY, 11 *FEBRUARY*, 1897.

Present:—

THOMAS THOMSON EWING, Esq. (Chairman).

The Hon. Frederick Thomas Humphery.	Henry Clarke, Esq.
The Hon. James Hoskins.	Charles Alfred Lee, Esq.
The Hon. Charles James Roberts, C.M.G.	John Lionel Fegan, Esq.
The Hon. William Joseph Trickett.	Thomas Henry Hassall, Esq.
The Hon. Daniel O'Connor.	George Black, Esq.

Frank Farnell, Esq.

The Committee proceeded to consider the proposed Sewerage Works for Parramatta.

Cecil West Darley, Acting Under Secretary, Department of Public Works, sworn, and examined:—

1. *Chairman.*] Do you produce a statement in reference to the proposed Sewerage Works for Parramatta? Yes. It is a statement giving a history of the proposed scheme up to the present time:— C. W. Darley. 11 Feb., 1897.

Department of Public Works, Sydney, 4 February, 1897.

Minute Paper.—Parramatta Sewerage.

On the 22nd June, 1892, the question of providing sewerage works for Parramatta came before the Public Works Committee for consideration, and after examining a number of witnesses they decided, on the following motion, to recommend that the work should not be carried out (*see* Report, dated 4th October, 1892):—"That this Committee is of opinion it is not expedient to carry out the proposed Sewerage Works for Parramatta, as referred to the Committee by the Legislative Assembly, for the reason that, in the opinion of the Committee, the sewage farm is too small for the purpose, and that the sewage should be dealt with at the pumping-station at Clay Cliff Creek by a system of precipitation and filtration, or other effective modern process."

When the report of the Committee was presented to the House, Mr. Hickson, feeling that the Committee had laboured under some misapprehension as to the capacity of the proposed filtration area at Duck River, wrote a reply, going into the whole question of sewage disposal very fully; and the Minister decided, in view thereof, to refer the matter to a board of experts, consisting of Messrs. W. W. Wardell, C. N. Bell, and G. Chamier. These engineers, after having reviewed the whole of the evidence and visited the town of Parramatta, came to the conclusion that, subject to a suggestion which they made for excluding the rain-water, their "judgment and experience confirmed the recommendations of the Department; and supported as we are by the opinion of those who are accepted as the best authorities in Europe on this branch of science, we have no hesitation in advising that, with the modifications mentioned, they should be adopted." (*See* Report, dated 28th July, 1893.)

Some months after the receipt of this report the question was again referred by the Legislative Assembly to the Public Works Committee, and it came before them for consideration on the 7th February, 1894. It would appear, from the report of the Committee, dated the 22nd March, 1894, that they were satisfied with the proposal from an engineering point of view; but that, on account of the Mayor of the Municipality giving evidence to the effect that the district would be unable to bear the cost of the work, the Committee again decided that, in their opinion, "it is not expedient that the proposed Sewerage Works for Parramatta, as referred to the Committee by the Legislative Assembly, be carried out."

On 4th January, 1895, however, a large deputation waited upon the Minister, to represent the chronically bad sanitary condition of the Parramatta River in the vicinity of the town, and to suggest that temporary relief should be given by a small expenditure on the flood-gates, situated a little above the Harris-street bridge, and again that the whole question of a comprehensive system of sewerage should be considered, with a view of proposing, if possible, a cheaper, modified scheme. The Minister approved of these suggestions and another scheme was prepared.

The following is a copy of Mr. Hickson's minute on the subject:—"In accordance with the instructions conveyed in the Under Secretary's minute of 9/1/95, that the Minister wished to know whether, or to what extent, a modified scheme for the sewerage of Parramatta would be effective, I have to report that the matter has been very fully gone into and estimates prepared for dealing with the sewage on the following lines:—

1.—A scheme based upon the partially-separate system, with sewage-disposal works at Clay Cliff Creek.
2.—The same system, utilising the sewage farm.
3.—The separate system, with sewage disposal works at Clay Cliff Creek.
4.—The separate system, with the sewage treated on the farm.

The estimated cost of scheme No.	1	is	£59,437
,, ,,	2	,,	59,309
,, ,,	3	,,	58,121
,, ,,	4	,,	57,993

C. W. Darley. 11 Feb., 1897.

"The annual cost of management and maintenance of sewers, &c., for the various schemes, is as follows :—

No. 1 Scheme.

Maintenance and interest	£2,152
Interest and repayment in sixty years at 3½ per cent.	2,377
Total	£4,529

No. 2 Scheme.

Maintenance and interest	£1,376
Interest and repayment, &c.	2,372
Total	£3,748

No. 3 Scheme.

Maintenance and interest	£2,152
Interest and repayment, &c.	2,325
Total	£4,477

No. 4 Scheme.

Maintenance and interest	£1,376
Interest and repayment, &c.	2,320
Total	£3,696

"If No. 1 scheme were carried out, it would be necessary to strike a rate of 13⅓d. in the £ on the ratable value of all properties affected by these sewers, and a rate of 6d. in the £ on the cost of properties outside the area served by the main sewers but within the watershed of the storm-water sewers. This would give an annual revenue of £4,536.

"For No. 2 scheme, it would be necessary to strike a rate of 10¾d. in the £ on the ratable value of all properties affected, &c. ; and a rate of 6d. in the £ on the cost of properties outside the area served, &c. Annual revenue, £3,785.

"For No. 3 scheme, it would be necessary to strike a rate of 13d. in the £ on the ratable value of all properties affected, &c. ; and a rate of 6d. in the £ on the cost of properties outside the area served, &c. Annual revenue, £4,426.

"For No. 4 scheme, it would be necessary to strike a rate of 10½d. in the £ on the ratable value of all properties affected, &c. ; and a rate of 6d. in the £ on the cost of properties outside the area served, &c. Annual revenue, £3,624.

"It will thus be seen that while the first cost of the four different schemes differs very slightly, the annual charge in connection with the farm scheme is very much lower than schemes dealing with the sewage at Clay Cliff Creek.

"In all schemes the cost of the garbage destructor is included, as that was a point specially raised by the Parramatta Council.

"I would suggest that the Parramatta Council be now asked to confer with me on this subject, when all the plans and estimates can be placed at their disposal, and the whole question of finances gone carefully into."

The Minister having approved of Mr. Hickson's suggestion, the Parramatta Council was communicated with, and eventually Mr. Davis waited upon them with full particulars, on the 3rd May, 1895.

On the 11th June, the following letter was received from the council, approving of scheme No. 2 :—

The Hon. the Minister for Public Works,—

Sir, Town Hall, Parramatta, 11 June, 1895.

Under the direction of His Worship the Mayor, I have the honor to forward herewith, copy of a resolution passed at a general meeting of the council held on 3rd June last, viz. :—

That the Mayor be hereby authorised to request the Hon. the Minister for Public Works to forward to the Public Works Committee for consideration and report the proposed sewerage scheme for Parramatta, as per plan No. 2 ; such scheme to be carried out, provided that a satisfactory agreement can be made between the council and the Government in reference to the assessed value of the Government properties ; and, also, when the works are completed, they be placed under the control of the council.

And to state that the works are not to be commenced until a satisfactory arrangement has been made with the Hon. the Minister for Works in reference to the assessed value of Government properties, and that the works when completed be handed over to this council.

In reference to the first portion of the proviso, the council thinks the assessed value insufficient, and trusts that you will consent to an increase upon the amount ; and the council presumes that an annual assessment will be made upon the Government properties, the same as upon all other properties within the borough.

And also that the latter portion of the proviso in the resolution will receive your favourable consideration.

I have, &c.,
S. WICKHAM,
Council Clerk.

They again wrote, on the 24th September, 1895, as follows :—

The Hon. the Minister for Public Works,—

Sir, Town Hall, Parramatta, 24 September, 1895.

Under the direction of His Worship the Mayor I have the honor to forward herewith a copy of a resolution passed at a general meeting of the Borough Council of Parramatta, held on the 23rd instant, viz. :—

That His Worship the Mayor cause a letter to be forwarded to the Hon. the Minister for Works, urging him to introduce the Bill for the carrying out of the sewerage works in the borough of Parramatta into Parliament.

At the same time to point out that the question of sewerage for Parramatta is a matter of great importance to the ratepayers, and one demanding immediate attention. Under these circumstances would request that you would kindly accede to the application, and cause the necessary steps to be taken to introduce the Bill.

I have, &c.,
S. WICKHAM,
Council Clerk.

Thereupon, in order that the financial aspect of the case might be more fully dealt with, the Minister instructed Mr. Johnston, of the Department of Public Works, to visit Parramatta and report.

The substance of Mr. Johnston's report is contained in the following extracts :—"The total cost of the proposed scheme, as submitted by the Engineer-in-Chief, and approved by the municipal council, is £59,309, to which must be added the interest accruing during the construction of the works, making a grand total of expenditure and interest of, say £60,000. This total includes the cost of the Clay Cliff Creek and Brickfield Creek stormwater channels when completed, but does not take into account the sum of £16,685 already spent on the main drain (leading from the hospital for the insane, the gaol, and girls' industrial school), and on the channel cut in the bed of the river.

Assuming that the scheme, if carried out, will be vested in and administered by the municipal council, and that the council will be granted the privilege of repaying the capital cost on the hundred (100) years system, with interest at the rate of of 3½ per cent. per annum, the total annual liabilities in connection with the scheme will be as follows, viz. :—

Annual instalment required to repay the debt of £60,000, principal and interest, in 100 years	£2,170
Working expenses, maintenance, and administration, as per Engineer-in-Chief's estimate	1,433
Total	£3,603

The

C. W. Darley.
11 Feb., 1897.

The annual revenue required to meet this liability would have to be provided for as follows:—

Assessed rate of 1s. in the £ on all lands and buildings (private) within the sewerage area—annual valuation, £52,831, say	£2,640
Public lands and buildings—annual valuation, £3,200	160
Government institutions, charge of 10s. per head on number of inmates, say, 1,580	790
Railway stations (2), say	25
Total revenue	£3,615

On the 30th June, 1896, hot, dry weather being again experienced, as in the previous year, and the nuisance arising from the Parramatta River again giving great trouble, another deputation waited upon the Minister, and he stated that "it seemed to him almost unnecessary, at least at the present stage, to find out whence the nuisance emanated. The question to decide was as to the best way of getting rid of the nuisance, and he thought there was no way but by adopting some proper system of sewerage.". The Minister added that the people would have to make up their minds to repay the Government the cost of the scheme. Parramatta seemed to be in a better position than any other town in New South Wales with respect to their waterworks, and he thought it would be a reasonable thing for them to treat the two services as one. If there were a profit on their water supply it would assist to pay their rates on the sewerage scheme. The reports before him showed that, on the rates for the twelve months ended 30th June, there was a profit on the water supply of Parramatta of not less than £1,784. He thought this could not be said of any other town in the country, and would again say that he thought the people of Parramatta should be prepared to treat the water and sewerage services as one, and be satisfied to pay the amount required on account of sewerage from the profit from the water supply.

On the 22nd June, 1896, the Council Clerk wrote, by direction of the Mayor, informing the Under Secretary that, after having Mr. Johnston's report under consideration at the council meeting, on the 15th June, the council were quite prepared to have the proposed sewerage scheme, No. 2, carried out, provided that an agreement could be made between the council and the Government, in accordance with their letter of the 11th June, 1895.

The proposed sewers gravitate to the pumping-station, and are as follows:—

Trunk Sewers.	Length. M. Chs.	Sizes.
Outfall sewer	44·4	16 in. pipe
George-street sewer	1 13·1	12 in. to 21 in.
Harris-street sewer	1 10·4	9 in. to 18 in.
Sorrell-street sewer	39·0	9 in. to 12 in.
Total length of trunk sewers	3 26·9	
Reticulation sewers	12 23·9	9 in. pipe

The proposed site of the pumping-station is situated at the corner of George and Arthur Streets, near the Clay Cliff Creek, when the sewage will be screened and then pumped through a 16 in. rising main to the sewage farm at the junction of the Parramatta and Duck Rivers.

The sewage will be treated in the filtration area in a similar way to the method in vogue at Botany.

The pumping-station comprises four centrifugal pumps, two tubular boilers, and a garbage destructor.

The pumps are to be so arranged that they can be worked either singly or together. Two pumps will be of sufficient capacity to deal with the maximum quantity of sewage from the present population, together with the rain-water it is intended to admit into the sewers.

The destructor, which is provided at the express wish of the council for treating the garbage, is designed to supply a portion of the heat to the boilers, which are 9 feet long by 4½ feet diameter.

The original scheme was estimated to cost £75,926, and that now recommended £59,309, or a difference of £16,617, but if the destructor and the additional storm-water channels which were not included in the original scheme were omitted from the present proposal, the difference would amount to £24,282.

2. You mention in your statement that a sum of £16,000 has already been spent on a large storm-water drain;—is that included in the total estimated cost of £60,000? Yes.

3. Where does it appear? It appears in Mr. Davis' detailed report, where there is an item of £14,684 for storm-water channels.

4. You think that is for the same work? Yes. Reference is made in Mr. Johnston's report to a sum of £16,685 already spent on a main drain leading from the hospital for the insane, the gaol, and girls' industrial school, and also on the channel cut into the bed of the river. That is a work which the present scheme, if carried out, will practically supersede, and the item should not be included in the new scheme. The expenditure was incurred in connection with the different asylums to give temporary relief.

5. With regard to the financial aspect of the matter, you mentioned a suggestion that was made that a surplus of £1,700 in connection with the water supply should be taken as part of the assets of the sewage scheme? In other words, that the two should be put together, and if there was a profit on the one it would relieve the loss on the other.

6. I did not hear that there was an approval of the Municipal Council at Parramatta with regard to that; the question appears to have been shelved when placed before them? It was a suggestion made by the Minister.

7. Did the council agree to it? I do not know that they agreed to it. If they did not, it would then be for the Government to take over both the water and sewerage works, and place them under the Metropolitan Board. They would properly come under the Board, being within the Metropolitan Water and Sewerage district.

8. You are not aware whether or not the council are agreeable to that course? I am not aware.

9. *Mr. Hoskins.*] The storm-water sewer to which reference has been made was constructed irrespective of any proposed system of sewerage for Parramatta;—it was to drain the water from the hills overlooking Parramatta? It is the Clay Cliff storm-water sewer. It will be required in connection with the scheme, and must eventually form portion of the permanent scheme.

10. Was not that storm-water sewer primarily constructed, in the same way as the storm-water sewers at Ashfield and other places, to drain off the water which, during heavy rains, rushes down the hills? As the name implies, it was constructed as a storm-water outlet, and it will be necessary in conjunction with any sewerage scheme that is carried out at Parramatta.

11. But the water conveyed by that storm-water sewer would be of no benefit to the Government asylums in cleansing them? It has nothing to do with that.

12. Then the storm-water sewer, or the water that comes down by that sewer, would not be of any utility or benefit to any proposed scheme of sewerage in Parramatta? Undoubtedly it would.

13. It what way? As a relief to the other sewers. The sewers of the town cannot possibly be made large enough to carry the stormwater. You must exclude the stormwater from the system. You must keep out the rainwater as much as possible. When heavy rain falls, in order to prevent the sewers from surcharging, you must at certain points find outlets, otherwise damage will be done, and you will have the sewers bursting up through the houses. This storm-water sewer is a necessary adjunct in connection with the general sewerage scheme.

14.

C. W. Darley. 11 Feb., 1897.

14. At the same time it was only intended originally to act in the same way as other storm-water sewers have done in different parts of the suburbs—not primarily to assist in the sewerage of Parramatta because it was constructed some time ago? The storm-water sewer already constructed will be a necessary adjunct to any scheme of sewerage to be carried out. I presume pressure was brought to bear on the Department to anticipate the sewerage scheme, and carry out the storm-water sewer in order to give local temporary relief.

15. Have the residents of Parramatta been required to pay any rate for the purpose of reimbursing the Government the interest paid on the money expended upon the construction of the sewer? Not yet.

16. Suppose it was not considered desirable to carry out the proposed scheme, or that from some cause or other Parramatta was not sewered, the storm-water sewer would still exist, and be primarily used for the purpose for which it was constructed? It would be used, and if the sewerage scheme were not carried out, or if the municipal council would not take it over, there would be nothing to prevent its being transfered under the Act, just as the other storm-water sewers have been, to the Board of Water Supply and Sewerage. The Minister could transfer it to the Metropolitan Board, who could strike a local rate, and collect the revenue.

17. Do you know of your own knowledge whether it is intended that if these sewerage works are carried out, the municipal council of Parramatta are to strike what they regard as a sufficient rate to pay for the maintenance of the work, and interest on the money expended on its construction, or whether it is to be left to the Board of Water Supply and Sewerage to strike a rate which the residents of Parramatta would have to pay in order to maintain the work and pay the interest on the money expended? As the proposal stands there has been no attempt to hand the work over to the Board. The council have expressed a wish to have it in their own hands, and I do not think the Minister has signified his intention not to give it to them.

18. During a previous inquiry by this Committee we were told by the Mayor of Parramatta that the rates already paid by the residents were much greater than they could bear, and that they could pay no more, and would not pay a rate of 11d. in the £ on the ratable value of their property for sewerage works; have you heard anything of that? No. They now write to the Government expressing their willingness to pay the rate. The letter which I read to the Committee in my statement was written only last year. The council have written requesting the Minister to take immediate steps to carry out the work.

19. But have they shown their capacity to pay the interest on the money which will be expended? I think Mr. Johnston can speak as to that, because he has gone into the question in his report.

20. Are you acquainted with Parramatta? Pretty well. I have not investigated the scheme; it has not come under my direct notice.

21. Having had charge of the sewerage work in the county of Cumberland, perhaps you know something of Parramatta;—do you happen to know whether it is not the case that the major portion of the Government institutions in Parramatta have a good system of drainage for their buildings? No, I cannot admit that they have a good system. They have a system, but the Government and the townspeople are all anxious to change it, and do away with the system now in vogue—that is, draining into the river. The townspeople are bringing a great deal of pressure to bear to induce the Government to discontinue that system, and the Government are likewise anxious to discontinue it.

22. Do you consider that a nuisance has arisen from the drainage of these institutions going into the river? There is no doubt a considerable amount of nuisance in the river, partly from the Government sewage, and partly from sewage coming from the town. Between the two the river is in a very foul state at times—in dry weather.

23. Are you aware that the Public Works Committee have recommended that the Government should find some other place in which to house the inmates of the charitable institutions at Parramatta, instead of leaving them where they are? Yes, I am aware of it.

24. Do you know whether any steps have been taken to carry out the recommendations of the Committee in that respect? I am not aware.

25. Suppose that one of the schemes, to which reference is made in Mr. Davis' report, were carried out—the precipitation works—would not all the liquids that passed through those works be emptied into the river, though the solids might be otherwise disposed of? Yes.

26. Would that be likely to cause any nuisance? No. After it is filtered and properly treated it does not cause much nuisance.

27. I know you have given great attention to these matters; which do you prefer for the disposal of the sewage at Parramatta—having regard to the fact that the country about there is very level, and that it is difficult to find drainage—precipitation works as suggested at Clay Cliff Creek, or the disposal of the sewage at what is termed the sewage farm at Duck Creek? I prefer the sewage farm at Duck Creek.

28. Have you seen the land acquired by the Government for the purpose of a sewage farm? I have.

29. Have you carefully inspected the nature of the soil, and do you think it would be a good soil to absorb sewage? The original intention was to make a surface there by reclaiming it with sand and by means of a sand-pump, in the same way that some of the other bays about the harbour have been reclaimed.

30. While Mr. Davis has made an estimate of the probable cost of carrying out the Parramatta sewage farm, he has made no estimate of the cost of depositing sand there for the purpose of absorbing the sewage—it was originally intended in the scheme to pump sand by means of sand dredges on to the farm? Yes, he has omitted the cost of that.

31. That would be a considerable item, would it not? It would be a large item.

32. Therefore that would largely increase the estimate of £59,000? If it were charged to this work. Hitherto, we have simply looked upon that as a means of getting rid of the silt that has necessarily to be raised from the harbour.

33. Would it not necessitate the towing of the amount of silt that would be raised by the dredges in the harbour a good many miles to take it up to the sewage farm? Assuming that it was brought up from the harbour, the towage would not be much longer from some parts of the harbour than is the case when the silt has to be towed out to sea. Just at the present moment we are not towing any silt to sea, because we are carrying out reclamation works at Roselle Bay. But that can only last a matter of so many months longer—say a year—when Roselle Bay will be fully reclaimed. Therefore we must find another site for depositing the silt on shore, if we do not tow it to sea. If it has to be taken away

away to be discharged at sea, it would be just as cheap to tow it up to Duck Creek and pump it on shore. I should explain that when this scheme was originally under consideration, a considerable amount of pressure was brought to bear to dredge and deepen and improve the Parramatta River. We had to look round at that time to get sites for depositing the material on shore, in order to save the great expense of towing it to sea—not only the expense of towing it to sea, but also the loss from broken time, arising from bad weather when we cannot get to sea. There are times when there is a heavy sea outside, and we cannot get out with tug punts, and the dredge has to lie idle. Since we have been pumping on shore, we have effected a very considerable saving in the dredging on that account. But the grounds we had available in Sydney are now nearly filled up, and we must go either to Homebush Bay or Duck Creek to deposit the silt next. C. W. Darley. 11 Feb., 1897.

34. What is the distance between Homebush Bay and Duck Creek? About 2 or 3 miles. We finished the retaining-walls at Duck Creek before we commenced Homebush Bay.

35. You have not finished Homebush Bay? We are not putting any silt there now, because they are receiving it at Roselle Bay.

36. I understand you to say that for some time past you have not been taking the silt out to sea, but have been using it to reclaim the foreshores in some parts of the harbour? To reclaim land. We treat it as a matter of dredging—to get rid of the dredging. We are not charging the Lands Department, who take charge of this land, with the cost of pumping the silt ashore. We are using the ground as a means of getting rid of our silt, and we hand it over to the Lands Department afterwards.

37. Are there not a number of places—bays and inlets in the harbour—where land has been purchased and which has become settled, in which silt raised by the dredges could be more economically deposited than by taking it all the way to Duck Creek? I do not know of any such places at present ready to receive it. We have no bays ready to receive silt now, other than the ones we are working at.

38. How far is it from Dawes Point to Duck Creek, where you propose to deposit sand on the sewage farm? Ten and a half miles.

39. Would it not cost a great deal to take the sand up there and tow the empty punts back again? Not more than the cost of having to tow the silt 6 miles out to sea.

40. But in the latter case, you have barges from which you discharge the silt into the sea, while in the case of Duck Creek you have to deposit it on the land for some distance and level it? We would tow it up to Duck Creek, and then we should have to pump it ashore.

41. At all events, I suppose you will admit, whether or not it is desirable to deposit the silt dredged from the bottom of the harbour at Duck Creek, if the silt is deposited there—the land being very inferior as an absorbent of sewage—the taking of the sand up there in punts or dredges would largely increase the cost of utilising the sewage farm? If you added the cost of dredging, of course it would very largely increase it.

42. Are you familiar with the working of sewage farms generally? Pretty well.

43. How does the sewage farm at Botany answer;—it is not self-supporting, is it? No.

44. There is a considerable deficiency resulting from the operations of that farm? Yes; it is only looked upon as a means of getting rid of the sewage, not as a means of profit.

45. Have there not been complaints from persons in the locality that noxious fumes arise from that farm? There are complaints. People residing 100 miles away, if they noticed a bad smell, would complain, though probably it might come from their own backyard. There has been no room for complaint whatever.

46. And the work is still going on? Yes.

47. I suppose you will admit that the sandy and loamy mixed soil at Botany is very much superior as a material for absorbing sewage, and therefore causes less offensive smells from the spreading of the sewage over it, than is the land acquired by the Government at Duck Creek for a sewage farm? From what I know of the land at Duck Creek, it would not be suitable unless it was topped over with sand.

48. And would it not also require subsoil drainage? Yes; it would require preparation by drainage.

49. Is that provided for in the estimate? Yes.

50. Looking at the fact that the soil at Duck Creek is not very well adapted for the absorption of sewage, and also that the country is very level about there, do you not think that the residents of Granville and the persons living in the township across the river, which is very narrow at that point, would complain of the nuisance created by the establishment of a sewage farm at the spot proposed? I do not think there would be any room for complaint. It must be borne in mind that the solid portion of the sewage, which is really the offensive portion, is to be treated at Clay Cliff by separators and destructors. Only the water would be carried to the sewage farm, and very little smell would arise from the water after precipitation.

51. But at Botany the solids are spread upon the land? That is where the smell comes from. The solid portion is carried across a bridge in an open truck, and after being deposited on the surface it is picked up and carted about. That is how the smell, if any, arises. It is not proposed to do anything of that kind in this scheme. Mr. Davis proposes to separate the solids at the Clay Cliff pumping-station, and only to pass the water on to the sewage farm.

52. What is proposed to be done with the solid matter? To burn it in a garbage destructor.

53. Have experiments made either at the Meat Preserving Co.'s works or at other places shown that the solids of sewage can be effectually disposed of by these destructors without creating a nuisance? It has been done successfully in many places.

54. Where? In England and on the Continent.

55. Do you not think that the utilisation of the piece of land at Duck Creek, which you admit is not very suitable for the disposal of sewage, might lead to actions at law against the Government by adjacent municipalities for the creation of a nuisance? I do not think so. You cannot trace any nuisance from a simple filtration of the water on the surface. There is really not much smell or nuisance arising from that.

56. I am proceeding on the hypothesis that it has not been proved, at all events in New South Wales, that these destructors can dispose of the solids of sewage without creating an offensive smell in the locality—has that been proved? Not in New South Wales. There has been nothing of the kind done here yet. But it has been done in other countries. I think Mr. Davis will be able to give you information on that point.

57. At all events you will admit that the disposal of the solids of sewage at Parramatta by the means proposed would be an experiment as far as this Colony is concerned? It would be a new thing in the Colony, but it has passed the experimental stage in other countries.

Joseph

Joseph Davis, Engineer for Sewerage Construction, Department of Public Works, sworn, and examined:—

J. Davis. 58. *Chairman.*] What are you? Engineer for Sewerage Construction.

11 Feb., 1897. 59. Has the printed statement which has been placed before the Committee been prepared by you? Yes, it is my report, and there is also a supplementary report.

60. Do you desire to give it in as evidence? Yes.

61. It is really the Department's statement of the case? Yes.

62. *Mr. Lee.*] Are you the author of the scheme? I modified the original scheme, and this is the result of my work. I will read the report as follows:—

Department of Public Works, Roads and Bridges and Sewerage Branch,
Sydney, 26 March, 1895.

MINUTE PAPER.—PARRAMATTA SEWERAGE.

FOR the information of the Engineer-in-Chief, in accordance with the Minister's instruction, I have the honor to report that I have carefully considered the question of the Parramatta Sewerage, with a view of devising a scheme which would be less costly than the one submitted to the Parliamentary Standing Committee on Public Works, and at the same time be efficient and meet the present requirements of the municipality.

The necessity for the construction of efficient sewerage works has been admitted, and urged frequently by the council and the residents of the town. There is no need, therefore, for submitting any lengthy observations on the unsanitary state of many parts of the municipality, or to show that the only means by which the evils that inevitably follow such a condition of things can only be permanently remedied by the adoption of a proper drainage system.

SCHEMES.

In order that a cheap and comprehensive scheme might be adopted, I have prepared estimates for dealing with the sewage by the following methods:—

1. A scheme based upon the partially separate system with sewage disposal works at Clay Cliff Creek.
2. The same system with the sewage farm.
3. The separate system with sewage disposal works at Clay Cliff Creek.
4. The separate system with the sewage treated on the farm.

SURVEYS AND PLANS.

So that the schemes might be submitted in a complete form, and in order to prevent any inaccuracy in the estimates, it has been found necessary to do a large amount of survey work, and to prepare the following drawings to illustrate the different proposals, viz.:—

1. Ten chain plan of Parramatta, showing lines of sewers for partially separate system, and the separate system with disposal works at Clay Cliff Creek.
2. Same with pumping-station at Clay Cliff Creek and sewage farm at Duck River.
3. Four chain plan of Parramatta showing lines of sewers and drainage areas.
4. Two chain plan showing pumping-station at Clay Cliff Creek, the sewage farm at Duck River, and connecting pipe line.

5–13 (inclusive). Longitudinal sections showing invert levels of sewers.

14. Disposal works at Clay Cliff Creek.—Plans and elevations on ¼-in. scale, of boilers, garbage and sludge destructors, settling tanks, filter beds and sludge presses.
15. The same.
16. Disposal works at Clay Cliff Creek.—Elevations of buildings on ¼-in. scale. Pumping-station at Clay Cliff Creek.
17. Plans and elevations on ¼-in. scale of boilers, engines, centrifugal pumps, garbage destructors, and outside elevations of buildings.

DRAINAGE AREA.

The area of the Municipality which is built upon sufficiently to warrant the sewerage being extended into it, is shown in yellow on the plans which accompany this report, and amounts to 683 acres. This area includes the Gaol, Asylum for Insane, Girls' Reformatory, and the Macquarie and George Streets Asylums.

An area of 702 acres, which is so sparsely populated that the sewerage will not be required for the present, is shown in brown; reserves and waste lands amounting to 415 acres making up the balance of the municipality (1,800 acres) are coloured green.

POPULATION.

The estimate of the population given below, of the area (683 acres) in which it is proposed to construct sewers, is based partly upon the last census returns, and partly upon the number of persons per house, estimated by the Government Statistician at 4·88 (p. 745 "Wealth and Progress of New South Wales for 1893").

Gore Ward.		
Number of houses within area—162 at 4·88		791
Marsden Ward.		
Population by census for 1891 (the whole populated area to be drained)		2,200
Anderson Ward.		
Population by census for 1891	3,023	
Less 19 houses at 4·88	93	
		2,930
Forrest Ward.		
Population by census for 1891	1,700	
Less 79 houses at 4·88	386	
		1,314
Government Institutions.		
Marsden Ward District Hospital		12
Anderson Ward Benevolent Asylum, George-street		1,020
" " Macquarie-street		335
Forrest Ward.		
St. Joseph's Hospital		16
Hospital for Insane		1,000
Industrial School		147
Gaol		400
Total estimated population in 683 acres		10,165

GARBAGE DESTRUCTOR.

At the request of the Parramatta Council a garbage destructor has been included in the design of each of the four schemes. The destructor has four cells, and is designed for the most part on the lines of the "Fryer" and "Horsfell." The cells are arranged in two pairs, separated by a passage, above which passes a common or main flue. Each cell may be described as a chamber 9 ft. long by 7 ft. high by 5 ft. wide, divided crosswise by a fire bridge. The fire bars are placed on a steep incline, upon the upper end of which the garbage descends through a self-closing hopper. As the garbage

J. Davis. 11 Feb., 1897.

garbage dries, it slides down or is raked into the furnace below the fire bridge. A forced draught is provided by means of three steam ejectors to each cell, which draw air from the outfall sewer. This has the effect of ventilating the sewers and destroying any disease germs which the sewer air may contain. The roof of the cell consists of a firebrick arch, which is perforated to allow the heated gases to pass into the flue. The main flue is considerably deepened beyond the furnace, to form a chamber for the destruction of infected mattresses and bedding. This chamber at the same time forms a receptacle for the deposit of dust, which might otherwise create a nuisance. A small furnace has been provided in the side of the mattress chamber, which can be started at any time should the temperature in the furnace fall too low, through the dampness of the garbage or from other causes, to consume the noxious gases which are given off from the refuse when it is first shot into the furnace. It will be observed, however, that with ordinary care this furnace is not likely to be brought into use, as the gases have to pass through the perforations in the arch of the furnace into the highly-heated flue above before they reach this main flue. The heated gases, after traversing the boiler flues, are discharged into the stack which is 101 ft. high. The boilers are provided with fire grates, so that they can be worked independently or in conjunction with the destructors.

Of the total amount of steam generated by the heat from the destructor, 25 per cent. will be required for working the ejectors. The balance of the heat will be available for producing steam for driving the machinery.

In schemes Nos. 2 and 4, where there will be no sludge cake to burn in the destructor, the surplus heat will materially assist in generating steam for lifting the sewage from the pump-well to the farm.

In schemes Nos. 1 and 3, where considerable heat will be required for burning the sludge cake, there will not be the same quantity of surplus power.

The amount of garbage to be disposed of will probably be about 7 tons per day, to which must be added the probable quantity of sludge cake to be burnt (about 5 tons). In schemes Nos. 1 and 3 the cells have a capacity of 6 tons per 24 hours; so that two of the four cells will have to be kept constantly at work.

The cost of the destructors, apart from the sewage disposal works, will be about £682; but the extra accommodation required in the building, and the additional size of the chimney must be taken into account. This will bring the cost up to about £1,414.

Sewage.

The quantity of sewage per head is calculated on the same lines as the original scheme at 40 gallons per diem for a population at the rate of thirty-five persons to the acre. The sewers are intended to remove half this quantity in six hours.

Rainfall.

As in the former scheme, a rainfall of 1½ in. per twenty-four hours, and a catchment area of 200 square feet per head, of a prospective population of thirty-five persons to the acre, is provided for.

The sewers in schemes Nos. 1 and 3 are sufficiently large to discharge the rainfall on this basis when the several drainage areas dealt with are occupied with the prospective populations. Storm-water overflows have, however, been provided in the Harris Park sewer at Wentworth-street, Wigram-street, and Harris-street to admit of 1 in. of rainfall to pass off into the Clay Cliff Creek Channel at the first two streets and into the river by means of a pipe-sewer at Harris-street, leaving the balance (½ in.) to go to the pumping-station to be pumped with the sewage.

Overflows have also been provided at the head of the O'Connell-street sewer, and at Market-street, in the Sorrell-street intercepting sewer.

Scheme No. 1.—Partially Separate System with Precipitating and Filtration Works at Clay Cliff Creek.

Outfall Sewer.

The Outfall sewer, commencing at the pumping-station at Clay Cliff Creek and terminating at the intersection of Harris and George Streets, has a grade of 1 in 306·7, is 16 in. diameter, 44·4 chains long, and is capable of discharging the maximum sewage and rainfall from the area drained, including the northern side of the river.

Main Sewers.

From the intersection of Harris and George Streets there are two sewers, which may be designated the Harris Park and O'Connell-street Sewers.

Harris Park Sewer.

The Harris Park Sewer, which varies in size from 18 in. to 9 in. in diameter, commences at the intersection of Harris and George Streets, and passes along Harris-street, Wigram-street, Kendal-street, Station-street East, Parkes-street, Wentworth-street, Sydney Road, and Landsdown-street, where it branches into the reticulation pipes, being a length of 1 mile 10·40 chains of earthenware pipes.

O'Connell-street Sewer.

The O'Connell-street sewer, which is composed of 21-in. and 12-in. earthenware pipes, is 1 mile 13·1 chains long, and commences at the intersection of George and Harris Streets, and passes along George-street to its junction with O'Connell-street, along O'Connell-street to 5½ chains north of O'Connell-street bridge, at which point it turns into the Park and continues parallel to the existing sewer for 15·7 chains, where it terminates for the present—a short distance north of the Domain Road.

Sorrell-street Intercepting Sewer.

It is proposed to intercept the sewage from the area traversed by the Windsor Road, between Lennox Bridge and Pennant Hill Road, by a 9-in. and 12-in. earthenware pipe sewer, leaving the O'Connell-street sewer 1·1 chain north of the bridge, and crossing King's School grounds, and thence along Villiers and Market Streets, Windsor-road, Palmer and Sorrell Streets, being a total length of 39 chains.

Reticulating Sewers.

A total length of 12 miles 23·6 chains of reticulating sewers has been included in the estimate. These are shown on the plan in blue lines, and are all that will be required to fully sewer the districts dealt with.

FRIDAY,

FRIDAY, 12 *FEBRUARY*, 1897.

Present:—

THOMAS THOMSON EWING, Esq. (Chairman).

The Hon. Frederick Thomas Humphery.	Henry Clarke, Esq.
The Hon. James Hoskins.	Charles Alfred Lee, Esq.
The Hon. Charles James Roberts, C.M.G.	John Lionel Fegan, Esq.
The Hon. William Joseph Trickett.	Thomas Henry Hassall, Esq.
The Hon. Daniel O'Connor.	George Black, Esq.

Frank Farnell, Esq.

The Committee further considered the proposed Sewerage Works for Parramatta.

Joseph Davis, Engineer for Sewerage Construction, Department of Public Works, sworn, and further examined:—

J. Davis. 12 Feb., 1897.

63. *Chairman.*] Since yesterday, you have had a map prepared showing how the population of Parramatta is located? Yes. The portion which it is proposed to drain is shown in red, blue, and yellow, the thickly populated areas being shown in red, the moderately populated areas in blue, and the thinly populated areas in yellow.

64. Will you continue your statement from the point where you left off yesterday? The statement goes on to say:—

Intercepting of Sewage from Lunatic Asylum, &c.

The existing drain, which conveys the sewage from the Gaol, Lunatic Asylum, and Girls' Reformatory will be intercepted at the termination of the O'Connell-street sewer. Nearly the whole of the rainwater and the liquid sewage from the Government institutions mentioned above are carried off by the present sewer.

As only a small quantity of the rainwater can be admitted into the proposed system, the question had to be considered, which would be the better course—

First—To exclude a portion of the rainwater from the existing sewer, and construct new drains to convey it direct into the river; or

Second—To continue the new sewer beyond its proposed termination into the institutions, and lay a new set of drains, using the existing sewer for stormwater only.

With a view to seeing which of these two modes would be cheapest and best, levels have been taken of all the drains and other sanitary arrangements at the institutions.

After an examination and careful consideration, I am of opinion that it will be the cheapest plan to adopt the first course.

I have accordingly provided for the intercepting of the existing sewer at the point before mentioned.

Overflow Chambers.

The overflow chambers at Wentworth, Wigram, Market, Harris, and O'Connell Streets will be so constructed that only the 40 gallons of sewage and ½-in. rainfall will pass into the sewers below. The balance will pass over the weirs into the storm-water overflow pipes.

Sewage Disposal Works at Clay Cliff Creek.

Site. About 2 acres of land, bordered by George, Hassall, and Arthur Streets, which was acquired in connection with the old men's asylum, has been placed at the disposal of the Department for the sewage treatment works or pumping-station, as the case may be. The land is suitable for the purpose, and will save the expense of resuming a site.

Outlet works. The outfall sewer discharges into a distributing-well, from which the sewage passes over horizontal screens which are situated between the distributing well and pump-wells. After the sewage has been screened, upon reaching the pump-well, the precipitant is added, which is thoroughly mixed with the sewage as it passes through the centrifugal pump on its way to the settling tanks.

The screening chamber and pump-well are in duplicate, and are controlled by penstocks; so that one screen may be used while the other is being cleaned.

The settling tanks, of which there are four, side by side, are designed on the continuous system. They are rectangular in plan, with segmental sides and bottom, and are each divided into three compartments by cross walls, which, being slightly lower than the outlet weir, allows the sewage to flow over from one compartment to another in a thin film. In addition to the cross walls, the tanks are fitted with wave and scum boards. By these means the forward movement of the sewage is sufficiently retarded to admit of the solid being deposited. The bottom of the tank, along which runs a semi-circular channel, is graded to a fall of 1 in 80 towards the pump wells, so that the sludge may be run off by gravitation into the sludge reservoir.

The sewage is raised from the pump well to distributing troughs, which are fitted with sluice boards, so arranged that the sewage enters the settling tank in an even sheet.

As the clarified sewage leaves the tank, it falls over a series of steps or cataract, which are designed to expose it to the air, to facilitate the absorption of oxygen. From thence it passes through filter beds formed of sand, polarite, and gravel, after which it is discharged in a purified state into Clay Cliff Creek.

Settling tanks. The capacity of the tank is equal to 50 per cent. of the total dry weather flow, and it is intended that during periods of maximum flow sufficient tank accommodation shall be in use to admit of the sewage being two hours in its passage through the tank, that being the time it has been found by experience it will take for the deposition of solids.

After the tank has been in use for two or three days, it will require to be cleansed. To effect this, the sewage will be shut off, and the clarified sewage in the tank drawn off by a floating arm, so as not to disturb the sludge which has settled at the bottom of the tank.

After the water has been drawn off, the sludge flows into the reservoir which is situated at the end of the tanks next the pumps. When it has stood in the reservoir for some two hours, the fluid which rises to the surface is drained off into the pump-well, and the sludge is run off into the metal sludge vessels.

As the sludge is lifted from the vessels to the filter-presses, about 4 per cent of lime is mixed with it, to facilitate the pressing.

The pump wells will be provided with an overflow into the Clay Cliff Creek, so that in the event of more diluted sewage, during heavy rain, finding its way to the disposal works, it can overflow into the creek without doing any damage to the machinery.

Building. The building is designed in the conventional style, red dry pressed bricks being used throughout, relieved here and there by sandstone facing. The portion of the ground floor which accommodates the two tubular boilers and the destructor is 62 ft. x 45 ft. There is also on the ground floor, a machinery room 21·5 ft. x 15 ft., a mixing room 24 ft. x 15 ft., and a store 26 ft. x 15 ft.

Below the ground floor are the straining chambers, pump wells, two sludge vessels, and the air vessel.

On the upper floor there are two rooms, 62 ft. x 45 ft. respectively. The floor itself is built of concrete overlaid with 1½ in. of sand and paved with brick, the whole being supported by iron girders resting upon cast-iron columns. This floor is designed for use in connection with the destructor and filter presses. A hatchway in the floor gives access to the straining chambers below, through which the screens may be drawn up and the rubbish emptied into a trolly, which conveys it to the destructor.

Filter beds. The walls and floors of the five filters are formed of concrete, each filter being 50 ft. long, 24 feet wide, and 4·75 ft. deep. The filters, which are provided with the necessary inlet and outlet channels and sluice-gates, are constructed as shown on detail drawing.

A special feature of the filters, which have a sufficient area to make them capable of purifying the sewage of 10,000 persons, is the provision made for cleansing the sand from the solid particles of sewage which are arrested at the surface of the filter. J Davis. 12 Feb., 1897.

An iron trough runs lengthwise down the centre of each filter bed, having a slight fall towards, and being connected with the pump well. When a filter requires to be cleaned (say, No. 1), the effluent from the settling tanks is cut off and the filter allowed time to drain. The outlet valves from filters Nos. 1 and 2 are then closed and the sewage turned into filter No. 2. When the water has risen about 3 ft. above surface of filter No. 2, a valve is opened which connects the two filters at the bottom, the sewage then passes from filter No. 2 into filter No. 1. This has the effect of reversing the ordinary direction of the current in filter No. 1, and the water carries with it the particles of sewage which had collected in the upper stratum of sand, and these flow away through the iron trough referred to above. (*See* subsequent report attached).

There are two tubular boilers, 9 ft. long by 4½ ft. diameter, each capable of supplying the steam required to drive all the machinery. Machinery.

The sewage is raised by two centrifugal pumps, coupled direct to high pressure vertical engines.

The air compressor which provides power for raising and forcing the sludge from the vessels through the filter presses, is one of the horizontal, crank, and fly-wheel pattern, the steam cylinder being 8 in. diameter, and air cylinder 6 in. diameter, and stroke 7 in.

There is also a small high pressure vertical engine driving a grinding mill for the precipitant and automatic feeding and mixing machines, used to supply precipitants to the sewage.

Each of the two presses is composed of a series of forty-five vertical plates 42 in. square, resting by sidelugs on two horizontal tie-rods, on which they are free to slide. The rods are supported at each end on strong fixed frames. The movable end of the press is opened or closed by means of a screw. When the press is closed, it contains a series of vertical chambers with filter cloths on each side, giving to the chamber a filtering area equal to double the size of the plates. The sludge is forced from the sludge vessels by compressed air, through the centre of the fixed end, into these chambers, where the separation of the solid and the liquid takes place. The liquid, filtering through the cloth, runs down grooves in the plates, and out through openings at the lower edges. The pressure is kept on until the liquid ceases to run from these openings, when the chambers are full of sludge cake. There are filter presses at present being used at the Sugar Company's works similar to those it is proposed for Parramatta. Sludge presses.

65. *Mr. Humphery.*] What you have described is the ordinary process of precipitation and filtration, known as the International system? Precipitation and filtration are the same, whether the system is the International or not. The International is simply the precipitant and filtration agent—that is to say, the International means that ferezone is used for precipitating the sewage, and polarite for filtering the sewage.

66. Then you would call what you have just now described a system similar to the International system? Yes.

67. That is to say, the use of ferezone and polarite? It is not proposed to use ferezone.

68. It is the International system, except that you do not propose to use ferezone? Yes; it is too expensive.

69. *Chairman.*] In your opinion, does that materially affect the efficiency of the system? No. It makes no difference what precipitant is used; it is a question of cost.

70. Instead of using ferezone, you are using lime as a precipitant? Yes.

71. Otherwise, the whole description might be applicable to the International? Yes.

72. The only difference is that instead of using ferezone you use lime? That is the only difference. My statement continues as follows:—

Estimate of Scheme No. 1.

Scheme No. 1, including the amount spent or authorised to be spent on the storm-water channels, and the cost of the sewage farm, is estimated to be £59,437. (*See* Appendix A.)

73. Does the item of £14,864 represent the amount previously spent on storm-water sewers, to which Mr. Darley referred yesterday? Yes. Nearly the whole of it has been spent. You might say that £13,000 has been spent.

74. Does that item of £14,000 stand in place of the £16,000? The £16,000 has nothing whatever to do with the sewage of Parramatta. It has to do with the drainage of the Government asylums, and has been spent during a period of twenty years or so.

75. *Mr. Lee.*] Spent in the improvement of the river? It has been spent in bringing the sewage of the asylums to the river, and also along the river bed itself.

76. It has nothing to do with the storm-waters? It has nothing whatever to do with the Parramatta sewerage.

77. *Chairman.*] Then is it correct that the cost of carrying out the scheme now before the Committee will be £45,000 in addition to what has already been spent? The cost of the scheme I propose amounts to £59,309. That includes a sum of £14,864, the cost of the storm-water sewers, which has nearly all been spent, and a sum of £6,931 spent on the sewage farm.

78. Then of the sum of £59,000, the cost of the scheme now before the Committee, £20,000 in round figures has already been spent? Yes, £21,795.

79. Therefore the proposal now is to spend £38,000? That is correct.

80. The £21,000 already expended on works which legitimately form part of the sewerage scheme for Parramatta, includes £6,931 on the sewage farm, and £14,864 on the storm-water sewers at Clay Cliff Creek and Brickfield Creek? Yes.

81. The £16,000, which I understand the Department proposes to write off, has been expended on the sewer coloured black on the map, commencing at the lunatic asylum, running down through the reserve, across O'Connell-street, through the King's School grounds, and along the bed of the river to the flood-gates, immediately above Harris-street bridge? I do not know why that work should come in in connection with the present scheme, as it forms no part of it any more than does the lunatic asylum.

82. Then is this the position: that although a scheme at a cost of £16,000 was designed to deal with the sewage from the lunatic asylum to the west of Parramatta proper it has been a failure? No, I would not say that.

83. The Department is not going to continue to use it? Not the lower portion. We are going to make use of the upper portion. We are going to intercept it a little above King's School. This upper portion will be used for the storm-water and sewage from the asylums.

84. What proportion in regard to cost lies above the point of intersection? I could not say—probably half.

85. A very large proportion of the work will be discarded? No, I would not say that, because although the lower portion will not be used for sewage proper, it will be utilised for the storm-water from the institutions, which must be carried off into the river.

86. Then is this the position: that a portion of it will be useful, and will still be used with the present scheme, and also partly for carrying off overflow water, yet you are not going to charge the present scheme

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with any portion of the cost? I do not see that the scheme should be charged with any part of the cost for this reason, that the Government institutions are entitled to provide for their own drainage.

87. *Mr. Humphery.*] In the estimate of revenue you propose to charge the Government 10s. per head for the inmates of the charitable institutions? We propose to charge for removing the sewage, not the stormwater.

88. Who is bearing the charge at the present time? The Government institutions pay the Parramatta Council so much per pan, except, I think, in the case of the lunatic asylum, where they dispose of it themselves.

89. Who is bearing the charge for the interest on the £16,000 already expended in connection with the lunatic asylum? I presume it forms part of the cost of the asylum itself.

90. When was it expended? It has been expended at different times during the last twenty years.

91. When did the expenditure cease? The last portion of the work was carried out about five years ago, along the bed of the river, from the Lennox-street bridge to the flood-gate.

92. Was it included in the last proposal placed before the Public Works Committee? No. There was, I think, a little of it placed before the Committee—some £1,000 or so. But this was no part of the £16,000, but another item altogether.

93. It was not included in the £75,000 estimated cost of the proposal placed before the Public Works Committee in 1891? Not the £16,000, but a portion of the same work—a sum of £1,276.

94. How much of the £16,000 was comprised in the £75,000 estimated cost of the work placed before the Committee in 1891? None whatever. But there was another item—a sum of £1,276—included in the £75,000 for flood-gates, and other expenses connected therewith. That sum is not included in the £59,000.

95. *Mr. Hoskins.*] The £16,000 ought to be added to the cost of the present scheme? That was not my view, and, therefore, I did not include it.

96. *Mr. Humphery.*] You propose now to spend £59,000? Yes.

97. The former proposal was to spend £75,000? That is so.

98. How do you explain the difference in the two estimates? Under the present scheme there are not so many sewers, and the whole thing is carried out on a more economical scale.

99. *Chairman.*] Will you now resume your statement? Yes.

Annual Cost.

According to the letter attached, from the Council Clerk, Parramatta, the annual ratable value of property within the area served by the proposed sewers is £59,560. To this must be added the annual ratable value of the Government Institutions and property. It is difficult to say what this value should be; but if the valuation made by the Assessor to the Water and Sewerage Board, and given in evidence before the Public Works Committee, be taken, it would amount to £17,511. This would make the total annual value of the property liable to be rated, £77,071.

Annual charges.

The annual cost of management and maintenance of sewers and other works, including cost of treatment of the sewage at Clay Cliff Creek, is estimated (*see* Appendix B) to be £2,152.

The charges for interest and repayment on the outlay, if taken at 3½ per cent. and repayment at sixty years, will amount to £2,377 per year.

The annual charges will, therefore, be as follows:—

Maintenance, &c.	£2,152
Interest and repayment	2,377
Total annual charges	4,529

It must be borne in mind that while the sewers proper only at present serve the property in the area of 683 acres, the annual ratable value of which, exclusive of the Government Institutions, is £59,560, that the stormwater channels, upon which a sum of £14,864 has been, or will be, spent, serve the whole municipality, and that, therefore, the property not chargable for the construction of the sewers proper would be ratable for the sum spent on stormwater sewers.

Revenue.

The annual ratable value of the property not included in the 683 acres is £10,034. If a 6d. rate were levied for the stormwater channels on this amount, the revenue therefrom would amount to £252. This sum deducted from the total annual cost (£4,529) would leave £4,277 to be provided from the 683 acres.

13⅓d. in the £ on £77,071 would return £4,284, which would be sufficient together with the amount derived from the stormwater channels, to pay the total annual cost.

SCHEME No. 2.—THE PARTIALLY-SEPARATE SYSTEM, WITH THE SEWAGE FARM AT DUCK RIVER.

The only difference between schemes Nos. 1 and 2 is in the means by which the sewage is disposed of. The description given of the works above the pumping-station at Clay Cliff Creek in scheme No. 1 will, therefore, apply to scheme No. 2.

Pump-house.

In the pump-house, which it is proposed to erect on the same site as the sewage disposal works in scheme No. 1, accommodation has been provided for four centrifugal pumps, two tubular boilers, and the garbage destructor.

Pumps.

It is proposed to have four centrifugal pumps in pairs, two of which working at the same time will be capable of raising the maximum quantity of sewage, together with as much rainfall as it is intended to admit, to the highest part of the farm. The suction and delivery pipes of the pumps are fitted with valves so that when a small quantity of the sewage only requires to be raised one pump will do the work, and when the maximum quantity requires to be raised, two pumps will be worked, the one discharging into the other.

By this arrangement the pairs of pumps will be in duplicate, so that should an accident happen, or repairs be required to one pair, the other pair will be available.

Should the two pumps be found at any time to be inadequate, however, then a third pump can be worked in conjunction with the other two.

The difference between the level of the water in the pump-well and the farm, together with the friction, gives a maximum head of 25 ft., and the maximum quantity to be pumped is 1,200 gallons per minute.

The advisability of adopting the centrifugal pumps rather than a Worthington, or pumps of that type, has been very carefully considered. The Worthington, no doubt, would give higher duty than those proposed, but this, where so small an amount of power is expended, is not worth taking into consideration. The lift is so small compared with the quantity of sewage to be raised that it would be necessary to have a pump specially made, stock sizes not being suitable. In the case of the centrifugal pumps, the sizes required are kept in stock, or are obtainable at short notice, and, not having to be specially made, the four centrifugal pumps would cost less than two suitable Worthingtons.

Overflow.

Provision has been made, as in scheme No. 1, for an overflow from the pump-wells to the Clay Cliff Creek.

Delivery main.

The cast-iron delivery main, which will extend from the pumping-station along the tramway avenue to the north-west corner of the sewage farm, is 16 in. in diameter and 7,352 ft. long.

Farm.

At the termination of the delivery main it is proposed to have a small well, from which a semicircular carrier 24 in. in diameter will run in a south-easterly direction for 891 ft., conveying the sewage to the centre of the farm. From this point two carriers will run parallel with each other, on each side of a 20-ft. roadway, down the centre of the farm to near Duck River. The sewage will pass down these carriers, which will be composed of split 16-in. earthenware pipes, on

to the eighteen beds it is proposed to form with sand on the land resumed for the sewage farm. The details of these beds and the general arrangements for turning the sewage in the required direction, and the amount of filling to be done, are shown on the plans of the farm. J. Davis. 12 Feb., 1897.

Scheme No. 2, including the amount spent or authorised to be spent on storm-water channels, the cost of the farm, and the sum expended on the farm, but not including the cost of filling at farm, is estimated to cost £59,309. (*See* Appendix C.) Estimate.

The annual cost of management and maintenance is estimated to be £1,433. (*See* Appendix D.) Annual cost.

The charges for interest and repayment on the outlay at 3½ per cent., and repayment at sixty years, will amount to £2,372 per year.

The annual charges in this case, therefore, will be— Annual charges

Maintenance, &c.	£1,433 10 6
Interest and repayment	2,372 0 0
Total annual charges	£3,805 10 6

(*See* subsequent report attached.)

If the same lines are followed in respect to the revenue as in scheme No. 1, the matter will stand thus :— Revenue

6d. in the £, derivable for storm-water channels, from £10,034	£252
10¾d. in the £, derivable from £77,071, the annual ratable value of the property on 683 ac.	3,533
Total revenue	£3,785

(*See* subsequent report attached.)

SCHEME NO. 3.—THE SEPARATE SYSTEM, WITH SEWAGE DISPOSAL WORKS AT CLAY CLIFF CREEK.

The description of the precipitation and filtration works given in scheme No. 1 applies in every respect to scheme No. 3, so that nothing further need be said under that head.

The cardinal difference between the separate and partially-separate systems consists in the rigid exclusion of all rain water from the sewers in the former. This enables the sewers to be very much reduced in size, as only 40 gallons of sewage per head of the population is provided for. But, inasmuch as the pipes are smaller in diameter, the grades are proportionally greater. This has the effect of very much increasing the depth of the sewers.

In the case of Parramatta, the facilities for overflows into the Clay Cliff Creek and river are so great that the advantage to be gained from the separate system in point of cost is not great.

The outfall sewer from Clay Cliff Creek to Harris-street is composed of 21-in. earthenware pipes. Sewers.

The Harris Park sewer varies in size from 9 in. to 16 in., and the O'Connell-street sewer from 12 in. to 16 in.

The reticulation sewers are 9 in. in diameter.

The whole of the sewers coincide as to position with those in the partially-separate system, the only difference being a slight reduction in the size of the trunk sewers.

Provision is made in the sewers for 40 gallons per head on a prospective population of thirty-five persons per acre, and for 13,000 persons at 40 gallons per head in the sewage disposal works, which are in all respects the same as those in scheme No. 1. Outfall works.

Scheme No. 3, including the amount spent or to be spent on storm-water channels, cost of the farm, and the sum expended on the farm, is estimated to cost £58,121. (*See* Appendix E.) Estimate.

The annual cost of management and maintenance, including the cost of treatment of the sewage at Clay Cliff Creek, is practically the same as in scheme No. 1, £2,152. (*See* Appendix B.) Annual charges.

The annual charges for interest and repayment on the outlay, at 3½ per cent. and repayment at sixty years, will amount to £2,325 per annum.

The annual charges will, therefore, be as follows :—

Maintenance, &c.	£2,152
Interest and repayment	2,325
Total annual charges	£4,477

If the same lines are followed in this instance in respect of the revenue as in schemes Nos. 1 and 2, the matter will stand thus :— Revenue

6d. in the £, derivable for storm-water sewers, from £10,034	£252
13d. in the £, derivable from £77,071, the annual ratable value of the property on 683 acres	4,174
Total revenue	£4,426

SCHEME NO. 4.—SEPARATE SYSTEM, WITH SEWAGE TREATED ON THE FARM.

The description of the sewers given in scheme No. 3 applies in this case, and that of the pumping-station delivery main and sewage farm in scheme No. 2.

It only, therefore, remains for the financial aspect of the scheme under review to be stated.

This scheme, including the amount spent or to be spent on storm-water channels, cost of farm, and the sum expended on the farm, but not including cost of filling at farm, is estimated to cost £57,993. (*See* Appendix F.) Estimate.

The annual cost of management and maintenance will be very much as in Scheme No. 2, £1,433. (*See* Appendix D) Annual charges.

The charges for interest, at 3½ per cent. and repayment at 60 years on outlay, will amount to £2,320 per year.

The annual charges in this case will be :—

Maintenance, &c.	£1,376
Interest and repayment	£2,320
Total annual charges	£3,696

Following on the same lines in respect to the revenue in this instance, as in the other three schemes, the matter will stand thus :—

6d. in the £ derivable for stormwater sewers from £10,034	£252
10½d. in the £ derivable from £77,071, the annual ratable value of property on 683 acres	£3,372
Total revenue	£3,624

Ventilation.

In the estimate I have included what, I believe, will be an ample sum for efficiently ventilating the sewers.

Sewage

J. Davis.

12 Feb., 1897.

Sewage Disposal.

If the question of sewage disposal is to be properly understood, it is important not to confound the purification of sewage with the utilisation of it.

Utilisation does include the purification of sewage; but it does not always follow that purification includes utilisation. Sewage may be said to be utilised when it is applied to land in the service of agriculture, so that the land will extract and utilise all, or nearly all the fertilising properties which it contains. When the system known as broad irrigation is adopted, this is effected.

Without under-rating the value and efficiency of other modes of dealing with sewage,—such as precipitation, filtration, or by the use of chemicals,—it is not too much to say that, under certain imperative conditions, the most effective and satisfactory means is that of passing it over and through land. Whether the sewage should be put on to the land in its crude state depends upon the amount of land available, compared with the quantity of sewage to be treated.

The adoption of the broad irrigation, while desirable, is not frequently possible, owing to the difficulty in obtaining land through its high price, or lack of a suitable site.

The system proposed in Schemes Nos. 2 and 4 is not broad irrigation, but intermittent downward filtration. In the case of broad irrigation, the usual practice is to allow from 100 to 200 persons to the acre, but in that of intermittent downward filtration it is still an open question what amount of sewage sand is capable of treating successfully per acre. At Botany farm, where this system is in vogue, sewage from 1,000 to the acre is being successfully treated. As the Parramatta farm will be under-drained and its efficiency thereby increased, there can be little doubt that it will purify far more than the Botany farm per acre.

The area of the farm it is proposed to utilise for the present (31 acres) is equal (based upon the present population of 10,000) to 322 persons to the acre, which is only about 25 per cent. of its capacity.

It is alleged that the treatment of sewage by chemicals does not purify, but only clarifies. It is also asserted that, while in some cases purification is effected, it is only of a temporary character, and the effluent, after a brief period, reverts to the same condition of impurity which it possessed before treatment.

There is no question that these allegations are true, under certain circumstances; but it must be remembered that it is proposed not only to chemically treat the sewage, but pass it through filters. Most certainly in the case of the international process when the clarified sewage is passed through polarite filter beds, the effluent, when it leaves the works, is in a high state of purification.

At Salford and other places, careful experiments have recently been conducted with polarite, the results of which were highly satisfactory.

It will, therefore, be fair to assume that the purification will be as permanent and thorough after the sewage has passed through the filter beds, as it will after passing through sand at the sewage farm.

Assuming this to be the case and all other things being equal, the matter resolves itself into one of cost.

The sewers are another subject, and will be discussed later.

Whether the separate or partially separate system is adopted does not effect the method of disposal.

By the international process the precipitating tanks and filter beds provide for the treatment of the dry weather flow. The small quantity of rain water which will be allowed to flow to the pump well will merely dilute the sewage, and the tanks and filters will be practically as capable of purifying the sewage when diluted with the small quantity of rain water as they will be when the sewage is undiluted. The sewers in the separate system will convey to the pump only the sewage, while those in the partially separate system, the sewage plus a small quantity of rain water.

In the same way the filtration areas at the farm will not materially be affected whether the separate or partially separate system be decided upon.

In coming to a conclusion as to the adoption of any system of precipitation and filtration process at Clay Cliff Creek, it should not be forgotten that some process may be invented for the treatment of sewage which may have the effect of making precipitation and filtration over filter beds obsolete. It is not at all improbable, satisfactory as the International process seems to be, that it will be superseded by some better and cheaper one. Parramatta would then find itself in a rather awkward position.

It is only in cases where land is not to be had, or it is too costly, that the precipitation and filtration works of the description shown in Schemes Nos. 1 and 3 are resorted to.

It is not anticipated that the annual charges in connection with the disposal works at Clay Cliff Creek will be reduced by the sale of pressed sludge.

The sludge cake is of low manurial value compared with manures of a more concentrated nature, and, should the farmers, therefore, not readily take it away, provision has been made for burning it in the destructor.

The difference in cost between the sewage farm and the precipitation and filtration works is as follows :—

Sewage Farm—Scheme No. 2.

Pumping Station, delivery main, carriers, preparing farm, raising banks round farm, and amount paid for land ... £59,309

Precipitation and Filtration Works—Scheme No. 1.

Sewage disposal works at Clay Cliff Creek and amount paid for land 59,437

Difference in favour of Scheme No. 2 ..... £128

It will be seen therefore that although the first cost of Scheme No. 2 is practically the same as Scheme No. 1, that the annual charges are considerably less in the former than the latter, and that consequently, whilst in the precipitation and filtration scheme the rate would be 13½d. in the £, the farm scheme would be 10¾d. in the £.

Exception might be taken to the amount spent on the farm being included in the estimate for Scheme No. 1, seeing that it would not be used. Even supposing this sum were deducted from the estimate, the rate would amount to 12½d. in the £, as against 10¾d. in the £ for the farm scheme.

SEWERS.

When the experts (Messrs. Wardell, Bell, & Chamier) reported on the former scheme, they strongly recommended the adoption of the separate system, and the Engineer-in-Chief, in his observations thereon, said that this system should receive due consideration. I have, therefore, prepared estimates of this method, so that it might be seen exactly what difference in the cost there would probably be if the separate system were carried out.

It is certainly a disadvantage not to be able to admit the drainage from paved yards and roofs, so that, unless it be on the ground of cost, the separate system cannot be recommended.

The facilities there are for providing overflows reduce the size of the pipes of the trunk sewer to such a degree that, compared with the separate system, the partially separate system will cost very little more.

In point of cost the matter stands thus :—

Sewers above pumping-station, not including storm-water channels, in partially separate system	£25,427
Sewers above pumping-station, not including storm-water channels, in separate system.....	24,111
Difference in value in favour of separate system	£1,316

This difference, in my judgment, is not sufficient to warrant the separate system being further considered.

SCHEME RECOMMENDED.

After carefully considering the four schemes I have come to the conclusion that No. 2 is by far the best, the most suitable for Parramatta, and from which the best results are likely to accrue, and, compared with scheme No. 1, the cheaper. I have therefore no hesitation in recommending it for the favourable consideration of the Engineer-in-Chief, with a view to its adoption.

The approximate cost, exclusive of storm-water channels, will be £42,420.

Comparison

J. Davis.
12 Feb., 1897.

Comparison of Former with Scheme (No. 2) Recommended.

Item.	Description of work.	Probable cost of former scheme. £ s. d.	Probable cost of present scheme recommended. £ s. d.
1	Sewers	47,856 0 0	24,427 0 0
2	Ventilation	.....	1,000 0 0
3	Land for farm	5,592 0 0	5,847 0 0
4	Spent on banks of farm	1,084 0 0	1,084 0 0
5	Preparing land, carriers, &c.	1,550 0 0	1,131 0 0
6	Effluent drains	.....	1,615 0 0
7	Pumping-station	3,525 0 0	3,116 0 0
8	Pumping-main	7,095 0 0	4,200 0 0
9	Storm-water channels	7,200 0 0	14,864 0 0
10	Survey, designs, fees, and sundries of first scheme	611 0 0	611 0 0
11	Drainage of public buildings	137 0 0	.....
12	Flood gates	1,276 0 0	.....
13	Destructor	.....	1,414 0 0
		75,926 0 0	59,309 0 0

The difference of cost between the two schemes, if these totals be taken, is £16,617. If, however, the storm-water channels, the destructor, &c., be left out of the question for the moment, and the items from No. 1 to No. 8, which comprise the two sewerage schemes, be compared, then there is a difference in favour of the scheme recommended of £24,282.

J. DAVIS, M. Inst. C.E.,
Principal Assistant Engineer for Country Towns Water Supply and Sewerage.

I wrote a supplementary report a day or two ago bringing the matter up to date, because since my first report developments have, to some extent, taken place in sanitary matters. The supplementary report is as follows:—

Department of Public Works, Sewerage Construction Branch,
Sydney, 8 February, 1897.

MINUTE PAPER.—PARRAMATTA SEWERAGE.

SINCE writing my report of March, 1895, very exhaustive and conclusive experiments of the filtration of sewage have been made at the London Outfall Works by Mr. Dibden, the chemist of the London County Council. It will be seen by reference to his report (a copy of which I append) that he has come to the conclusion that breeze-coke or sand—preference being given to the former—was equally as good a filtering agent as the proprietary material—polarite. He suggests—if a reduction of 75 per cent. in the oxidisable organic matter in solution in the sewage be a sufficient degree of purification—that an effluent, after passing through the settling-tanks, can be treated at the rate of a million gallons per acre per twenty-four hours. Applying this to Parramatta, where there are 400,000 gallons per twenty-four hours to be treated, the area required would be ·4 acre, or 17,424 square feet.

The International Company state that they can by the use of polarite as a filtering agent purify 1,000 gallons per square yard of filter, and this is in accord with their practice where they have adopted their system. Applying this again to Parramatta, the area of filter-bed necessary will be 3,600 square feet. To be, however, on the safe side, 6,000 square feet has been provided for in the estimates, and shown on the drawings. Should the precipitation and filtration scheme be adopted, and should it be found prudent to dispense with the polarite and adopt the data suggested by Mr. Dibden for the construction of the filter-beds, then inasmuch as £1,187 has been provided on the estimates for the cost of polarite, the larger filter could be substituted with sand and gravel in the place of polarite for the same money.

It is right, however, to say that the International system still holds its position in the front rank, and is still being largely used in England.

The estimate of the revenue derivable under Schedule No. 2, given in my report of the 26th March, 1895, will have to be slightly amended now that Mr. Johnson has made an examination of the Council's books, &c. The expenditure and revenue now stand as follows:—

	£ s. d.
Annual instalment required to repay the sum of £60,000, principal and interest, 3½ per cent., in 100 years, is	2,170 0 0
Working expenses, maintenance, and administration (*See* Appendix D)	1,433 0 0
Total required	3,603 0 0
Storm-water channel, 6d. in the £, derivable from £10,034	252 0 0
Private property served by the sewerage scheme, £52,831, at 11d.	2,421 8 5
Railway stations	25 0 0
Public buildings and land, £3,200, at 11d.	146 13 4
Government institutions, 1,580 inmates, at 10s. per head	790 0 0
Total estimated revenue	3,635 1 9
Present cost of pan system	1,598 14 4

J. DAVIS,
Engineer for Sewerage Construction.

Commissioner and Engineer-in-Chief for Roads, Bridges, and Sewerage.

The appendices to these reports are as follows:—

APPENDIX A.

ESTIMATE OF SCHEME NO. 1.

PARTIALLY Separate System with Filtration Works.

Summary.

Sewers	£24,427
Ventilation	1,000
Building	2,209
Wells, settling-tanks, filters, &c.	6,409
Machinery, pumps, &c.	2,322
Destructor (exclusive of building and chimney)	664
Storm-water sewers	14,864
Amount spent on farm	6,931
Amount spent on surveys, fees, &c., in connection with former scheme	611
	£59,437

Sewers.

J. Davis.

12 Feb., 1897.

Sewers.

Description of work.	
Outfall sewer	£1,630
Harris Park Sewer	2,248
O'Connell-street Sewer	3,292
Sorrell-street Intercepting Sewer	995
Reticulating sewers	13,933
Overflow sewers	108
	£22,206
Add 10 per cent. for contingencies, &c.	2,221
	£24,427

Building.

Description of work.	Unit.	Probable quantity.	Rate.	Amount.
				£ s. d.
Brickwork	cubic yard	472	25/-	590 0 0
Concrete in footings	cubic yard	232	28/-	324 16 0
Cement facing	square yd.	937	2/3	105 8 3
Excavation in foundations	cubic yard	114	2/-	11 8 0
Sandstone facings, &c.	cubic foot	2,165	3/-	324 15 0
Timber in roof	cubic foot	433	3/-	64 19 0
Cast-iron columns	cwt.	140	10/-	70 0 0
Rolled joists	cwt.	320	12/-	192 0 0
Tiling in roof	square	51½	50/-	128 15 0
Lead flashing	lb.	5,107	-/4	85 2 4
Windows and doors	.....	lump sum	.....	106 0 0
Tie-rods in roof	lb.	283	-/4	4 14 0
				2,007 17 7
Add for contingencies and supervision				201 2 5
Estimated cost of building				£2,209 0 0

Wells, Settling-tanks and Filters, &c.

Description of Work.	Unit.	Probable quantity.	Rate.	Amount.
				£ s. d.
Excavation	cubic yard	5,625	2/-	562 10 0
Refilling	cubic yard	1,080	-/6	27 0 0
Embankment in roadway	cubic yard	2,111	1/3	131 0 0
Sandstone ballast in roadway	cubic yard	400	4/-	80 0 0
Blue-metal ballast in roadway	cubic yard	65	11/-	35 15 0
Split fencing	cubic yard	184	16/-	147 4 0
Ordnance fencing	rod	36	14½-	25 0 0
Concrete in wells, tanks, filters, &c.	cubic yard	1,716	28/-	2,402 8 0
Cement facing in wells, tanks, filters, &c.	square yard	3,448	2/3	387 18 0
Brickwork in chimney	cubic yard	130	50/-	325 0 0
Fire brick in chimney	cubic yard	5	70/-	17 10 0
Effluent drain, 15-in. pipes, 7 chains, 10 ft. deep	.....	.....	.....	168 0 0
6-in. diameter stoneware pipes	lineal foot	270	1/-	13 10 0
4-in. diameter stoneware pipes (perforated)	lineal foot	2,760	-/6	69 0 0
Sandstone cover slabs in filter-beds	cubic foot	250	3/-	37 0 0
Cap of chimney (cast-iron)	cwt.	14	17/-	7 0 0
Cast-iron troughs in filter-beds	.....	.....	.....	70 0 0
Pea-gravel in filter-beds	cubic yard	100	5/-	25 0 0
Clean sand in filter-beds	cubic yard	436	4/-	87 4 0
Polarite in filter-beds	ton	250	95/-	1,187 10 0
				5,825 9 0
Add for contingencies and supervision				583 11 0
				£6,409 0 0

Machinery, Pumps, &c.

Description of Work.	£	s.	d.
Two boilers, complete	700	0	0
Two centrifugal pumps	200	0	0
Two filter-presses	240	0	0
Air compressors	100	0	0
Engine	50	0	0
Kirby's patent mixer	100	0	0
Lime-mixer	40	0	0
Disintegrator	50	0	0
9 in. sludge valve to sludge reservoir	7	0	0
Two 9 in. sludge valves	14	0	0
Two 6-in. sludge valves	8	0	0
Eighteen 3-in. valves	20	0	0
Two 18 in. penstocks	20	0	0
Eight sludge slides in tanks	16	0	0
Four sludge doors in tanks	16	0	0
Four floating arms and connections	60	0	0
Two strainers	80	0	0
Three reservoirs	135	0	0
One feed-pump	25	0	0
Steam trap	7	10	0
Hot-water trap	30	0	0
12-in. penstock	7	0	0
Two suction roses	7	0	0
Piping, complete	70	0	0
Thirty-eight 12-in. shutters	28	0	0
Shafting pulleys, &c.	30	0	0
Sundries	50	0	0
	2,110	10	0
Add for contingencies and supervision	211	10	0
	£2,322	0	0

Destructor.

Description of work.	Unit.	Probable quantity.	Rate.	Amount.		
				£	s.	d.
12 ejectors and steam fittings complete	each		£15	180	0	0
Brickwork	cubic yard	49	40s.	98	0	0
Firebricks	cubic yard	27	70s.	94	10	0
Firing-doors	cwt.	101	14s.	70	14	0
Ashpit doors	cwt.	66	14s.	46	4	0
Firebars	cwt.	155	10s.	75	10	0
Buckstays	cwt.	19	10s.	9	10	0
Tie-rods	cwt.	7	10s.	3	10	0
Hoppers	cwt.	14½	14s.	9	19	0
Shoots to mattress chamber	cwt.	5	14s.	3	10	0
Fume cremator	cwt.	7	14s.	4	18	0
Dampers	cwt.	10	14s.	7	0	0
				603	5	0
Add for contingencies and supervision				60	15	0
				£664	0	0

Storm-water Sewers.

AMOUNT spent and to be spent.

Description of Work	£	s.	d.
Clay Cliff Creek from Sydney-road to Station-street	4,599	18	4
Clay Cliff Creek from Station-street to beyond Harris-street	3,800	0	0
Brickfield Creek from River to Pennant-street	2,443	15	9
Brickfield Creek from Pennant street	4,020	0	0
Total	£14,863	14	1

Farm.

AMOUNT expended.	£	s.	d.
Land	5,847	11	1
Making banks	1,084	4	0
Total	£6,931	15	1

Amount spent in surveys, fees, &c., in connection with former scheme £610 18 9

APPENDIX B.

SCHEME No. 1.

ESTIMATE of Annual Working Expenses.

Two engineers @ 10s. = 20s. Two firemen @ 7s. = 14s. Four labourers @ 6s. = 24s. Three boys @ 3s. = 9s.	67s.	£1,222	15	0
Coal for pumping-engines, 8 cwt. ,, filter-presses, 8 ,,	16 cwt. per day @ 15s.	219	0	0
Oil, &c., @ 9d. per day		13	13	0
Precipitants		500	0	0
Maintenance of sewers @ 7s. per day		127	15	0
Repairs and renewals to machinery at 3 per cent. on total cost of £2,322		69	13	0
		£2,152	1	0

APPENDIX

J. Davis.
12 Feb., 1897.

APPENDIX C.

ESTIMATE OF SCHEME No. 2.

PARTIALLY Separate System with Sewage Farm.

Summary.

Sewers (Appendix A)	£24,427
Ventilation	1,000
Building	1,152
Pumps, wells, and machinery, &c.	2,714
Destructor (Appendix A)	664
Delivery main	4,200
Farm—effluent drains, carriers, and preparing land	2,746
Storm-water sewers (Appendix A)	14,864
Amount spent on farm	6,931
Amount spent on surveys, fees, &c., in connection with former scheme	611
	£59,309

Pumping-station Building.

Description of work.	Unit.	Probable quantity.	Rate.	Amount.
				£ s. d.
Excavation in foundations	.....	.....	.....	.....
Freestone facings	cubic foot	690	3/-	103 10 0
Freestone copings	cubic foot	696	3/-	104 8 0
Concrete in foundations	cubic yard	16	28/-	22 8 0
Concrete in floors	cubic yard	45	28/-	63 0 0
Brickwork	cubic yard	317	25/-	396 10 0
Cement facing in ceilings, &c.	square yard	140	2/3	15 15 0
Timber in joists, &c.	cubic foot	312	3/-	46 16 0
Timber in floor	cubic foot	245	3/-	36 15 0
Timber in steps	cubic foot	12	3/-	1 16 0
Rolled joists	ton	3	£12	36 0 0
Tie-rods in roof	lb.	.....	.....	3 0 0
Windows and doors	.....	.....	.....	80 0 0
Lead flashing	lb.	3,800	-/4	63 0 0
Tiling in roof	square	30	50/-	75 0 0
				1,047 18 0
Add for contingencies and supervision				104 2 0
				£1,152 0 0

Cement Works and Machinery.

Description of work.	Unit.	Probable quantity.	Rate.	Amount.
				£ s. d.
Excavation for pump well, strainers, &c.	cubic yard	410	2/-	41 0 0
Excavation for road formation	cubic yard	252	2/-	25 4 0
Refilling	cubic yard	22	-/6	0 11 0
Embankment in roadway	cubic yard	2,111	1/3	131 18 0
Ballast in roadway	cubic yard	400	4/-	80 0 0
Blue metal in roadway	cubic yard	65	11/-	35 15 0
Split fencing	rod	184	16/-	147 4 0
Ordnance fencing	rod	36	14/-	25 0 0
Concrete in outlet works	cubic yard	189	28/-	264 12 0
Cement facing in outlet works	square yard	120	2/3	13 10 0
Brickwork in chimney	cubic yard	130	50/-	325 0 0
Firebrick in chimney	cubic yard	5	70/-	17 10 0
Cap of stack	cwt.	14	10/.	7 0 0
Two boilers and setting complete	.....	.....	.....	700 0 0
Four cent. pumps complete	.....	.....	.....	400 0 0
Steam-trap	.....	.....	.....	7 10 0
Feed-pump	.....	.....	.....	25 0 0
Hot-water tank	.....	.....	.....	30 0 0
Two 18-in. penstocks	.....	.....	.....	20 0 0
Four suction roses	.....	.....	.....	14 0 0
Piping complete	.....	.....	.....	40 0 0
Sundries	.....	.....	.....	30 0 0
12-in. penstock at overflow	.....	.....	.....	7 0 0
Two screens complete	.....	.....	.....	80 0 0
				2,467 14 0
Add for contingencies and supervision				246 6 0
				£2,714 0 0

Sewage Farm.

Description of work.	
Carriers	£620
12-in. diameter effluent pipes	432
4-in. diameter perforated pipes	1,036
Earthwork distributing channels	65
Distributing wells	20
Outlet well	7
Sluice-gates	4
Flushing chambers	10
Embankment or dyke round farm	302
	2,496
Add 10 per cent. for contingencies, &c.	250
	£2,746
16-in. rising main ¾-in. metal—7,352 lineal feet, including laying and jointing	£4,200

APPENDIX D.

SCHEME No. 2.

Annual Working Expenses.

	£	s.	d.
Two engineers @ 10s. = 20s. Two firemen @ 7s. = 14s. } 46s.	839	0	0
Two labourers @ 6s. = 12s.			
One labourer for maintenance of sewers at 7s.	110	0	0
Coal, 10 cwt. per day at 15s. per ton	136	17	6
Oil, at 9d. per day	13	13	0
Two labourers for farm, at 6s. per day	219	0	0
Repairs and renewals to machinery at 3 per cent. on £1,353	40	0	0
Office administration, management, stationery, &c.	75	0	0
Total	£1,433	10	6

APPENDIX E.

ESTIMATE OF SCHEME No. 3.

SEPARATE System with Filtration Works.

Summary.

Sewers	£23,111
Ventilation	1,000
Building (Appendix A)	2,209
Wells, settling-tanks, filters, &c. (Appendix A)	6,409
Machinery, pumps, &c. (Appendix A)	2,322
Destructor, exclusive of building and chimney (Appendix A)	664
Storm-water sewers (Appendix A)	14,864
Amount spent on farm (Appendix A)	6,931
Amount spent on surveys, fees, &c., in connection with former scheme	611
	£58,121

Sewers.

Description of work.	
Outfall sewer	£1,680
Harris Park branch	1,705
O'Connell-street sewer	2,762
Sorrell-street intercepting sewer	931
Reticulation sewers	13,933
	21,011
Add 10 per cent. for contingencies, &c.	2,100
	£23,111

APPENDIX F.

ESTIMATE OF SCHEME No. 4.

SEPARATE System with Sewage Farm.

Summary.

Sewers (Appendix E)	£23,111
Ventilation	1,000
Building (Appendix C)	1,152
Pump wells and machinery, &c. (Appendix C)	2,714
Destructor (Appendix A)	664
Delivery main (Appendix C)	4,200
Farm, effluent drains, carriers, and preparing land (Appendix C)	2,746
Storm-water sewers (Appendix A)	14,864
Amount spent on farm (Appendix A)	6,931
Amount spent on surveys, fees, &c., in connection with former scheme	610
	£57,993

100. *Chairman.*] The intention of the Department, the Committee understand, is to place several feet of silt and sand over the present site of the sewage farm, which will then become the sewage farm itself? Yes.

101. The soil underneath is immaterial? Quite so. We shall bring the surface of the farm 5 feet above high-water mark.

102. Does the scheme then become a similar scheme, except on a smaller scale, to that at present in existence in the western suburbs? Yes.

J. Davis. 12 Feb., 1897.

103. Is there any point of difference? None whatever; except that in the case of the western suburbs the work is all done by gravitation, while here we shall have to pump at Clay Cliff Creek.
104. The Minister appears to have suggested to the Parramatta Municipal Council that as they have a very successful water supply scheme giving a profit of £1,700 a year, the water scheme and the sewage scheme might be placed together, and be regarded as one scheme;—have you heard anything of that? Yes.
105. Can you tell us anything definite about it? I know that the Parramatta Council were making a very large profit on their water supply.
106. Are they agreeable to pool it? That is another matter.
107 You do not know? I do not think they would be agreeable. I think there would be a difficulty, because they have borrowed money for a water supply, and before they could make one debt of it they would have to get the Government to lend them money under the Country Towns Water and Sewerage Act. The whole thing could then be brought under one debt. That is the only way it could be done.
108. In your estimate of revenue there is an item of £146, under the heading "Public Buildings and Land, £3,200 at 11d";—will you explain that? That is what is proposed to be charged for the public buildings and land not included in the following item of "Government Institutions."
109. You think that is a fair estimate, and that the Government would be prepared to pay the amount? Yes; I think the Government would be prepared to pay what is included in these proposals; that is to say, 11d. in the £ for any buildings, that could be paid for by rates, and 10s. per head in respect of the Government institutions, which it would be scarcely fair to rate in the ordinary way.
110. The other items are all correct, and the figures giving the estimated revenue and expenditure show a profit of £30 a year? Yes, on the ordinary revenue and expenditure.
111. If the Government institutions were removed from Parramatta there would be a deficit of £760? Yes.
112. And then if the annual profit of £1,700 on the water supply were worked in, there would be a net profit of about £800? Yes. They would be able to reduce the rates. Instead of charging 11d. in the £ to the people, as I propose, they would be able to come down to say 8d. in the £.
113. Is there a profit of £1,700 a year from the water supply? Yes.
114. Has that been for a number of years? I think so. I think that is the usual profit they make. In fact I believe that year they spent an unusual amount in extending the works—constructing filter-beds, and other things.
115. What do they do with the profit of £1,700 a year from the water supply? I understand they spend it on the roads, and use it on the borough for different purposes.
116. It is utilised for municipal works? I understand so.
117. How close is Parramatta to the water-pipe from the Prospect Reservoir? It is connected with it. The Council had to take their water from the Prospect Reservoir for four or five months during the dry weather of last year. They paid just what the Railway Commissioners pay—so much per 1,000 gallons.
118. Was that water put into the reservoir above Parramatta? They turned it into their mains. They had a meter, and they paid for what they got from the Prospect main.
119. And still they made a profit of £1,700? I do not know that they made so much profit that year. They would make nothing at all out of the water they got from the Water and Sewerage Board.
120. Is the present water supply of Parramatta a satisfactory one? No, it is not.
121. Suppose they abandoned the reservoir at North Rock, and utilised the Sydney supply, do you think there would then be a profit of £1,700 a year? The only thing they could then do would be to go to the Water and Sewerage Board or the Government, and say "Take any portion of our works which will suit you and supply the people of Parramatta with water in the same way that you supply the other suburbs of Sydney."
122. You think that the people of Parramatta should have a better water supply? I think that unless something is done in a very short time they must go to the Water and Sewerage Board and get a supply from the Prospect main.
123. Suppose the supply be obtained from the Prospect main, what profit would there then be on the water supply? There would be no profit whatever; the control of the water supply would pass out of the hands of the municipality.
124. *Mr. Humphery.*] Is the scheme that you propose a partially separate system or a wholly separate system, or what is called the combined system? It is a partially separate system.
125. Does that mean that the water from the roofs of the houses will go into the drains that will carry the slops? Yes; it provides for roof-water and polluted water from yards.
126. Precisely the same as the system adopted in connection with Webb's Grant? Yes.
127. With regard to the storm-water sewers, what will they carry? They will carry storm-water only.
128. Why do you propose to charge a rate of 6d. in the £ to the owners of property for simply carrying away the storm-water? To begin with, it is an advantage to the people of Parramatta to have the storm-water sewers to carry away the liquid sewage for the time being.
129. But you say that the sewers are for storm-water only? Yes; but the storm-water sewers are at present being used, not only to carry off the storm-water, but also to give a measure of relief to Parramatta in regard to the liquid sewage.
130. *Mr. Hoskins.*] Is not a rate charged for the use of storm-water sewers in the other suburbs? Wherever the sewerage system is not carried out, a storm-water rate is charged, and that is what is proposed at Parramatta.
131. *Mr. Humphery.*] But you say that these storm-water sewers will carry storm-water only? That is the case. Perhaps I ought to have qualified what I said in this way,—suppose a sewage scheme is extended into any area, then the storm-water sewers will only carry storm-water; but until that time they will be used for carrying away liquid sewage, as is done at present.
132. Do you propose that the rate of 6d. in the £ should be charged where the storm-water sewers carry storm-water only? No.
133. Is your calculation based upon the rate that will be paid by the owners of property connecting with the storm-water sewers, so that the slops will be carried away by the storm-water system? The 6d. in the £ is charged to property-owners where they get the accommodation of having the slops carried away.
134. Then your reply to my question is "yes"? Yes.

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135. There is a difference of £24,000 between the scheme placed before this Committee, and the scheme placed before the Public Works Committee of 1891, and rejected by them;—will this service be as efficient as the service proposed in 1891? Yes, so far as it goes. It does not cover the same area.
136. I am asking you if it will be as efficient for the service of the present residents of Parramatta? I think it will meet all the requirements of Parramatta.
137. It is your opinion that the scheme now proposed will fully meet the requirements of Parramatta? That is certainly my opinion.
138. And this scheme might have been proposed in 1891, and would have been equally as efficient then as now? I would not say "yes" to that, because things have progressed since then, and besides the cost of carrying out sewerage works is less now than it was at that time.
139. I am asking you, not about the cost, but about the scheme. Would the scheme now proposed have been equally efficient in 1891;—have any circumstances occurred to modify the scheme? None whatever.
140. *Mr. Hoskins.*] This proposed scheme of yours provides sewage for a much smaller number of people than did the original scheme? Yes.

WEDNESDAY, 17 FEBRUARY, 1897.

Present:—

THOMAS THOMSON EWING, Esq. (Chairman).

The Hon. Frederick Thomas Humphery.	Charles Alfred Lee, Esq.
The Hon. James Hoskins.	John Lionel Fegan, Esq.
The Hon. Charles James Roberts, C.M.G.	Thomas Henry Hassall, Esq.
The Hon. William Joseph Trickett.	George Black, Esq.
The Hon. Daniel O'Connor.	Francis Augustus Wright, Esq.
Henry Clarke, Esq.	Frank Farnell, Esq.

The Committee further considered the proposed Sewerage Works for Parramatta.

Joseph Davis, Engineer for Sewerage Construction, Department of Public Works, sworn, and further examined:—

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141. *Chairman.*] Have you any evidence to give in reference to information desired on the occasion when you were previously before the Committee? A question then arose as to the advantage which the existing sewer running from the lunatic asylum to the flood gates on the Parramatta River would be to the proposed scheme. I have gone into that matter, and I find that the only advantage would be to reduce the size of the pipe running from the intercepting point below the lunatic asylum to O'Connell-street bridge. That pipe, if the existing sewer were not there, would have to be 18 inches instead of 16 inches, and at the O'Connell-street bridge there would have to be an overflow instead of the existing sewer. The extra cost would be about £100.
142. Therefore, of the original cost of £16,000, only £100 ought to be charged to the new sewerage scheme? That is so. Another question arose as to what was meant by the item in my estimate of revenue of "Government institutions, 1,580 inmates at 10s. per head, £790." I find that this item includes the inmates of the hospital for the insane, the inmates of the gaol, of the girls' industrial school, and of the cottage homes. It does not include the inmates of George-street asylum and of Macquarie-street asylum. So that if these last two institutions are in existence at the time the scheme is carried out, that amount of £790 will have to be considerably augmented. In connection with the Government institutions of Parramatta, I have gone into the question of what it is costing the Government per head for emptying the pans under existing arrangements.
143. *Mr. Fegan.*] Is the use of pans adopted in all the Government institutions at Parramatta? The whole of them have pans, but the Hospital for the Insane makes its own arrangements. The others depend on the Council for emptying at 3d. per pan. That worked out comes to an annual cost per inmate of the institutions served in that way of 6s. 8d. The Government at the present time are paying 6s. 8d. per person for emptying the pans, and if the proposed scheme is carried out they will pay 10s. per head for the accommodation afforded to the Government institutions. That would include slops and everything.
144. *Mr. Roberts.*] Do you know the average total annual cost? The Government paid for the year ending September 30th, 1895, the sum of £632 17s. for the George-street asylum, the Macquarie-street asylum, the girls' industrial school, and the gaol. Then for the other public buildings they paid for the same period £61 0s. 9d. That is at the rate of 3d. per pan. I do not think it would be reasonable to assess the Government institutions on the basis of the ratable value of the property, seeing that the inmates are so thick on the ground, and the buildings are very old and dilapidated.
145. *Chairman.*] But there are other asylums and institutions under Government control in which there is a sewage charge? The whole of the properties in the metropolitan area are rated on the basis of 7d. in the £, except in regard to storm-waters, when it is sometimes a little less than that.
146. *Mr. Wright.*] Does Darlinghurst Gaol pay a sewage rate? I believe it does.
147. Could you find out for the Committee what is the population of Darlinghurst, and what is the amount of the rates paid annually? Yes. Another matter that arose at the last sitting was in reference to the cost of the proposed sewage farm. The amount already expended on the farm for land is £5,847. That is for the purchase of the site at the junction of Duck River and Parramatta River. There has also been spent on the training-banks £1,084, making a total of £6,931. It is estimated that the work of preparing the land will cost £1,131, and the effluent drains £1,615, making a total of £2,746 of proposed expenditure. In addition to that there is the filling-in of the farm. Evidence was given on this question by Mr. Portus when it was before the Committee in 1894. It was then estimated that it would take 600,000 tons of some kind of material to fill in the farm to the required level. The evidence of Mr. Portus on that point seems a little contradictory, but it would appear that he estimated that 150,000 tons of the material could be obtained near the site of the farm, and that it would cost 1¾d. to deposit this on the land. That would mean a sum of £1,093 15s. Then the 450,000 tons would have to be brought from some place either in the river or in the harbour where sand could be obtained. The cost of this he estimates at 6¼d. in one place and 7¼d. in another. If 6¼d. is taken as the cost the amount will be £11,718 15s., or a total of £12,812 10s. for the work of filling up. If 7¼d. is taken then the cost of filling up will be £14,687.

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148. *Mr Humphery.*] Is that item included in your total estimate of £59,000? No.
149. *Chairman.*] Ought it to be included? That is a question which was before the Committee previously, and it was then decided not to do so. Mr. Darley gave evidence on the subject.
150. If the estimate of Mr. Portus be correct, that it will cost £12,000 to put the stuff on the sewage farm in order to render the latter suitable for sewage operations, ought that sum to be added to the cost of the scheme? If it is a convenience to deposit dredged material on the site of the farm, then it should not be charged; but if that material is deposited for the express purpose of the farm, then, no doubt, it should be charged as part of the cost of the scheme.
151. If that were done, by how much would your estimate be increased? By £12,812, taking the cost of the material at 6¼d., and by £14,687 if the cost is taken at 7¼d.
152. *Mr. Humphery.*] The cost of filling in was not included in the estimate of £75,000 placed before the Committee in 1891? No, it was not.
153. In regard to the sum of £16,000 expended upon the sewerage connected with the lunatic asylum, you say that only £100 of that scheme could fairly be charged to the present proposal? That is so.
154. Are we to understand that if the present system of sewerage for the asylums did not exist you could connect the asylums with the proposed scheme at a cost of £100? No; that is scarcely the case.
155. Be good enough to explain in what way the £16,000 is apparently thrown away in connection with this scheme? The work upon which the £16,000 was expended comprised the drainage above the intercepting point, near the corner of Newth-street and Grove-street, and that portion of the £16,000 would certainly be required in any case for draining the institutions and bringing the drainage down to the intercepting point. Then, in addition to that, the drain below the intercepting point to the river would be required to some extent to carry off the storm-waters from the institution.
156. What would be the cost of providing the portion of the drainage in connection with the lunatic asylum which you say would be necessary, assuming that the expenditure of £16,000 had not been incurred? I should have to make an estimate of that.
157. I thought that that was what you intended doing? I understood the question was, supposing this sewer did not exist, then how much would be added to the proposed scheme, and that is the information I have obtained..
158. And you say only £100 would be added? Yes.
159. Then do you propose to charge 10s. a head, equivalent to £790 a year, for what you say would only cost £100 to provide—that is, to give them connection with your sewer? No. We take away the whole of the sewage from the four institutions—the girls' industrial school, the lunatic asylum, the gaol, and the cottage homes.
160. What I want to know is how much of the £16,000 already expended would it be necessary to expend for the purpose of connecting with the scheme now before the Committee—I mean approximately? I should say that from £1,500 to £2,000 ought to carry out all the drainage required for the institutions provided for in the scheme.
161. Then where has the other expenditure taken place which you say will no longer be of use? It is rather difficult to answer that question, because the expenditure has been going on, I understand, for twenty years. I could obtain the information by reference to the records of the Department.
162. You see this is the position: We are told that £16,000 has been expended, and we want to know how much of that has been expended upon work which cannot be used in connection with the present proposal? The evidence I gave with regard to it is that supposing the sewerage in connection with the lunatic asylum and the other institutions mentioned were not in existence, the cost of the scheme at present proposed, which I estimate at £59,000, would only be increased to the extent of about £100. And then the Government institutions could be provided with water closets and private drainage, in the same way as any other private property, for about £2,000.
163. For that £2,000 of expenditure in connection with the lunatic asylum and the other three institutions, you propose to charge £790 a year? £790 a year for the four institutions I have named.
164. In addition to the existing method of getting rid of the slops and solids and storm-waters, you provide a sewage farm at Duck River? Yes.
165. The whole of that sewage would be conveyed to the farm on Duck River? Yes.
166. The total cost of the proposal before the Committee is £59,000, and you say that there has already been an expenditure of about £21,000? Yes, about that.
167. Has any interest been obtained upon that expenditure up to the present time? No. It was proposed to vest the storm-water channels that have been carried out in the Water and Sewerage Board, and steps were taken to do that; but as the matter was continually under discussion, and was likely to come before this Committee again, nothing has been done finally in that respect.
168. Then, as a matter of fact, the £21,000 portion of the £59,000 has not been giving any return to the Government, and you propose now to obtain from the municipal council a return upon that £21,000 which will be included in the £59,000, to cover the cost of the proposal before the Committee? That is so; and I would put another aspect of the case before the Committee. Suppose the scheme is not carried out, the storm-water channels, no doubt, would be transferred to the Water and Sewerage Board, and we should get interest on the money expended upon those sewers amounting to £14,864; but we could get no return for the money expended on the farm amounting to £7,000.
169. We are to understand that the proposal now is to expend £38,000—that is your present proposal? Yes, that is correct.
170. In addition to that, if it should be found necessary to expend some £12,000 or £14,000 upon the sewage farm, do you propose to charge interest upon that expenditure? The view taken as to the filling up of the farm is the same as that taken when the question was before the Committee previously—that is to say, not to charge that expenditure.
171. Whose view do you say that was? There was a letter written, I believe, by the then Minister, Mr. Lyne, to the Committee, stating that it was not his intention to charge that.
172. Then the proposal is to give the municipal council of Parramatta the benefit of that expenditure without charge? Yes; for this reason: It was considered that it would be a convenience to the dredge branch to have the farm as a site upon which to deposit their dredged material.
173. But would not the filling up of the farm as proposed be worth, in connection with the scheme an additional £12,000 or £14,000? Yes.

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174. Whether you propose to charge for it or not, it will be worth that to the municipal council in connection with this proposed scheme? That is so. But you have to bear in mind the whole of the circumstances. That land was resumed years and years ago, and it was resumed at the time for the express purpose of making it a depôt for the dredges. It would not have been resumed then if it had not been so. The banks were provided for that purpose. The primary object of the resumption of the land was that it should be used as a depôt for the dredged material.
175. *Mr. Hoskins.*] Are you sure of that? I have not seen the papers for years, but I think they will bear out the view of the case I have just stated.
176. *Mr. Humphery.*] What particular dredging operations were in contemplation at the time of that resumption? The dredging of the Parramatta River. There was an agitation going on at the time, and it seemed to be likely that the work would be carried out.
177. Then your reply would only be pertinent as to the 150,000 tons of material, and not as to the 450,000 tons which you propose to bring from a considerable distance? That is so, except that if the sand can be obtained in the Parramatta River, then it will be got from there, and not brought from a distance.
178. What portion of the Parramatta River do you propose to dredge for the purpose of obtaining the sand? I am not in a position to answer that question, but I believe it is Mr. Darley's opinion that sand can be obtained somewhere near.
179. I think you said that the annual cost of the No. 2 scheme, which is now before the Committee, would be £1,433 10s. 6d.? Yes, as compared with £2,152, the annual cost of the No. 1 scheme. The expenses in connection with the filtration and precipitation works at Clay Cliff Creek will be necessarily heavier than the expenses connected with the disposal of the sewage at Duck River, inasmuch as more labour will be required. The precipitating tanks and filtration beds would be required to be constantly attended to, in addition to which there would be the purchase of the precipitants.
180. Will you briefly state the difference in wages, and the cost for the precipitants? That information is to be found in Appendix B, relating to scheme No. 1. The cost of the wages would be £1,222 15s., as against £1,168 in the No. 2 scheme. In regard to the precipitants £500 has been put down in scheme No. 1, and nothing in scheme No. 2. Then the cost of coal is estimated at £219 in scheme No. 1, as against £136 17s. 6d. in scheme No. 2.
181. Those are the principal items of difference between the two schemes? Yes; principally in the precipitants.
182. And you have no doubt that scheme No. 2 would be quite as effective as scheme No. 1? I am positive about that.
183. And the capital cost would be about the same? Almost precisely the same.
184. Therefore, as a matter of economy, No. 2 scheme should be preferred, inasmuch as the annual expenditure will be some £800 less? That is so.
185. Have you made ample provision for maintenance? Yes.
186. You can say that positively? I can say positively that we have. In fact I think we have rather over-estimated it than anything else.
187. You have made an estimate that a certain sum must be paid by the municipal council annually to cover interest, and to redeem the capital expended? Yes.
188. Are you quite satisfied that the sum you have named would be a maximum sum to be paid by the council? Yes. The sum actually paid would be less than my estimate, supposing the George-street and Macquarie-street asylums had to be served.
189. Assuming that the George-street and Macquarie-street asylums remain at Parramatta the revenue would be much greater than that estimated by you? That is so.
190. Have you taken into consideration in your estimate the cost of the management of the farm? Yes. Nothing has been reckoned in the estimate for any revenue, supposing revenue to be derived.
191. But you have considered all probable expenditure? Yes.
192. With regard to the storm-water sewers which you say will carry sewage from that portion of Parramatta that will not be connected by reticulation with the proposed scheme, will there be any nuisance as the result of that portion of your proposals? No. Nothing more than the slops from the houses will be admitted into the channels.
193. And no nuisance will arise from that? None whatever—no more than arises from the storm-water channels in the city and suburbs.
194. How do you propose to deal with the solids? They will have to be dealt with by the pans, as now.
195. And the result would be an additional charge of 6d. to the ratepayers for separating the fluids from the solids;—is that your proposal? The ratepayers who would not be embraced in the proposal would have to pay 6d. in the £ for the use of the storm-water channels, and they would have, in addition, to pay for the emptying of their pans.
196. Do you think that is a satisfactory arrangement for the residents? At present they pay so much for the emptying of the pans.
197. Now you propose that they should pay 6d. additional for allowing the rain-water and fluids to be passed into the storm-water sewer? I think it is satisfactory. If the present proposal is not recommended by the Committee and adopted, the position of the whole of the people at Parramatta will be precisely such as you have now described. They must pay for these storm-water channels, and that would cost them 6d. in the £, and they must pay for the emptying of their pans.
198. What you contend is this: that although hitherto they have not paid for connection with these storm-water sewers, they should have paid—that the charge has been held in suspense? That is exactly the case.
199. In regard to the portion of Parramatta which you say will be served by the storm-water sewers, have any connections been made up to the present time between those sewers and the dwellings? Yes. The whole of the slops from Parramatta are discharged into these storm-water channels, either directly or indirectly.
200. When were they completed? They have been in course of construction for the last four years, and the last one was finished about two months ago.
201. So that the people are getting the advantage of the storm-water channels at the present time? Decidedly, and it is a very great advantage.
202. And without paying for it? Yes.

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203. Have you considered whether the proposed sewage farm will cause a nuisance or not? I am perfectly sure it will not, with ordinary management.
204. Do you propose to take any further steps to deodorise the sewage after it has left the pumping station? We propose to turn the sewage after it has passed through the screens on to the farm in its crude condition.
205. And you think there will be nothing offensive from it? With ordinary management I am perfectly sure there will not be. If you run sewage on to a plot of ground three or four days together, and make the ground sewage-sick, possibly there will be a smell, but if you treat the beds intermittently there will not be.
206. How far will the sewage farm be from the population boundary? There is no population of any consequence within a mile of the farm.
207. You are speaking of the Parramatta side? Yes. The farm is more than a mile from Granville. There are some isolated houses in between, but not within perhaps half-a-mile of the farm.
208. *Mr. Hoskins.*] And on the other side of the river? There are a few houses, but I think I am correct when I say that within half-a-mile of the farm there will be no population whatever.
209. *Mr. Humphery.*] Therefore, you are not apprehensive of any offensive exhalation causing a nuisance to the public? No. Even supposing the population came right up to the farm, if the farm were properly managed, I do not think there would be anything whatever to fear.
210. How far is the Convent of Subiaco from the proposed farm? I should think about a mile.
211. In your estimate you have provided a sum of £24,427 for sewers;—will that estimate comprise the cost of the complete reticulation of the portion of Parramatta you propose to connect? Yes.
212. *Mr. Hoskins.*] This scheme of yours only proposes to provide sewage for a population of 10,000. The disposal works are for a population of 10,000, but the sewers are large enough to take the sewage from the future population of Parramatta which would amount on that area to about 34,000.
213. But at the present time there are only about 10,000 people located on the area? That is so.
214. And there are about 1,500 inmates of the Government institutions? More than that—2,930.
215. You propose to increase the charge made to the Government for the inmates of these institutions from 6s. 8d. to 10s.;—is that a proposal of the Government or a suggestion by the Municipal Council of Parramatta? It was a suggestion made by Mr. Johnston, of the Department of Public Works, after having investigated the matter.
216. Investigated what? He had instructions from the Minister to proceed to Parramatta and examine the books of the council, and report on the whole financial aspect of the case; and he suggested, and Mr. Beaumont of the Water and Sewerage Board agreed, that the fairest way would be to charge 10s. per head for the inmates of the institutions.
217. Will a rate of 1s. in the £ on the ratable value of the property included in the area proposed to be sewered, call for the imposition of a charge of 10s. per head on the residents embraced in that area,—that is to say, at a rate of 1s. in the £ on the ratable value of the property,—will the people themselves, under this proposed scheme, have to pay 10s. per head, as it is proposed that the Government should do for the inmates of the institutions? No, not under existing circumstances.
218. Why not? The area is not so thickly populated as is the area occupied by the Government institutions.
219. Considering that there is a larger number of persons to a given area on land on which the Government institutions are located, and, therefore, that there is greater facility in collecting the tax from the Government than from individuals, is it right or just that persons who reside in a more scattered area and have more room, and have greater advantages from the proposed system of sewerage, should pay less than is proposed to be paid for the persons crowded together so closely in the Government institutions? I have come to the conclusion that the proposal I have laid before the Committee is a fair one; that is to say, that the people of Parramatta comprised in the area sewered should pay 11d. in the £ on the annual ratable value of the property; 6d. in the £ where the population is served by the storm-water sewers only; and 10s. per head in the Government institutions.
220. But you admit that, under the proposed scheme of 11d. in the £ on the ratable value of property, the residents included in the area of the sewerage scheme, apart from the Government institutions, will not pay so much per head for the advantage of this system of sewerage as will be paid by the Government for the inmates of the institutions;—can you explain on what principle of equity such a difference should exist? I do not think that Parramatta itself would require such a scheme,—at any rate, there would not be any immediate hurry for such a scheme,—if it were not for the Government institutions. These institutions collect sewage in such very large volumes, and it is deposited by the drains at specific spots in the bed of the river, that a great deal of the nuisance is caused in that way. Whereas, in the case of the ordinary population of Parramatta, they are scattered about, and their slops and other causes of nuisance, not accumulating, do not cause the same degree of annoyance.
221. Is all the solid sewage from the Government institutions deposited in the river? Professedly not.
222. Is it not absolutely so;—is it not buried? It is supposed to be taken away and buried.
223. Is it not buried? I believe it is, most of it.
224. If the contract for burying the solids and excrement from the Government institutions was not carried out, whose fault would it be? After the excreta had been delivered to the council, the council would become responsible, but before its delivery to the council the institutions would be responsible. A short time ago I was asked to visit Parramatta to look into this matter, and I found that the practice was to give very full measure for the pans in the Government institutions—one pan being emptied into the other, and then they washed the pans out on the premises, and some of the excrement found its way into the river.
225. But that was only the excrement that adhered to the pans, and was not washed off;—the greater portion, I suppose, was buried? Certainly.
226. Has there been any complaint from people who do not want Government money expended in the locality of any nuisance being created near these Government institutions, seeing that the excrement from the institutions is buried? Yes; there have been very grave complaints every year during the hot summer weather.
227. What is the nature of the complaints? That filth had accumulated, and there being nothing to flush the river it has accumulated in the bed of the river, and caused a very serious nuisance.

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228. Is it not silt that comes down the river in time of storm, and not excrement from the institutions? It is fresh water that comes down the river.
229. Does not that carry the filth away? When it comes, certainly. But it is in the dry weather that the nuisance arises.
230. But if the terms of the contract were carried out, and the sewage from the institutions was buried, very little nuisance could be created, except from the liquid sewage emptied into the river subject to the influence of the tide? That is so; but a very large portion of this liquid sewage is precipitated. The particles held in suspension are precipitated on the banks of the river; they are not carried out by the tide, and that is the difficulty. The volume of water as the result of the tidal influence is so small that unless it is helped by a flow in the river a deposit takes place and causes a nuisance.
231. How long has it been discovered by the people of Parramatta that the sewerage is defective, consequent upon the nuisance which is alleged to have been created by the Government institutions? I have known Parramatta for twelve or thirteen years, and they seemed to be aware of it then.
232. They made no complaint, did they? Oh, yes; they have been complaining from that time up to the present.
233. Have you ever heard of their making complaint about the Government institutions being removed from the place? Yes, I have.
234. In one of your schemes you propose the precipitation and filtration of liquid sewage at Clay Cliff Creek, and the disposal of the solid sewage by destructors? By destructors, if it could not be disposed of in any other way.
235. Do you not think that even though it might be purified the flowing of liquid sewage into the river would tend to cause a nuisance? No. It would be in such a state of purification that it would cause no nuisance whatever.
236. Although it causes a nuisance now? It causes a nuisance now, certainly.
237. Have you ever seen the destructors described in your scheme at work anywhere? I have seen destructors at work—not quite the same kind as the one I propose, but practically the same.
238. Have you had any personal experience of the working of these destructors? I have not worked one myself.
239. But you have seen them at work? Yes.
240. Have you been responsible for the working of them? No; I say that I have not worked any myself.
241. Is it not a fact that wherever these destructors are used to get rid of solid excrement a nuisance is created in the locality—that offensive smells prevail? It is very difficult I know to prevent an offensive smell, but you must remember that it is not the pure excrement that is proposed to be destroyed in this case; also that the material treated from the pans at Katoomba and Orange and other places is totally different to sludge cake.
242. You admit that if the solid sewage of Parramatta is to be disposed of by destructors at Clay Cliff Creek a disagreeable smell would of necessity prevail in the neighbourhood? No, I would not say so at all. I should say that no smell whatever would prevail.
243. Are there to be destructors at Clay Cliff Creek? We propose to have destructors there in any case, but under scheme No. 1, which provides for precipitation and filtration, the sludge cake is to be dealt with. If that could not be disposed of to the farmers, it would have to be got rid of in some other way, and the readiest way would be to mix it with the town garbage and burn it in the destructors.
244. Do you not think that the burning of such matter would cause an offensive smell in the locality? I am sure it would not.
245. Do you say that from experience gained? Yes.
246. Where are there any of these destructors in existence? There is one at North Shore, which is used for garbage; there is another one at Katoomba used for excrement; and another one at Orange for the same purpose. There are no destructors being used in this country for the destruction of sludge cake.
247. You also propose to use destructors under the No. 2 scheme, which provides for a sewage farm? Yes, for the purpose of destroying the garbage of the town.
248. And not excrement also? No. That will go on to the farm in suspension.
249. How would you get rid of that—in the way adopted at Webb's Grant, Botany, by taking it in a tram, and tipping it over and burying it? No. The large particles or more than particles, such as boots and rags and things of that sort, would be intercepted by the screens, and would be burnt in the destructors along with the town garbage. It would be material similar to that which you got from the dust-boxes.
250. Still I want to know how you are going to get rid of the excrement? That is carried on to the farm. It is carried in suspension in the water and turned on to the different beds.
251. That is not the way they dispose of it at Webb's Grant, Botany? Yes, just the same.
252. I suppose you will not admit that the soil of the proposed farm at Duck River at the present time until it is covered with sand is not very well adapted for the absorption of sewage matter? Not the lower portion.
253. To make the farm suitable it would be necessary to have the sub-soil drained, and to have the land covered to a good depth with sand? Yes.
254. In point of fact it would not be fit for a sewage farm unless it was covered by a good thick layer of sand? Certainly not the lower portion.
255. Would not that apply to the whole of it? The upper portion could be made to treat sewage by an expenditure. It would have to be trenched or ploughed (say) 2 feet deep, and under-drained. That refers to the upper portion, comprising about 20 acres.
256. The land is nearly all clay with just a few inches of sandy soil on the surface. That clay will not absorb sewage. How are you going to get rid of the sewage? If you refer to evidence given by Professor Anderson Stuart, you will find that he analysed the material to which you refer, and he says that a very small percentage of it is clay, and that it is fairly suitable. He does not say it is admirably suited, but that it is fairly suitable for the disposal of sewage.
257. I suppose you are aware that great complaints were made before this Committee by the mayor and residents of Granville, and also by the mayor and residents of the municipality on the opposite side of the river, that the disposal of sewage on the Duck River farm would cause such a smell in the neighbourhood that it would injuriously affect the value of their property, and be detrimental to their health? I know they did complain, and I further know that they had no grounds whatever for the complaint, and that it was purely ignorance on their part to do so.

J. Davis. 17 Feb., 1897.

258. You admit, at all events, that the position of Webb's Grant, Botany is very different from the position of the land at Duck River if the latter were made a sewage farm? I should say they were very analogous. Webb's Grant stands between Cook's River and George's River on the point, and the proposed site of the farm at Parramatta stands between Duck River and Parramatta River on the point.
259. Of course you are aware that the soil at Webb's Grant is very suitable for the absorption of sewage? And so will this be if the sand intended to be put there is deposited on the land.
260. I suppose you will admit that if a large quantity of sand has to be taken and spread over the farm at Duck River the cost of that operation will largely increase your estimate of the cost of the scheme? Yes; if it is considered to be a fair charge, then it will increase my estimate to the extent of between £14,000 and £15,000.
261. *Mr. Lee.*] The cost of depositing the sand or silt would be spread over a series of years? I think the whole of the work should be carried out, though it would not all be required at once. It would be more convenient for laying out the farm if the whole of it were filled in at the same time.
262. But the deposit of the sand on the farm would depend upon the progress made in excavating the river? If you depend upon the silt from the river, certainly.
263. Would there be any other source from which it could be obtained? It was proposed to bring the sand from some other part of the harbour.
264. At all events it would all be dredged? Yes; and it would then be deposited on the site of the farm, and be pumped on the land by means of a sand-pump.
265. So it may happen that the deposit of silt on the farm would depend entirely on the dredging works going on in the harbour? Quite so.
266. What will be the exact site of the proposed pumping-station? At the corner of Hassall-street and Arthur-street.
267. If No. 2 scheme, which includes the filtration process, is carried out, will it be necessary to pump from that station to the sewage farm? Yes.
268. Why? The levels would not admit of the sewage being conveyed to the farm by gravitation.
269. If the sewage farm could be dispensed with, would it be possible to treat the sewage matter at the pumping-station? Yes.
270. By what process would it be treated? By the process proposed in scheme No. 1—precipitation, filtration, and destruction.
271. Could that work be carried out without becoming a nuisance to the people? Yes. It would depend on the management to some extent, but it certainly could with ordinary management. The sewage must not be allowed to ferment. If it is treated freshly there should be no nuisance.
272. What would be the saving in cost if the sewage were not conveyed to the farm? The position taken up by the Department is this: If the precipitation and filtration works were carried out, then, inasmuch as £7,000 has been spent on the farm, the people of Parramatta would have to pay that £7,000. Consequently it would have to be added to the cost of scheme No. 1, and if it be added then the cost of the precipitation and filtration scheme will be pretty much the same as the cost of the scheme which includes the farm.
273. In your estimate of revenue you speak of "a rate of 6d. in the £ on the cost of properties outside the areas served"—what do you mean exactly by that? The portion on the map coloured yellow would be charged 11d., because the people there would be served by the scheme. But the portion coloured brown would not be served by the scheme; they would be served by the storm-water channels, and would be charged 6d. in the £.
274. Would those within the yellow boundaries be charged for the storm-water as well as for the sewage? No.
275. So that their total rate would be 11d.? Yes.
276. And the total rate of the others would be 6d.? Yes.
277. And when the reticulation is extended to them, they also will pay 11d.? That is so.
278. Your revenue is estimated upon the annual rental value and the unimproved value? Yes.
279. In the ordinary municipal way? Yes, taking the municipal valuation.
280. Your amounts are taken from the valuations in the municipal books? Yes.
281. In reference to the Government asylums, it appears to me that if those asylums were removed your estimate would be considerably reduced, and therefore the municipality would have to contribute more? There is no present intention or probability of any of the asylums being removed, except the George-street and Macquarie-street asylums, and in the estimate of revenue those two institutions have not been taken into consideration. If they were there when the scheme was carried out the revenue would be that much increased beyond the estimate.
282. You are quite clear that the benevolent asylums have not been included in this estimate of revenue? Not the George-street and Macquarie-street asylums. The four Government institutions that have been included are the gaol, the lunatic asylum, the girls' industrial school, and the cottage homes.
283. Then, according to your estimate, the revenue would be from the general sources of the municipality with those permanent institutions included? Yes.
284. *Mr. Roberts.*] I understood you to say that the expenditure of £16,000 upon the sewerage connected with the lunatic asylum had been going on for a period of twenty years? So I understand.
285. Has the expenditure taken place in small sums of £100 or £200 at a time with a view of affording temporary relief? I believe so. That sum of £16,000 does not include the whole expenditure, as there is another sum of £1,276. I shall endeavour to obtain particulars of the expenditure.
286. What sewage farms are at present being worked in the suburbs of Sydney? There is only one, and that is at Botany. It is on all fours with the farm proposed in connection with the present scheme.
287. Have any complaints been made as to a nuisance arising from the sewage farm at Botany? I do not think so.
288. Does it work satisfactorily? Yes.
289. And is not in any way detrimental to the health of the inhabitants of the locality? No. The workmen are living on the farm, and there are no cases of sickness.
290. Is the experience of the work and management of the sewage farm at Botany of a sufficiently favourable character to justify you in recommending with confidence the adoption of a sewage farm at Parramatta? Yes, certainly, and there is also experience elsewhere. Then, again, it is based on scientific principles. The filter-beds are made. You have not to depend on the soil that is there, but you take material

material suitable for the treatment of sewage. Experience has shown that the treatment of sewage in the way proposed in the present case has been eminently successful. J. Davis. 17 Feb., 1897.

291. Would it not be possible to deal with the sewage of Parramatta effectually if what I may call the pan system were efficiently carried out? So far as the excrement is concerned, certainly. It is not a very good system; it is not the best, still it is better than some other systems. In regard to the three institutions above the O'Connell-street bridge, namely, the gaol, lunatic asylum, and girls' industrial school, the whole of the liquid sewage, and sometimes something stronger than that, is discharged into the existing drains shown on the map. It is deposited at the flood-gates, and the volume of liquid sewage discharged there is so large compared with the quantity of water that is ebbing and flowing in the river that a nuisance is caused at that point.

292. Is there not any way of dealing with this sewage by having it carted away from the institutions? It could be treated at the institutions by filtration, and the pan system continued; but the question is whether that is advisable in view of the fact that the people of Parramatta consider it desirable that they should have sewerage too.

293. Would it be more expensive to treat it in the way I suggest? It would be more expensive for the Government.

294. Is the nuisance existing at Parramatta, which you say is greater in dry weather, and of which complaints are made, due to the neglect of any official or any body of men? I do not think so. I think it is due simply to physical facts. The sewage is discharged into the river, and there is not sufficient water to dilute it. Consequently it accumulates in very large quantities on the banks, and causes a very great smell.

295. There is not sufficient flow in the water to carry it away? Quite so.

296. *Chairman.*] Have you taken into consideration the responsibility which the people of Parramatta have incurred in impounding the water above the town for the purpose of a water supply, which water, if unimpeded, would run past the town of Parramatta? Yes; I had occasion to do so after a deputation waited upon the Minister pointing out the very gross condition of the river. In my report to the Minister I then said that I considered the Council had contributed to a very great extent to the condition of the river by retaining the water behind the town for the water supply, and that if that water were available the river would not be in the state complained of. With regard to the utilisation of the water for sluicing purposes, the only alteration that would have to be made would be in the dam itself. In all probability larger sluice-gates would have to be put in. The effect of the water in the river would be good, and possibly in nine cases out of ten it would remove the nuisance.

297. It would sweep the river right down? Certainly.

THURSDAY, 18 *FEBRUARY*, 1897.

Present:—

THOMAS THOMSON EWING, Esq. (Chairman).

The Hon. Frederick Thomas Humphery.	Charles Alfred Lee, Esq.
The Hon. James Hoskins.	John Lionel Fegan, Esq.
The Hon. Charles James Roberts, C.M.G.	Thomas Henry Hassall, Esq.
The Hon. Daniel O'Connor.	George Black, Esq.
Henry Clarke, Esq.	Francis Augustus Wright, Esq.

Frank Farnell, Esq.

The Committee further considered the proposed Sewerage Works for Parramatta.

James Johnston, Clerk, Department of Public Works, sworn, and examined:—

298. *Chairman.*] What are you? A clerk in the Department of Public Works.

299. In charge of clerical work in connection with municipalities? My work is varied. The duties I perform are analogous to those of an inspecting accountant. J. Johnston. 18 Feb., 1897.

300. Have you a statement to make with regard to the proposed sewerage scheme for Parramatta? I have a report which I made to the Under Secretary for Public Works, dated 28th October, 1895. I have also taken out some figures from the council's last published statement of accounts in reference to their water supply. I have taken out the figures from the last four half-yearly statements published up to the 3rd August, 1896. The figures for the last half-year are not yet published. I will read the report which I furnished to the Under Secretary on the 28th October, 1895. It is as follows:—

Parramatta Sewerage Scheme.

Sir, Sydney, 28 October, 1895.

I have the honour to report that, in obedience to your instructions, I have visited Parramatta and made an investigation into the amount of revenue likely to be received from a sewerage rate levied on all properties situated within the proposed sewerage district.

The municipal valuation for the current year of all properties served by the proposed scheme, excluding the Government institutions and public buildings, amounts to the sum of £52,831, being a decrease of £6,743 on the amount of the 1894 valuation as stated by the council clerk in March last. In the absence of the council clerk, who is away on sick leave, I cannot ascertain how he arrived at his total; but the figures I now submit have been very carefully compiled, and may be taken as absolutely correct. Some portion of the discrepancy is accounted for by the general lowering of rental values which is now going on from year to year, and is not yet come to a stop. In all parts of the town I am informed of houses that some years ago commanded rentals of 25s. to 30s. a week now being let for 12s. to 15s. a week, and of frontages, formerly valued and sold at £4 10s. per foot, now being disposed of at 30s. to 40s. per foot. *See* Appendices A-B.

This decline in values is, of course, in common with the general reduction to a healthier state of affairs now taking place all over the Colony, but further consideration of the circumstances of Parramatta leads one to the conclusion that it will be unwise to count upon any notable expansion of the town for many years to come. It appears to me that the very sanguine anticipations lately uttered as to large increases in the near future in the number of residents, and consequent additions to the annual valuation must be received with caution. There is little in or around the town to warrant these expectations, for it offers no special attractions as a business or manufacturing centre, while its distance from Sydney is too great to permit of its becoming a popular residential suburb. In my opinion, therefore, Parramatta will grow but slowly, and the valuations of the properties affected by the sewerage scheme, and from which the revenue is derived, are not likely to be increased to any great extent. The present population to be served by the sewerage scheme may be set

J. Johnston. 18 Feb., 1897.

down at 7,500, exclusive of the inmates of the Government institutions, and if any expansion does take place it will be in the outside districts. In passing, I may remark that the removal of these Government institutions from Parramatta would inflict a rather severe blow on the prosperity of the town.

Public Buildings.

See Appendix A.

A list of these is given in Appendix A, showing a total annual valuation of £3,200, the various sums making up this total having been arrived at after consultation with the assessor to the Metropolitan Board. It will be observed that the list includes the new court-house now in course of erection, and also the asylum buildings in George-street and Macquarie-street at present occupied by the old men. When these inmates have been removed to the new homes at Bankstown, the buildings will then be subject to the ordinary valuation.

Railway Stations.

The two (2) railway stations can be rated only if connected with the sewerage system; the amount of revenue set against them, £25, is based upon the cost of the present pan service.

Government Institutions.

As the removal of the old men from the George-street and Macquarie-street asylums will most probably take place long before any sewerage scheme can be completed, the number of Government institutions to be served thereby is reduced to four (4), namely, hospital for insane, gaol, girls' industrial school, cottage homes.

In view of the extreme difficulty in arriving at anything like a proper rental value of these buildings and grounds, and considering the large population inhabiting them, I beg to submit that the fairest method of charging for the service rendered by a sewerage system is to assess a reasonable charge per head on the number of inmates. The fixing of this charge is also a question of considerable difficulty. So far as sewerage alone is concerned, once the system is completed it makes very little difference in the working cost whether there are 50 or 500 persons using it in the same building; but in the case of Parramatta there are two special circumstances which materially affect the amount of rate to be levied on the Government institutions:—

Firstly, it is alleged, and no doubt with some force, that these institutions are the chief cause of the necessity for a sewerage system, and that in their absence, the town itself might continue to carry on for many years with its present methods, and without being compelled to undertake the construction of costly sewerage works.

Secondly, the water supply of Parramatta is very limited, and at the same time extravagantly used (the consumption per head is nearly double what it is in Sydney), consequently it is frequently taxed to its utmost powers to meet the demands upon it. The working of the proposed sewerage scheme would entail upon it such further large demands that the council would be compelled to add greatly to their existing source of supply; and the only method by which they could do so is by purchasing water from the Metropolitan Board. This means extra expense to the council; and, as it is admitted that the Government institutions would consume a larger quantity of water for sewerage and cleansing purposes proportionately than the townspeople, it is only fair that they should be made to contribute a full ratio of the cost of working the scheme.

After full consideration of the question, I beg to submit that a yearly charge of ten shillings (10s.) per head on the number of inmates would be a very liberal contribution towards the sewerage revenue, and in this opinion, I am also supported by the assessor to the Metropolitan Board.

As regards the amount of rate to be levied on buildings and lands—public and private—this cannot fairly be less than ninepence (9d.) in the £, being the same rate that is levied by the council on account of water supply.

Although this rate would be twopence (2d.) higher than the Sydney rate, still Parramatta residents cannot reasonably expect that a small population such as theirs is, spread over a comparatively large area, should secure the benefits of a sewerage system at the same price paid by a large population crowded into a comparatively small area.

On the other hand, Parramatta comes so intimately within the metropolitan influence, and the water from Prospect Reservoir is so readily available at a comparatively low price for both water and sewerage purposes, that it is useless to expect the ratepayers to submit to any glaring increase over and above Sydney rates.

For these reasons, I beg to propose a rate of ninepence (9d.) as a fair compromise between the Sydney rates and what the proposed sewerage scheme will apparently require in order to make it remunerative.

To sum up, the annual revenue that may be fairly looked for from the proposed scheme is as follows:—

Private buildings and lands valuation of £52,831, at 9d. in the £ will give	£1,981
Public buildings and lands valuation of £3,200, at 9d. in the £ will give	120
Railway stations (2) based on present cost of pan system should give	25
Government institutions, 1,580 inmates, at 10s. per head, will give	790
Total annual revenue	£2,916

Pans.

Under the existing pan system, the council charges a fee of threepence (3d.) for each emptying, and during the twelve months ended 30th September last collected from this source a total sum of £1,598 14s. 4d., to which the Government institutions (excluding the hospital for insane, which makes its own arrangements for the removal of its nightsoil) contributed the sum of £632 17s., and the other public buildings the sum of £61 0s. 9d., leaving the balance of £904 16s. 7d. as the sum paid by the townspeople on account of the pan service. But it should be borne in mind that if their pans were emptied as frequently and with the same regularity as those of the Government institutions, the cost to the townspeople would largely exceed what it is at present.

With respect to the Clay Cliff Creek and Brickfield Creek storm-water channels, it will be observed that I do not count upon any revenue being obtained from this source, apart from or prior to their incorporation with the proposed general sewerage scheme.

The total cost of the proposed scheme, as submitted by the Engineer-in-Chief and approved by the municipal council, is £59,309, to which must be added the interest accruing during the construction of the works, making a grand total of expenditure and interest of, say, £60,000. This total includes the cost of the abovementioned storm-water channels when completed, but does not take into account the sum of £16,685 already spent in connection with the main drain (leading from the hospital for insane, gaol, and girls' industrial school) and the channel cut in the bed of the river.

Assuming that the scheme, if carried out, will be vested in and administered by the municipal council, and that the council will be granted the privilege of repaying the capital cost on the hundred (100) years' system, with interest at the rate of 3½ per cent., the total annual expenditure in connection with the scheme will be as follows, viz.:—

Annual instalment required to repay the sum of £60,000—principal and interest—in 100 years, is	£2,170
See Appendix C. Working expenses, maintenance, and administration, as per Engineer-in-Chief's estimate	1,433
Total annual expenditure	£3,603
To meet which there is an annual revenue, as per Appendix A, of	2,916
Leaving a deficit of	£687

As it would be unreasonable to call upon the Government institutions to contribute anything beyond the ten shillings (10s.) per head of inmates towards wiping out this deficit, seeing that their contribution at that rate would be a most liberal one, the only course open to the council, in order to fully meet their obligations, would be to levy a rate of one shilling (1s.) in the £ on all ratable properties (other than the above Government institutions) situated within the sewerage district. The extra threepence (3d.) would produce exactly £700, and thus cover the deficit arising from a ninepenny rate.

As

As a further reason why the Government institutions should not be asked to pay more than ten shillings (10s) per head of inmates, it is to be remembered that they already contribute most generously to the council's water supply funds, as will be seen from an examination of Appendix D. The council's water supply is highly profitable ; after meeting all expenses of management and maintenance, new mains, and interest, for the year ended 31st July last, it furnished a net surplus of £1,784 11s 6d. J. Johnston. 18 Feb., 1897. See Appendix D.

The council's present indebtedness amounts to the sum of £56,600, consisting of £100 debentures, carrying 6 per cent. interest.

Practically they have no other debts, as their Bank overdraft on general account is counterbalanced by a corresponding amount of credit in their water account.

I have, &c.,
JAS. JOHNSTON.

J. Barling, Esq , Under Secretary for Public Works.

There are also appendices to the report giving details of (*a*) estimated annual revenue from properties within sewerage districts, total £2,916 ; (*b*) ratable properties within sewerage district, excluding public institutions and public buildings, showing a total annual valuation of £52,831 ; (*c*) estimated annual working expenditure, showing a total of £1,433 10s. 6d , (*d*) revenue from Parramatta water supply for year ending 31st July, 1895, showing a total revenue of £4,457 1s., as against £2,672 19s. 6d. of expenditure, leaving a surplus on the year's working of £1,784 11s. 6d. These appendices are as follows —

APPENDIX A.

PARRAMATTA SEWERAGE.

ESTIMATED Annual Revenue from Properties within Sewerage District.

Description of property	Annual valuation		Annual revenue at 9d in the £
	£	£	£
Buildings and lands as per schedule annexed—Appendix B . ..		52,831	1,981
Public buildings and land—			
Post Office (new), North Parramatta	50		
,, South Parramatta	350		
Public School and residence, Macquarie-street	300		...
,, ,, North Parramatta	300		
Court house, new (4 per cent. on cost, £20,000)	800		
,, old	200		
Police Barracks	500		
Asylum buildings, George street—when vacated by old men	400		
,, Macquarie street ,, ,,	200		
Land—Church street, Fitzwilliam-street (purchased by Justice Department in 1884, at a cost of £4,000).	100		
		3,200	120
Railway stations (if connected)			25
Government institutions—	Number of inmates		
Hospital for Insane	1,070		. .
Gaol	360		
Girls' Industrial School	100		
Cottage Homes	50		
	1,580 at 10s per head		790
Total estimated annual revenue ...			2,916

APPENDIX B.

PARRAMATTA SEWERAGE.

RATABLE properties within Sewerage District, excluding Government Institutions and Public Buildings.

Ward	Ratable properties			Amount of annual valuation
	No of buildings	No of vacant lands	Total number	
				£
Anderson	(*a*) 667	183	850	25,491
Marsden	484	165	649	16,869
Forest	240	33	273	7,157
Gore	169	37	206	3,914
	1,560	418	1,978	53,431
Deduct—Vacant lands on which rates are " bad and doubtful "		100	100	600
Totals	(*b*) 1,560	318	1,878	(*b*) £52,831

NOTE —(*a*) Includes terrace of ten (10) houses, at present occupied by Government inmates (old men), the rates thereon being paid by owner (*b*) Should the sewerage scheme be carried out and administered by the Metropolitan Board these figures would be increased by the addition of the council chambers and town hall, the baths, and the fire brigade station

APPENDIX C.

PARRAMATTA SEWERAGE

ESTIMATED annual working expenditure.

	£ s. d.
2 engineers, at 10s. per day, each 2 firemen, at 7s. per day, each } working seven days per week . 2 labourers, at 6s per day, each	839 0 0
1 labourer for maintenance of sewers, at £2 2s. per week	110 0 0
Coal, 10 cwt. per day, at 15s.	136 17 6
Oil, at 9d. per day . .	13 13 0
2 labourers for farm, at £2 2s. per week, each .	219 0 0
Repairs and renewals to machinery, at 3 per cent. on £1,353	40 0 0
Office administration and management	75 0 0
Total	£1,433 10 6

APPENDIX

J. Johnston.

18 Feb., 1897.

APPENDIX D.

PARRAMATTA WATER SUPPLY.

REVENUE for year ended 31 July, 1895.

	£ s. d.	£ s. d.
Macquarie-street Asylum—by meter 1s. per 1,000	122 7 0	
George-street ,, ,, 1s. ,,	310 9 0	
Cottage Homes ,, 2s. ,,	16 8 0	
Railway Stations ,, 1s. ,,	192 15 0	
Gaol—by agreement, 10s 6d. per head	181 2 5	
Girls' Industrial School—by agreement, 10s. 6d. per head	72 11 7	
Hospital for Insane—by agreement, 10s. 6d. per head	568 19 4	
Hospital for Insane, Rydalmere—by agreement, 10s. 6d. per head	201 17 2	
		1,666 9 6
Post-office, North Parramatta—rating	1 6 4	
Post-office, South Parramatta—by agreement	3 3 0	
School residence, Macquarie-street—2s. per 1,000	18 16 0	
School residence, North Parramatta—2s. per 1,000	43 4 0	
Court-house—by agreement	3 3 0	
Police Barracks—by agreement	6 10 0	
		76 2 4
		1,742 11 10
All other sources		2,714 9 2
Total revenue		4,457 1 0
Expended during same period on maintenance and management, repairs and renewals, new filter-beds, and interest		2,672 9 6
Surplus on year's working		£1,784 11 6

301. How much of that revenue of £4,457 was contributed by the Government? I can give you the figures for two years. For the half year ending 4th February, 1895, the council collected from a water rate of 9d. in the £ a sum of £902 17s. 4d., and from agreements and meters—and you may say almost the whole of it applies to Government institutions—they collected £1,371. In the following half year, ending 3rd August, 1895, the rates amounted to £980, and the contributions from Government institutions to £1,126. That is to say, for one year the council collected £1,883 from rates, and from the Government institutions and sundry little outside things, the bulk of the amount coming from the Government institutions, they recovered £2,497. They therefore recovered from the Government institutions in one year £700 more than they recovered from the rates. The following year does not show quite the same proportion. From rates for the year ending 3rd August, 1896, they received £2,199, and from the Government institutions £2,478—a difference of £300.

302. *Mr. Roberts.*] What other rates are levied upon the people of Parramatta? The last statement shows that from the general rate of 1s. in the £ the council recovered £1,314 19s.

303. Does that include the lighting rate? No. They have a lighting rate of 3d., which brought in £338, and they have a water rate of 9d., which brought in £986 18s. 7d. That makes a total rate of 2s. in the £. Then they have a street watering rate of 2d., but it only applies to two or three parts of the principal street, and is not a general rate. So that at present their rates amount to 2s. in the £.

304. There are no other rates beyond the 2s. just mentioned? No.

305. *Mr. Clarke.*] I presume you were instructed by the Department to inquire into all the matters connected with the Parramatta Municipal Council dealt with in your report, and particularly as to their ability or willingness to pay a sewerage rate? Yes.

306. And what you have read is a general summary of the result of your inquiries? Yes.

307. Has the value of property in Parramatta increased within the last year or two or decreased? I have made inquiries from a resident of Parramatta, who was formerly a land agent and auctioneer there, and he tells me that the valuations are almost exactly the same now as they were two years ago, and show neither increase nor decrease. I could only obtain the proper figures by applying to the council clerk.

308. Can you give the Committee any opinion as to whether or not the population of Parramatta is likely to increase? I say most decidedly in my report that in my opinion it is not likely to increase. If there is any increase at all it will take place not in the centre of Parramatta, to which the sewerage scheme is to be applied, but in the outside districts, where no sewerage rate would be paid.

309. If the various public institutions, particularly the pauper institutions, were removed from Parramatta, would that make any appreciable difference in the ability or otherwise of the corporation of Parramatta to pay the present rates? When I visited Parramatta, and when I drew up my report in October 1895, I ascertained from the Principal Under-Secretary that the question of the proposed benevolent asylum at Bankstown was coming before this Committee immediately, and the Principal Under-Secretary was certain that the work would be put in hand at once. Therefore, I eliminated those 1,400 or 1,500 old men from my calculations altogether. If these men still remain in Parramatta at 10s. per head, the council will have at least another £700 to come and go upon, which would obviate the necessity of their striking a higher rate than 9d.

310. So that if these old people are removed from the public institutions it will mean a considerable loss to the revenue of the corporation of Parramatta? It will amount to £700 a year, at any rate.

311. Will that be an increase or a decrease on your estimate? My estimate of revenue will not be altered, as it does not include the old men's asylums.

312. And if they are removed, and that revenue is taken away, the deficiency will fall upon the properties of the town? Yes. Instead of striking a rate of 9d., the council will have to strike a rate of 1s.

313. Have you taken into consideration the various schemes before this Committee in reference to sewerage works for Parramatta? No, that is an engineering question.

314. You have only gone into the financial aspect of the case? Yes. I obtained as much information as I possibly could from the aldermen of Parramatta and others, and got their ideas as to what they were willing to pay, or what they could afford to pay, in the shape of a sewerage rate. I do not think I am betraying confidence when I say that I found the prevailing opinion to be this, that the Government institutions were the cause of the nuisance, and of the necessity for a sewerage system, and therefore the

Government

Government institutions should pay, and the mere mention of a 9d. rate or a 1s. rate, in addition to the 2s. in the £ they already pay, would throw them all up in arms at once. J. Johnston. 18 Feb., 1897.

315. I see by No. 1 sewerage scheme that they will have to strike a rate "of 13½d. in the £ on the ratable value of the property affected by the sewers, a rate of 6d. in the £ on the cost of the properties outside the area served by the main sewers but within the watershed of the storm-water sewers," which would give an annual rate of £4,536? I do not know who prepared that statement, but I place no faith in it at all.

316. It is a Departmental statement? It is just possible. It might be an engineer's estimate. But when you go into these things specially, as I have done, and find out to an exact penny what can be raised, it makes a wonderful difference. I should mention that I allow no special revenue from the storm-water channels.

317. The sewerage rates proposed to be levied vary under the different schemes proposed, though none would be much more than the rate I have just mentioned. I suppose you do not take that matter into consideration? No. I take a different point of view from that of the engineers. The engineers say, "There is the scheme; it costs so much, and you must strike a rate for it." I do not look at the matter in that light. I go to the town of Parramatta, and find out what the people can pay, and then I say, "Cut your coat according to your cloth; if you cannot get above a certain rate, you cannot go in for such a costly scheme."

318. Considering that under most of the schemes proposed an expenditure of about £60,000 would have to be incurred, do you think, taking everything into consideration, that the Parramatta people, in view of the other rates which they are paying at the present time, would be able to contribute a fair proportion towards that expenditure? I doubt their ability to pay another shilling, and I am sure they are not willing to pay another shilling. They are not prepared to do so, whether they are able or not.

319. Do you think they would rather do without the sewerage than pay another shilling? It strikes me they want the sewerage, and at the same time they do not want to pay for it. They want the sewerage, and they want the Government institutions to pay for it. That is the opinion I gathered from my talk with the different people at Parramatta.

320. *Mr. Wright.*] Is not that a peculiarity of all the towns? Parramatta is differently circumstanced from other towns by reason of the Government institutions being located there. On that account they have some excuse for their argument.

321. *Mr. Clarke.*] You made some reference in your report to the present water supply of Parramatta,—are you aware whether the council receive any revenue from that water supply over and above the expenses? For the year ending 31st July, 1895, according to the published balance-sheet, dated 3rd August, 1895, they made a profit of £1,784.

322. That, I suppose, is not likely to continue in the event of a dry season setting in? No. In the following year the council had to purchase water from the Metropolitan Board to the extent of 13,942,000 gallons, for which they paid nearly £700. That, of course, reduced their profits.

323. In a very dry season you think they would have to go to the Prospect water supply? Yes. From the 1st January to the 28th July, 1896,—last year, when we had so much dry weather—they had to stop their own water-works altogether, which ran completely dry, and they had to get the whole of their supply, amounting to 50,491,000 gallons, from the Metropolitan Board. For this they paid 1s. per 1,000 gallons up to 20,000,000 gallons, and 9d. per 1,000 for the balance. The water thus supplied cost them about £2,143.

324. *Mr. Lee.*] Do you know the amount of revenue they collected for the same year? No; I have not got the last half-year's revenue, but only the statement of revenue for the first half year.

325. And what you have just mentioned referred to the last half year of 1896? No; they had to buy water during the first seven months of 1896. During that period the whole of their supply came from the Metropolitan Board. They have not bought any water since.

326. *Mr. Clarke.*] In one of the Departmental reports on the proposed sewerage scheme this paragraph occurs:—

> On the 22nd June, 1896, the council clerk wrote, by direction of the mayor, informing the Under Secretary that, after having Mr. Johnston's report under consideration at the council meeting, on the 15th June, the council were quite prepared to have the proposed sewerage scheme No. 2 carried out, provided that an agreement could be made between the council and the Government, in accordance with their letter of the 11th June, 1895.

According to that the council were prepared to accept the scheme proposed by the Department? It says, "provided that an agreement could be made between the council and the Government in accordance with their letter of 11th June, 1895." In the letter from the council of the 11th June, 1895, these words occur,—"provided that a satisfactory agreement can be made between the council and the Government with reference to the assessed value of the Government property." That, of course, materially qualifies their acceptance of the scheme as a debatable condition is imposed.

327. *Mr. Lee.*] Do you know whether the present water supply of Parramatta is under the Country Towns Water and Sewerage Act? No; it is under no Act at all. They constructed the works themselves, and they have full control of the water supply without reference to any Act.

328. They constructed their water-works many years before the Act mentioned came into force? I think these water-works have been in existence for about fourteen years.

329. Do you happen to know the financial position of the Water Trust—as to whether the liability is covered by debentures? With regard to that, the Parramatta Council owe altogether £56,600 of debentures, carrying interest at 6 per cent. The water-works are valued at £30,000; and out of the revenue from the water they pay interest every year amounting to £876. That is, out of the total indebtedness of £56,600 the council debit £14,600 to their water-works, and pay interest on that amount out of their water revenue.

330. During the first seven months of last year they paid interest on that amount, and they had to buy their water from another source of supply? Yes.

Thomas Moxham, Mayor of Parramatta, sworn, and examined:— T. Moxham. 18 Feb., 1897.

331. *Chairman.*] You are mayor of Parramatta? Yes.

332. *Mr. Lee.*] Do you understand the nature of the sewerage scheme for Parramatta proposed by the Department of Public Works? To some extent.

333.

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333. Do you know what is the estimate of cost? The council have been furnished with a copy of the report of Mr. Johnston of the Department of Public Works, dealing with the financial aspect of the sewerage proposal.

334. Has your council dealt with the question in any way? Yes, the matter has been well thrashed out in the council.

335. Has the council passed the necessary resolution empowering the Minister for Public Works to carry out the scheme, accepting that scheme, no matter what the cost might be, and agreeing to pay the stipulated amount of interest? I am not prepared to say that such a resolution has been passed; but I am strongly of opinion that a resolution has been passed empowering the Minister to carry out a scheme under conditions submitted to and approved by the council.

336. Submitted or to be submitted? I think the scheme was submitted, and the cost was not to exceed 9d. in the £. A resolution was passed empowering the Minister to carry out the work under those conditions.

337. When? A year or eighteen months ago.

338. Would not that apply to the old scheme? I may say that the council has had no intimation whatever of the new scheme, except what it has learnt from the newspapers.

339. Have no plans been submitted to the council? No.

340. Or estimate of cost? I think not in connection with the new scheme.

341. A statement to the following effect was made by the Engineer-in-Chief for Public Works:—

> On the 22nd June, 1896, the council clerk wrote by direction of the mayor, informing the Under Secretary that, after having Mr. Johnston's report under consideration at the council meeting on the 15th June, the council were quite prepared to have the proposed sewerage scheme No. 2 carried out, provided that an agreement could be made between the council and the Government in accordance with their letter of 11th June, 1895.

Do you remember that? Yes.

342. This is the letter referred to, signed by the council clerk of Parramatta, and dated the 11th June, 1895. It is addressed to the Minister for Public Works:—

> Under the direction of His Worship the Mayor, I have the honor to forward herewith, copy of a resolution passed at a general meeting of the council held on 3rd June last, viz.:—
>
> > That the Mayor be hereby authorised to request the Hon. the Minister for Public Works to forward to the Public Works Committee for consideration and report the proposed sewerage scheme for Parramatta, as per plan No. 2; such scheme to be carried out, provided that a satisfactory agreement can be made between the council and the Government in reference to the assessed value of the Government properties; and, also, when the works are completed, they be placed under the control of the council.
>
> And to state that the works are not to be commenced until a satisfactory arrangement has been made with the Hon. the Minister for Works in reference to the assessed value of Government properties, and that the works when completed be handed over to this council.
>
> In reference to the first portion of the proviso, the council thinks the assessed value insufficient, and trusts that you will consent to an increase upon the amount; and the council presumes that an annual assessment will be made upon the Government properties, the same as upon all other properties within the borough.
>
> And also that the latter portion of the proviso in the resolution will receive your favourable consideration.

So you see that your council has, to a certain extent, accepted this scheme? Yes.

343. Therefore they must have known something about it? Yes, it would appear so.

344. They must have had the scheme before them, or they would not have accepted it? Since then we have received the report of Mr. Johnston, dated the 28th October, 1895, and which, I think the council, with a few amendments, will be quite prepared to accept. In that report reference is made to a charge of 10s. per head for the inmates of the Government institutions instead of payment according to valuation.

345. Then you are now in a position to say that your council is in possession of the fullest facts in connection with the proposed scheme, and that you have received a copy of the report made by an officer of the Department, giving a detailed statement of the cost and also of the estimated revenue and expenditure? Quite so.

346. Therefore, your council having the fullest knowledge of the scheme, is in a position to deal with the matter? Quite so.

347. Although your council has not yet passed the necessary resolution, do you think it will be prepared to pass a resolution accepting the scheme at the estimated cost, and with the assessment proposed to be paid by the Government institutions? Upon that I should like to make some reference to the report of Mr. Johnston. In his report, Mr. Johnston, unnecessarily, I might almost say, introduces the question of the Parramatta water supply. Mr. Johnston says:—

> As a further reason why the Government institutions should not be asked to pay more than 10s. per head of inmates, it is to be remembered that they already contribute most generously to the council's water supply funds, as will be seen from an examination of Appendix D. The council's water supply is highly profitable; after meeting all expenses of management and maintenance, new mains, and interest, for the year ended 31st July last, it furnished a net surplus of £1,784 11s. 6d.

I think Mr. Johnston should not report regarding the water supply in connection with the present sewerage proposal, inasmuch as the water supply is a private undertaking by the council itself, and if it has proved remunerative to the council, I do not think it is fair that the Government should take advantage of that fact. If, on the contrary, it had turned out a bad investment for the council, I feel certain that Mr. Johnston would not have given us credit in his calculations for being in a bad position in regard to our water supply. Mr. Johnston thinks that 10s. per head is a very liberal allowance. In answer to that, I have to say that it is not a liberal allowance. We have, on different occasions, endeavoured to induce these Government institutions to accept our water by meter, but with no successful result. The institutions use the water in a most extravagant manner. Instead of paying 10s. per head, I feel certain that much more would be contributed to the revenue of the Parramatta Council if the institutions were to take the water by meter, provided they would then use the same quantity that they now use. The arrangement with the institutions was that they would be assessed at 10s. per head for domestic purposes only. But the water is used, not only for domestic purposes, but for all kinds of purposes—for flooding drains and so forth. Only last night, as the inspector for the council was going round to see to different things, he found, at the industrial school, two taps from which the water was running to waste. In one case the water was running absolutely to waste, being used for no purpose whatever, and in the other case it was used to supply a fountain which watered a flower bed, on which

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the water was running all night. The same thing was occurring at the gaol, as the inspector could hear, as he passed the building, though he could not get inside to see. It will thus be seen that the council supply far more water than is absolutely necessary to these institutions, though Mr. Johnston takes exception to the charge made. Therefore, seeing that the water supply was a private undertaking of the council, seeing also that the Water and Sewerage Board will not supply the Government institutions at less than 1s., and that the council is prepared to supply them at 1s., I fail to see that any advantage should be taken of the condition of our water account in connection with the sewerage question. If the Public Works Committee, in its wisdom, should so recommend, the council will be prepared to accept the basis of 10s. per head, as submitted by Mr. Johnston, on condition that the present population is made a minimum population; that is to say, that in the event of any of the institutions being removed from Parramatta by the Government the loss to the revenue occasioned thereby would not devolve upon the people of Parramatta.

348. *Mr. Lee.*] The estimate does not include the two benevolent asylums of Parramatta? I shall refer to that later on. With regard to sewerage, Parramatta is in the unfortunate position that this question is being forced upon the people by the Government itself, and for that reason Parramatta is entitled to generous treatment at the hands of the Government. If it were not for the existence of the Government institutions in Parramatta, and the fact that sewage from these institutions is concentrated at one given spot, the people of Parramatta would be well able to do without any sewerage system for the next twenty years. But seeing that this matter has been forced on the people by the Government, and that these institutions have concentrated their nuisance on one spot, namely, the river, and right in the centre of the town, the people of Parramatta are entitled to liberal treatment; and if the Public Works Committee will recommend a minimum population, such as we have at present, including the inmates of the George-street and Macquarie-street asylums, we shall be quite prepared to accept the scheme. Mr. Johnston, in his report, gives as a reason why these institutions are not taxed, that the taxes are paid by the owners of property. Attached to his figures, in respect to the ratable properties within the sewerage district, excluding Government institutions and public buildings, is this note—"Includes terrace of ten houses at present occupied by Government inmates (old men), the rates thereon being paid by owner." I may state, for the information of the Committee, that the owner of these houses, taking advantage of the Municipalities Act, which exempts institutions used for Government purposes, refuses to pay the rates, and the council has, consequently, received no rates whatever from those premises. You will see, therefore, the unfortunate position we are in. While the Government are paying for the use of the premises, the owner actually refuses to pay the rates, on the ground that they are used for Government purposes.

349. Does that apply to the water-rates? No. In respect to rates these houses stand in the same position as any Government institution, for the Municipalities Act applies to buildings used for Government purposes.

350. Is the Parramatta water supply laid on to all the Government institutions in Parramatta? Yes.

351. Including the gaol, the girls' industrial school, and the benevolent asylums? Yes.

352. And you do not receive any rates from any of those asylums? Yes; we receive the water-rates from the Government.

353. You say that the question of sewerage has been forced upon the people of Parramatta by the Government, who have concentrated the public institutions on the north-western side of the town, the sewage from which is passed down the centre of the river? Yes.

354. And has thereby become a general nuisance to the community? That is so.

355. If it were not for that, you say that the town of Parramatta generally could do without a sewerage system for some years to come? Yes.

356. Would the case, then, be met if the sewage matter from the Government institutions could be treated on the spot, and if the nuisance which now exists were removed in that way? Yes; I think that would meet the case. That is one of the things we have been endeavouring to get the Government to do for a very long time.

357. I want you to make that clear to the Committee—whether Parramatta generally is clamoring for the sewerage system, or whether it has been forced to demand a sewerage system as the best method of getting rid of the nuisance caused by the public institutions? I think we should be pleased to get a sewerage system for Parramatta as a whole. I merely wanted to show that the question at present is being forced on the council, owing to the deposit in the river of sewage from the Government institutions.

358. Owing to the nuisance in the river which comes entirely from the Government institutions? Well, not entirely. I must admit that Parramatta contributes probably 25 per cent.

359. Then you think on the whole that the people would be willing to accept a general sewerage system? Provided the rate did not exceed 9d. in the £ the people of Parramatta would be pleased to accept such a system, and I fail to see why the rate should exceed 9d. at the present time.

360. But supposing the rate would be 1s.? I do not think the people of Parramatta would be in a position to pay 1s.

361. What rates do you levy in Parramatta at the present time? The annual valuation of the property is £52,831, and upon that sum the council fixes an assessment of 1s. in the £ for a general rate. The amount named represents the valuation for the year 1896–7.

362. How much is levied for a lighting rate? Threepence in the £.

363. How much for a water rate? Ninepence in the £.

364. Is there any other rate levied? In one portion of Church-street there is a rate of 2d. in the £ for street-watering, but it applies to a very small portion of the street, and is levied by request.

365. For the greater portion of the town there is a rate of 2s., and for the remainder a rate of 2s. 2d.? Yes.

366. If the sewerage system would entail an additional rate of 1s. in the £, would the people of Parramatta be prepared to pay that sum? Of course it is a matter for the council to decide, but as far as I am personally concerned, 1s. in the £ is rather more than we anticipate being called upon to pay. We are quite prepared to accept the scheme provided the rate does not exceed 9d., and if, according to Mr. Johnston's report, the sum of £16,000 were excluded, the cost, I think, might be brought within the 9d.

367. If you accept some portions of Mr. Johnston's report, such as that referring to the cost, and also as to the valuation of the property, should you not also accept his figures as to the rate necessary to be struck

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struck to cover the interest on the sewerage scheme? Do I understand that the report has reference to a scheme costing £76,000.

368. No, only £60,000? It is a modification of the scheme to cost £76,000.

369. The resolution passed by the council will make you liable if the cost is £100,000, but the estimate is only £60,000;—you will have to take the risk whether the cost be more or less? Would it not be possible to have a 10 per cent. arrangement made with the Committee; that is to say, if the Committee would allow 10 per cent. over the amount stated.

370. The portion of Parramatta shaded brown on the map, which comprises the storm-water area, but not the sewerage area, would carry a rate of 6d. in the £, in addition to existing rates; therefore for those residents it will mean a total rate of 2s. 6d. in the £; in respect of that portion of the community within the boundaries marked yellow, showing the reticulated area, the cost will be 3s. in the £, including existing rates;—it is for you, as mayor, to say whether you think that would be acceptable to the borough, and whether the borough would be capable of raising that amount of revenue? I can only speak as the executive head of the borough, and I certainly do not think we are prepared to go beyond 9d. in the £. I think the people of Parramatta will be quite prepared to accept the sewerage system on the basis of 9d. in the £, or perhaps a shade more; but I hardly think the council would accept a proposal involving a rate of 1s. Of course, the council consists of twelve men, and I do not know what they might do.

371. You see now exactly what the charge would be—it would be an addition of 1s. in the one case, and an addition of 6d. in the other case;—first of all, do you think there would be any objection to the payment of 6d. for the storm-water rate? I think you have included in the storm-water area a portion that will not be benefited by the storm-water sewers; I think you have made the area far too large.

372. It is proposed that within that area a storm-water rate of 6d. in the £ should be levied, in order to cover the interest on the expenditure;—do you think the council could fairly levy that amount upon the residents of Parramatta embraced in that area? As I have said, there has been included in that storm-water area a portion of the town where the residents will derive no benefit from the sewers as now existing. They would derive a benefit from the scheme if extended, but at present those to whom I have referred derive no benefit from the storm-water sewers.

373. Then many of the residents within that area would object to the payment of this storm-water rate? I am very much inclined to think they would.

374. Of course you are aware that it could not be enforced within that area in a partial manner, and that if adopted at all it must be applied generally? Yes.

375. And you think there would be an objection? I think there might be an objection.

376. If the revenue is not collected from that rate of 6d. in the £, then you must levy an additional amount upon the residents within the reticulated area, and it will bring their rates up to at least 3s. 6d. in the £; therefore, if you say that an additional 9d. is as much as they can stand, that will give you an additional 9d. beyond that; probably many of these matters come upon you for the first time, and neither yourself nor the council have had an opportunity of looking sufficiently into them;—perhaps it would meet your convenience if we postponed these questions until some future day? I should be in a better position to give the Committee information if I had an opportunity of conferring with the council, and of ascertaining more fully the nature of the Departmental proposal in its present shape.

377. What percentage of your water-rates do you collect per annum? Speaking roughly, about 90 per cent.

378. And what percentage of your general rates? About the same.

379. Could you tell the Committee what is the financial position of the borough? We owe £56,600. We pay 6 per cent. interest on £42,000 and 5 per cent. on £14,600. This includes all our indebtedness.

380. *Mr. Roberts.*] Are the 6 per cent. debentures interminable? No; they expire in about six years time.

FRIDAY, 19 *FEBRUARY*, 1897.

Present:—

THOMAS THOMSON EWING, Esq. (Chairman).

The Hon. Frederick Thomas Humphery.	Charles Alfred Lee, Esq.
The Hon. James Hoskins.	John Lionel Fegan, Esq.
The Hon. Charles James Roberts, C.M.G.	Thomas Henry Hassall, Esq.
The Hon. Daniel O'Connor.	George Black, Esq.
Henry Clarke, Esq.	Francis Augustus Wright, Esq.

Frank Farnell, Esq.

The Committee further considered the proposed Sewerage Works for Parramatta.

James Johnston, Clerk, Department of Public Works, sworn, and further examined:—

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381. *Mr. Lee.*] Have you made a calculation to ascertain what would be the charge to the ratepayers in the reticulated area if the estimated amount were not derived from the storm-water area? No, I made no such calculation. I left the storm-water area out of my calculations altogether. Without wishing to put myself in opposition to the engineers, I may say that when I was at Parramatta I saw that these storm-water channels began nowhere and ended nowhere, and I left them out of my calculations, because I thought it was no use to charge a rate for carrying away the storm-water sewage from one district and depositing it in another district without relieving the town.

382. But in the estimate of revenue under the proposed scheme, the storm-water area is to contribute so much. It is held now that a large portion of that area, as a storm-water area, is of no use to the residents. Therefore, if there should be any objection on the part of the council to levy a rate in respect of that area, it would necessarily follow that an increased rate would have to be levied within the reticulated area? Certainly. Of course when the storm-water channels were connected with the sewerage system proper, that area might then be assessed. But in the meantime, so far as I can see, there is no chance of getting the people to pay a rate on the storm-water channels in the condition in which they were when I saw them eighteen months ago.

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383. Could not the output draining the whole of the storm-water area be connected with the sewerage system? That is an engineering question which I cannot answer. But, from reading the correspondence and the papers, I understand the intention is that ultimately the storm-water channels will be incorporated with the sewerage proper. Then, of course, there will be no special rate for the storm-water channels, which will all be covered by the sewerage rate.

384. But at the present time there are two separate estimates—6d. will have to be contributed from the storm-water area, and 1s. from the reticulated area? Not according to my estimate.

385. Is not that the way you make it up? No. My estimate only includes the area served by the sewerage proper.

386. *Mr. Fegan.*] The rate for which would be 9d.? The rate for which ought to be 9d., but 1s. will be required to make it up.

387. *Mr. Lee.*] For the whole area? For the sewerage area proper; not for the whole area of Parramatta, but for the sewerage area only. A rate of 1s. would be required if the old men in the Government institutions are removed. If these old men remain, and a charge of 10s. per head is paid for them, that would do away with the necessity of increasing the rates from 9d. to 1s.

388. If you will turn to page 11 of the printed evidence you will find the following figures given:—

If the same lines are followed in respect to the revenue as in scheme No. 1, the matter will stand thus:—

6d. in the £, derivable for storm-water channels, from £10,034	£252
10¾d. in the £, derivable from £77,071, the annual ratable value of the property on 683 ac.	3,533
Total revenue	£3,785

? I do not know where that estimate came from, but it is far in excess of the actual figures. I explain in my report that I leave out of my calculations the item of £252, because I do not think it could be recovered.

389. Then you confine your estimate to the charge of 1s. in the £ on the sewerage district? Yes. In regard to the storm-water channels, from which 6d. in the £ is estimated to be derived in the figures just quoted, I would point out that the Metropolitan Board do not charge 6d. in the £, but vary their rates from 2d. up to 7d. in the £. In this case I do not think the average rate on the £10,000 would come to 6d., even if the rate could be recovered.

390. You based your estimate on the annual rental value and the unimproved capital value of the properties, as taken from the municipal books, that being the basis of the assessment under the Municipalities Act? Yes.

391. Consequently unless there is an increase in the annual rental value, and in the capital value of properties, the sum estimated is not likely to be exceeded? I do not think so.

392. That is the only source from which an increase of revenue could be derived? Unless the Government institutions paid a higher rate. That is the other main source of revenue.

393. But omitting these institutions for the time, and taking the properties of the borough, you base your estimate of revenue upon the actual assessment of the properties? The actual valuation for that year.

394. If the assessment were to be less in any year, the revenue would be less? Exactly.

395. And if the assessment were greater the revenue would be greater? Yes. I gave reasons in my report for believing that it is not likely that the assessment will be increased.

396. Supposing the borough find that they are not able to pay 1s., and as a matter of fact are not able to pay more than 9d., what would be the reduction? There would be a deficiency of £700 a year.

397. Deducting that deficiency, the net amount of revenue would not be sufficient to pay the interest? Not by £700.

398. *Mr. Wright.*] Do you know anything about the financial position of the borough of Parramatta? Nothing further than I have disclosed in my report.

399. Are you aware whether any sinking fund is provided for the purpose of paying off the £56,000 of debentures? Judging from the council's last published abstract of revenue and expenditure, there does not seem to be any sinking fund, except in connection with the water account. I notice that for the half-year ending 4th February, 1895, they paid to the credit of a special water account in the A.J.S. Bank a sum of £543 18s. 6d., and in the following year they paid into the same account a sum of £418 9s. 10d. I expect that when their balance-sheet is published for the year ending February, 1897, there will be a similar entry.

400. That would show that some provision is being made to extinguish the debt? Yes; but their published statement does not disclose what becomes of this money. In their general statement they say they have paid so much to a special water account, but they do not give a statement of that special water account.

401. They do not take credit for that payment as against the debentures? No; the debt of £56,600 has remained at that sum for some years.

402. As a debit, without any credit? Without any reduction.

403. If what you suppose is the case, and the council makes no provision for paying off this debt, do you think the municipal rates are sufficient to enable them to pay the interest on the debentures, the present taxation, and the additional taxation which would be incurred by the construction of the proposed sewerage works? No; I should think they would feel it too heavy a burden altogether.

404. Their revenue, in fact, would not be equal to the demand upon it? Exactly. In spite of the credit which they have on their water account, their general account is considerably overdrawn.

405. If they pay 6 per cent. interest on the £56,600 of debentures, would not that more than consume the surplus arising from their water supply? I am not prepared to say.

406. Interest at 6 per cent. on £56,000 would represent a sum of £3,360? Yes.

407. That would be much more than the total surplus from their water supply? Yes.

408. Therefore the inference is, that if the Government carried out the sewerage works proposed, the Parramatta council would not be able to make the payments due to the Crown, either for interest or to extinguish the capital amount? They would be able to pay a certain amount, because they would require to burden themselves with an additional rate.

409. But would that rate, in addition to all their other revenue, be sufficient to pay interest on £60,000, the cost of the proposed works, interest on the £56,000 which they have borrowed, and also be able to meet their current expenses;—do you know what their revenue is at the present time? Their revenue from

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the general rate for the last half year published was £1,314, which would be equal to £2,628 for the year. From their lighting rate the revenue for the half year was £338, which would be equal to an annual revenue of £676. Their water supply yielded a revenue of £2,170 for the half year, equal to £4,340 for the year. These being the principal sources of revenue give a total sum of £7,644.

410. What is the estimated annual expenditure for the maintenance of the proposed sewerage works? £3,603.

411. If you add to that the sum of £3,360, interest on the debentures, that would make a total of £6,963, as against their revenue of £7,644, leaving a sum of £681 to carry out all municipal works;—with these figures before you, do you think the borough of Parramatta is in a position to pay anything like a rate of 1s. in the £ for sewerage? No; I have said that another rate of 1s. in the £ is too heavy a burden for them to carry.

412. If the Committee recommend the present scheme, and Parliament approves of it, would you be prepared to recommend that the works should be handed over to the municipal council of Parramatta, with any reasonable hope that they would ever meet their engagements? Judging from my experience of other places, I do not think they would be able to meet their engagements properly.

413. And there would be a repetition of what has happened in connection with the Country Towns Water and Sewerage Act where, after the Government has carried out certain works for country municipalities, those bodies have afterwards practically repudiated their obligations? That would just be about it. I think.

414. *Mr. Fegan.*] Your statement in regard to the financial aspect of the case was based, I think you said, on the supposition that the inmates of the George-street and Macquarie-street Asylums would be removed to Bankstown? Yes.

415. What institution exists there for their accommodation? The asylums were to be built. The plans were all drawn up in 1895, and everything was ready. Before I wrote my report I understood from the Principal Under Secretary that their removal to Bankstown would be carried out almost immediately, the Department being then very anxious to get them away from Parramatta.

416. I suppose you know that nothing has been done yet towards removing those old men? Yes.

417. I think your statement was to the effect that if these old men were retained in Parramatta, a rate of 9d. in the £ would cover all charges in connection with the sewerage scheme? Yes; because you would get an extra £700 from the 1,300 or 1,400 men.

418. I think your duties consist in looking after the various water and sewerage accounts for the Colony? I have been engaged in that work.

419. You initiated the system in Newcastle when the Act was passed? Yes.

420. So that, from your experience, you have a thorough knowledge of the probable revenue to be derived from these schemes, and more especially from the one under consideration? Yes.

421. Are they in great need of a service of this description in Parramatta? I think they are.

422. Having been there, and having obtained a knowledge of the circumstances, I thought you might be able to say whether or not the proposed scheme was absolutely necessary, considering the low condition of the finances of the borough? I have not the slightest hesitation in saying that a sewerage system is absolutely necessary in Parramatta in order to remove the nuisance that exists; but as to whether the present scheme is the right one or not, I cannot offer an opinion.

423. With a view to comparison with Parramatta, could you give the Committee an idea of the position of, say, half a dozen of the principal municipalities in regard to their water and sewerage works. I want to compare the taxation of other municipalities with the taxation of Parramatta, including that under the proposed scheme? I think you may take Parramatta as representing the generality of municipalities throughout the Colony. There is a general rate of 1s.; where they have gas, they have a lighting-rate of 3d.; and they have a water-rate of 1s. In Parramatta the water-rate is only 9d., so that the other country municipalities have a slightly greater burden in regard to rates than has Parramatta. There is no country municipality without a shilling rate for water.

424. And in most cases they have a better water supply than Parramatta? Yes.

425. With an average rainfall, the people of Parramatta make a surplus out of their water supply of £1,784 11s. 6d.? Yes.

426. From that they deduct £800 to pay principal and interest? They pay annually £876 for interest on the proportion of debentures which they have debited to the water works.

427. Then in a fair season they have something like £800 or £900 to the good? No; they have £1,784 after paying the interest.

428. So that with average seasons as regards rainfall, the people of Parramatta would be able to meet their liabilities from year to year? Yes.

429. Supposing they have a profit of £1,700 on their water supply every year, they will be able to meet their liabilities; but would they be justified in amalgamating the water and sewerage services, and in saying "we will take the profit from our water supply to meet the loss on the sewerage service?" I do not know that they would be justified in doing that.

430. And you would not recommend it? I would not recommend it. I say that any scheme of sewerage carried out ought to be able to pay for itself.

431. Then even considering the water surplus to be sound you would not recommend the combination of the sewerage and the water services? I do not think the council would be justified in playing off the one against the other.

432. The object of your report was to show the Minister whether or not there was any probability of the scheme being remunerative? Yes.

433. That being so, is it not a fair thing to ask your opinion as to whether, supposing the surplus from the water supply of £1,784 to be sound, the water and sewerage services should not be combined? It is quite justifiable I should think.

434. And feasible? Quite feasible and quite justifiable too. But the council has been so long accustomed to the credit balance from its water supply, which it has devoted towards its general operations in the borough, that it would be very hard to induce it to part with it.

435. *Mr. Roberts.*] On page 13 of the evidence Mr. Davis, in his estimate of revenue, has this item: "Public buildings and land, £3,200 at 11d.";—is that an 11d. rate? That is the 11d. rate which was adopted by Mr. Davis, but in my estimate of revenue I calculated for a 9d. rate and a 1s. rate.

436. The 11d. rate appears to suffice according to the figures given by Mr. Davis? It would suffice if you got the £252 from the storm-water channels. But as I have omitted that £252 from my estimate of revenue, I have provided for a rate of 1s. J. Johnston. 19 Feb., 1897.

437. Why did you omit, in your estimate, the rate of 6d. in the £ from the storm-water channels;—did you think there would be a difficulty in getting the people to pay it? I found that these storm-water channels were not available for the purposes for which they were intended. They began nowhere, and they ended nowhere, and I thought it would be unfair to call upon the people along the banks to pay a rate for their construction, considering that they did not get the full use and benefit of them, inasmuch as the channels did not carry away the drainage.

438. You thought there would be numerous protests against the rate on the part of the ratepayers? Yes. The Metropolitan Board are finding great difficulty in recovering the rates on the storm-water channels, against which there are many objections and protests.

439. Therefore, if this item of £252 were omitted from the revenue, a rate of 1s. would be required? Yes.

440. In the same part of the evidence just quoted from there is this item: "Present cost of pan system, £1,598 14s. 4d.";—is that for the whole of the Government institutions? No. The hospital for the insane has its own arrangements for removing the night-soil. That excludes the hospital for the insane, but includes all the other Government institutions.

441. If this scheme were carried out, would the Government save that sum of £1,598? That represents the total amount collected by the council under the pan system.

442. How much of it is paid by the Government? £694 is paid by the Government, in addition to which they provide arrangements for removing the night-soil from the hospital for the insane.

443. If the George-street and Macquarie-street asylums were closed, what would then be the cost of the pan system? I could not give the figures. I have no doubt, however, that the cost of removing night-soil from the George-street and Macquarie-street asylums will amount to a large proportion of that £694.

444. *Mr. Hoskins.*] Why did you suggest that in the event of the sewerage system being carried out the Government should pay 10s. per head for the inmates of the institutions at Parramatta, seeing that they now only pay 6s. 8d. per head? The latter sum has been calculated as about the cost of the pan system. It must be remembered that if the sewerage scheme were carried out, these institutions would not only have the night-soil removed, but they would also have additional water.

445. What additional water? A sewerage scheme cannot be worked without a large supply of water. The cost of the pan system being 6s. 8d. per head, it is well worth an additional 3s. 4d. per head to have a full supply of water, and to ensure extra cleanliness.

446. If the proposed sewerage scheme were carried out, and a rate were levied within the sewerage area, what, according to your calculations, would each person pay on an average for sewerage? I estimated the population served at 7,500, and the ratable valuation of the property at £52,000, giving a return of £1,981, which would come to 5s. 3d. a head.

447. Why did you recommend that the Government should pay 10s. a head for each inmate of the institutions, where a large number of people are congregated within a small space, thus affording greater facilities for the disposal of sewage, and requiring a shorter length of piping, when at the same time you considered that the people within the reticulated area should only pay 5s. 3d. per head? In answer to that perhaps I may be allowed to quote from my report. I say:—

> But in the case of Parramatta there are two special circumstances which materially affect the amount of rates to be levied on the Government institutions. Firstly, it is alleged, and no doubt with some force, that these institutions are the chief cause of the necessity for a sewerage system, and that in their absence, the town itself might continue to carry on for many years with its present methods, and without being compelled to undertake the construction of costly sewerage works. Secondly, the water supply of Parramatta is very limited, and at the same time extravagantly used (the consumption per head is nearly double what it is in Sydney).

Although I have not said so in my statement, I am inclined to believe that the large excess takes place in these Government institutions. There is such a mania for what they call cleanliness and the slushing of water all round, that they use far more than any ordinary household would use in proportion.

> Consequently it is frequently taxed to its utmost power to meet the demands upon it. The working of the proposed sewerage scheme would entail upon it such further large demands that the council would be compelled to add greatly to their existing source of supply, and the only method by which they could do so is by purchasing water from the Metropolitan Board. This means extra expense to the council, and as it is admitted that the Government institutions would consume a larger quantity of water for sewerage and cleansing purposes proportionately than the townspeople, it is only fair that they should be made to contribute a full ratio of the cost of working the scheme.

Those are the two reasons I gave why 10s. per head should be charged on the Government institutions.

448. One reason is because the inmates of the Government institutions are more cleanly in their habits than the people who reside in the reticulated area in Parramatta, and secondly, because, although the inmates of the institutions are more concentrated, and a less extent of piping would therefore be required to take away the sewage, the Government should pay a very much larger amount in proportion for the service rendered than should the people in Parramatta;—is that what you mean? I mean to adhere more especially to the first reason I gave—that these institutions are the chief cause for the necessity of a sewerage system.

449. *Mr. Humphery.*] Is this the position: at the present time the Government institutions treat the solids apart from the fluids? I am not prepared to say what method is adopted.

450. You can say whether, in the Government institutions, the slops are removed by the council under the pan system? That is done in the case of all the institutions, except the hospital for the insane, which is one of the largest.

451. In most of the private houses the slops do not go into the pans? No.

452. Is the same system pursued in the Government asylums? I could not say.

453. You are not aware what system obtains at the present time? Of course I am aware of the existence of the drains from the asylum and the gaol, and all these other places, by which everything goes down into the river.

454. Being aware of that, does it not follow that in addition to the removal of the contents of the pans the Government institutions will have the privilege of connecting their drains with the proposed sewerage system, and thereby gain a benefit? Yes.

455. What is the present cost of the pan system to the Government institutions? I do not know the cost in the case of the hospital for the insane, where they have their own arrangements for the removal of the night-soil; but omitting that institution, the cost is £694 a year.

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456. What will be the cost under the present proposal? It will be 10s. per head on 1,580 inmates, amounting to £790—apparently a cost of £90 over and above the present expenditure.
457. And for that additional £90 the institutions will have the benefit of connecting with the sewerage system now proposed? Yes.
458. Practically, therefore, the extra charge is unappreciable? That is so.
459. And they get a complete service? They get a complete and effective service for about £100 more.
460. Under the pan system what do the residents pay? I cannot say what they pay per head, but I can give you the amount of money collected for the year.
461. Then in order to make a fair comparison, it would be necessary to ascertain the number of people served? Yes; and another point is the frequency with which they are served.
462. You have referred to that in your report? Yes.
463. Is this the present position: The revenue derived by the corporation from the pan system is nearly £1,600, and the expenditure under the sewerage scheme for interest, redemption, and maintenance will come to about £3,603. Therefore, the difference of £2,000 would have to be contributed by the public and the Government institutions? Yes.
464. Do you think the burden has been fairly divided? In regard to the amount raised from Parramatta, it must be considered that it is not everyone who pays. I was told when I was in Parramatta that, even in the centre of the town, certain people are allowed to bury their night-soil in their gardens, for which they pay nothing at all; but they will be obliged to pay the sewerage rate.
465. I only wish to know whether, proportionately, this difference of £2,000 will be fairly borne by the Government institutions and by the residents of Parramatta? What I said before was, that calculating a population of £7,500, the revenue derived would be £1,981, which would be only 5s. 3d. per head, and we propose to charge the Government 10s. per head.
466. *Chairman.*] And then there will be a deficit of £700? Yes.
467. *Mr. Humphery.*] Then your calculation of £2,916 is irrespective of the item of £252 to be derived from the storm-water sewers and of the 10s. per head that will be fairly obtainable from the pauper institutions if they remain in Parramatta? Yes.
468. Assuming that the pauper institutions remain at Parramatta for several years longer, the burden will not be greater than 9d. in the £? I estimate that 9d. in the £ will pay under those circumstances.
469. What will be the additional cost of the proposed system of sewerage to the ratepayers after giving credit for the present cost of the night-pan system? I think about 6d. in the £.
470. Mr. Wright asked you whether, after paying about £7,000 for interest, and the cost of this proposed scheme annually, there would be left no more than £681 for the general purposes of the borough, and you assented to that? Yes.
471. Have you not left out of consideration the expected revenue from the sewerage system? Yes.
472. And are you now prepared to modify the opinion you expressed as to the inability of the council to meet the annual charge in connection with the proposal before the Committee? Before giving a decided answer to that question I should like to work out the figures a little more carefully, as I think there are other charges which would have to be taken into account.
473. *Mr. Wright.*] The expenses connected with the working of the municipality, for instance? Yes.
474. *Mr. Humphery.*] A statement was made yesterday by the mayor of Parramatta to the effect that if the Government paid by meter for all the water consumed, their annual contribution to the water fund would be much larger than it is at present;—have you gone into that question? The one man who can give you definite information on these matters is Mr. Beaumont, the assessor to the Metropolitan Board. He has a great many Government institutions to assess, and he has tried, I think, to work one or two of them by both methods—first of all, on the basis of so much per head, and then so much by the meter, and I am not sure that there is any great difference between the two methods. There is only one thing to be said in favour of a meter, and that is that its adoption might make the heads of these institutions a little more careful in the use of the water, and not waste so much; but I do not know that it would make much difference in the actual revenue.
475. Has the Government claimed exemption from the water-rate in connection with any of the properties possessed by it in Parramatta? No, not as far as I am aware. It cannot do so, because the water supply at Parramatta is a private one, and does not come under any Act. The council can charge any rate it pleases to the Government institutions. The only argument that might be brought to bear upon the council is this, that the Prospect water supply is so near to these institutions that the Government might turn round and say, "We do not want your water; we will go to the Metropolitan Board, and get water from them."
476. If the houses used by the Government in Harris-street are connected with the water-supply system, are you prepared to say that the council would receive rates in connection with them? The Macquarie-street asylum pays by meter at the rate of 1s. per 1,000 gallons, and the George-street asylum pays the same. The rates on the Harris-street premises are at present paid by the owner of the property.
477. I notice that some of the institutions are charged by meter and some at so much per head? Yes.
478. What is the difference per head if you reckon the whole on the same basis? For the half-year the council recovered in respect of the Macquarie-street and George-street asylums £432, which would mean £864 for the year; that was by meter. Assuming that there are 1,500 men in these two asylums, at 10s. per head, that would be £750, as against £864 by meter.
479. So that there would be a very slight difference? Very slight; and without speaking with any degree of certainty, I think that has been the experience of the Metropolitan Board with regard to one or two of the larger institutions in the metropolis.
480. Therefore, the statement that the Government would have to pay more if they used the water by meter is not quite supported by the figures? I do not think so. My opinion is it would not make much difference; and then meters are such a nuisance and trouble that the institutions are much better without them if they can come to some other arrangement.
481. *Mr. Lee.*] What rate of interest did you adopt in calculating the interest on the municipal loan? The repayment of the loan is spread over a period of 100 years, and the interest charged is £3 10s., to which has to be added 2s. 4d. for the sinking fund.
482. Have you any knowledge of the action of the Department in connection with loans for water and sewerage in country towns;—have there been any instances of default on the part of those who borrowed the money in paying their annual instalments? There has been no actual default, although we have had considerable trouble with two or three of them.

483.

483. Is it not correct that any money lent under the Country Towns Water and Sewerage Act gives the Government a first charge, not only upon the rate derivable from the water or sewerage, but also from the general revenue? The Act expressly states that the repayment of the debt shall be a charge upon all revenue from whatever source derived. J. Johnston. 19 Feb., 1897
484. Is it a first charge? We always understood it to be a first charge upon all sources of revenue.
485. Therefore, if a borough is mortgaged up to its revenue at the present time, any additional liability taken over by the council must necessarily be at the cost of the mortgagees? That is a point that is open to question. Perhaps I may give you an instance which has occurred. The Forbes people constructed gas-works, and they mortgaged these works and the rates arising from them to the contractor. Afterwards they got a loan from the Government on account of their water-works. The Crown Solicitor has advised the Minister that he would be quite justified in freeing the gas-works rate from the mortgage taken by the Government over the revenues of the borough, inasmuch as the gas-works were in existence before the Department made the loan to the borough. In one or two other cases, where applications have been made to erect gas-works, they want the Government to forego that clause, and to agree that any rates from gas-works to be erected shall be exempt from the mortgage. But the Crown Solicitor advises that we cannot go behind the Act in that instance, and that all rates from whatever source derived must be subject to the mortgage over the water-works.

WEDNESDAY, 24 FEBRUARY, 1897.

Present:—

THOMAS THOMSON EWING, Esq. (Chairman).

The Hon. Frederick Thomas Humphery.	Charles Alfred Lee, Esq.
The Hon. James Hoskins.	John Lionel Fegan, Esq.
The Hon. Charles James Roberts, C.M.G.	Thomas Henry Hassall, Esq.
The Hon. Daniel O'Connor.	Francis Augustus Wright, Esq.
Henry Clarke, Esq.	Frank Farnell, Esq.

The Committee further considered the proposed Sewerage Works for Parramatta.

Thomas Moxham, Mayor of Parramatta, sworn, and further examined:—

486. *Mr. Lee.*] I think that when you were last here you promised to consult your council with reference to the figures and statements which have been laid before this Committee. Have you had an opportunity to do so? Well, I have consulted the council, but I find that there is a great diversity of opinion, and you could well understand that that would be the case. The impression in the council is that the sewerage scheme would be a great acquisition to the town, and that it would be very desirable to have it brought about—that it should be adopted. It is purely a matter of cost. That is the only thing which is occupying the mind of the council. T. Moxham 24 Feb., 1897.
487. Has the council taken into consideration its present liabilities, and the security it has given to cover them;—I believe you have a debt of some £56,000? That is quite correct.
488. Are not the whole of the revenues of the town mortgaged to guarantee the repayment of that amount? That is so.
489. You are aware, I suppose, that if these sewerage works be carried out and handed over to the council, the whole of your revenue would be a first charge for the repayment of the interest and principal? Of course, I understand that that is a provision which the Government can enforce if it chooses to do so; but, seeing that the sewerage can be worked out on such a basis that it can be made to pay for itself, and that we have a debt of only £14,000 on the water works, and that the two things could be combined, I do not think there can be any doubt as to the capability of the town to pay for the scheme.
490. That is, taking one loan on the combined security. What you mean by getting rid of the £14,000, I suppose, is that you could raise money from other sources with which to pay it off? Without any doubt.
491. And you think that the revenue derivable from the two things combined would be more than sufficient to pay the interest and sinking fund? I think that when the Government come to examine the sources of revenue of the town, they will realise in one moment that we are well able to enter upon the scheme under an agreement such as would be fair to the town, and which I venture to suggest.
492. You think the council would be in a financial position sufficiently good to undertake the work without unduly pledging the ratepayers? Quite so.
493. The next question is this: Do you think that the ratepayers, as a whole, are desirous of discarding the system they now have and of adopting a more costly one? Of course, as I have already said in regard to the council, there is some diversity of opinion on the point. The moment you ask a man to put his hand into his pocket for anything he is bound to raise some objection. You will find that some of the people object to it; but a majority of them are in favour of the proposed scheme. I think that if a vote were taken that would be found to be the case.
494. In addition to the rates you enumerated when you were last here, is there not another rate paid by the ratepayers called a nuisances prevention rate? Yes.
495. Is that rate levied by the council? Yes.
496. Was that included in the total of 2s. you gave the other day? I should like to amend that portion of my evidence by adding the rate on account of the nuisances prevention account. There is a pan system, and 3d. a pan is charged for emptying.
497. That charge, I presume, relates, not to the houses, but to the pans? Yes; it is 3d. a pan. If there is more than one pan, of course more than 3d. is paid. The charge is upon that basis.
498. Those who use the pans have to pay the charge? Yes.
499. Are the whole of the residents compelled to use the pans? In most cases they do.
500. But there is no law compelling them to use them? There is a law. But Parramatta is situated in this way—that in many cases people have been able to purchase small homesteads on the outskirts, where they

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they may have an acre of land or so, and it is thought by the people of Parramatta that it would be a great hardship to force these persons to have their pans emptied by the council when they could deal with them themselves on their own property at no cost and with considerable advantage.

501. What is the system generally obtaining in the borough? The pan system.

502. Is there much of the pit system remaining? Very little.

503. You have a law compelling persons to use the pans? Yes.

504. And it is only in a few cases such as you have enumerated where, as a matter of policy or discretion, pans are not used? That is so.

505. In the centre of the towns, where the bulk of the population is to be found, the pan system is adhered to without exception? Yes.

506. What revenue is derived from the pan system? In 1894–5 the amount was £1,463; in 1895–6, £1,620; and in 1896–7, £1,702.

507. Then when you are considering the annual charge for the sewerage rate, you know that you have to deduct the amount which you are now levying in the shape of a pan rate? Quite so.

508. Although at the present time there may be a certain proportion of people who do not pay the pan rate, they will all have to pay the sewerage rate? Either that or the storm-water rate.

509. The Department does not set any value upon the revenue derivable from the storm-water area;—it is of opinion that that amount will never be collected, and it has confined its calculations to the amount derivable from the reticulated area where the rate will be 1s. in the £;—if the part of the borough which is proposed to be served by the sewerage scheme will stand 1s. in the £, and that amount would be sufficient to pay interest and principal, then if only 9d. in the £ were paid there would be a shortage of about £700 a year? Am I to understand that in the whole of the area served by the storm-water sewer there will be no contributors.

510. That is so? Then that would necessitate a heavier charge in that part of the town served by the sewerage.

511. The question is, whether the ratepayers can stand the additional 1s. in the £? That brings me to that portion of Mr. Johnston's report in which he refers to the Parramatta water supply. Since I was here last week, I have gathered sufficient evidence to be able to point out to the Committee that instead of the Government treating Parramatta in a liberal manner, they are, in respect of the charge in the institutions, treating it illiberally as compared with the way in which Darlinghurst Gaol is treated by the Water and Sewerage Board. In that case the contribution is much more than 10s. 6d. per inmate. The contribution is under the meter system. The authorities wanted to contribute 10s. 6d. per head, but the Water and Sewerage Board refused that absolutely, and said that they preferred to make a charge by meter. The gaol is in the position of contributing to the Water and Sewerage Board more than would be contributed to us by the inmates of the institutions at Parramatta at 10s. 6d. per head. In addition to that, the fact of the gaol authorities using the water by meter, would make them more economical in its use than they would otherwise be. The same precautions might not be taken at Parramatta, where so much a head would be paid. I think, therefore, that the Government is reaping an undue advantage from the water supply of the town, and that Mr. Johnston is in error when he says that 10s. 6d. per head is a liberal contribution.

512. Your contention is that the Government should pay more than it is proposed that they should pay for the water? Quite so.

513. Then there is this remaining point,—that there is an absence of any authoritative statement from the council on the question;—we should like to hear that? Upon what point.

514. As to whether the council are prepared to accept this proposal? That would necessitate a resolution. As soon as the proposal is definitely decided upon, I take it for granted that it will be submitted to the council for their approval or rejection.

515. But this Committee is open to receive an expression of opinion from the council, as representing the people generally, in favour of, or against the scheme;—there may be a strong feeling against it or in its favour, and in such a matter the Committee would naturally accept the council as the mouthpiece of the borough? The council has taken no vote upon the question; but it has been before that body for a number of years, and it is constantly cropping up. We have never had the voice of the people raised against the proposal at any time, and I take it that as no objection has been raised against it they are quite prepared to accept it.

516. Has any meeting been held in opposition to this particular scheme? Not to my knowledge. Meetings have been held to advance the scheme but not to oppose it.

517. Has there been any public action of any kind whatever for or against the scheme since its reference to the Committee? At different times meetings have been called to urge the Government to go on with the sewerage scheme in view of the stench arising from the noxious matter which the Government have concentrated in the bed of the river. No other meetings have, to my knowledge, been called.

518. Are you in a position to say definitely to-day whether, if the outflow of sewage from the Government institutions were intercepted and dealt with locally, that would meet local requirements for many years to come? It would certainly give relief to a very great extent. But seeing that that would entail a very great deal of expenditure, we think that it would be of advantage to both parties that a sewerage scheme such as that proposed should be gone on with.

519. If there were not a nuisance such as exists at Parramatta, said to be caused by the discharge from the Government institutions, do you think there would be any demand made upon the council for a large and expensive sewerage scheme? I do not.

520. The present position of affairs appears to be this: that, in order to get over the difficulty which has been brought about by the Government institutions, Parramatta is asked to take over a large and expensive sewerage system, the payment for which it will be responsible? Quite so. We are quite ready to face that position. But we think that the Government should meet us as far as they reasonably can in a contribution towards the expense of the scheme on account of their local institutions. Parramatta is willing to contribute any reasonable amount to the cost of the scheme.

521. You are aware, I suppose, that the Government will have to take over the whole of the liability—that the whole of its revenue will become liable for the repayment of principal and for the interest? That is a matter of detail, I presume.

522. It is a matter of law. You will undertake the absolute responsibility for the repayment of the outlay

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outlay, and the scheme will deal largely with the outflow of sewage matter from Government institutions. Therefore the question for you to consider is whether the Government ought not to intercept and deal with the sewage matter from their institutions, instead of committing the towns to an expensive sewerage scheme? We are quite prepared to meet the Government if it is prepared to carry out the scheme.

523. What you say is that you are fully prepared to take over the scheme upon the understanding that you will receive remuneration from the Government institutions upon a fair basis? Exactly so.

524. Do you think the people are prepared to pay an additional rate of 1s. in the £? That raises a difficult question. In the first place, I find from Mr. Davis' report that the council is charged £6,931 on account of the sewage farm, an area of 31 acres. I think the Committee will agree with me that this farm was proposed for two distinct purposes—one in order that the bed of the river might be dredged, so that it might not eventually silt up altogether, the other reason being to meet the eventual requirements of Parramatta. This land was purchased at a cost of £6,931. If the land were purchased to-day I think that a liberal price to pay for it would be £50 an acre. I think that a charge of £1,600 would be quite sufficient to meet the case.

525. When did the Government purchase the land? About six years ago I believe. I think they gave £200 an acre for it. Twenty-five pounds an acre would be a fair allowance, but I have allowed £50. Another reason why I do not think such a high charge should be made against Parramatta is that later on the farm will be used by the Granville council. For that reason alone I think that we should be exempt from the entire charge. At all events, I think, seeing that the Granville council have an opportunity to come in and use the farm at some future time, they should be made to bear a proportion of the cost. I do not think the whole charge should be made against Parramatta until Granville chooses to come in. It would not be fair to charge Parramatta for a larger number of acres than is absolutely necessary, seeing that Granville willl have an opportunity to come in later on and make use of the area which is superfluous, so far as Parramatta is concerned.

526. What is the area of the sewage farm? Thirty-one acres, I believe, according to Mr. Davis' evidence.

527. If Granville came in and relieved you of a portion of the cost, that would enable you to strike a lower sewerage rate;—for instance, it might enable you to make a reduction of 1d.? Yes; and that is a considerable item in a rate.

528. Have you estimated the proportion of the nuisance rate to the general rate? I think the nuisances prevention account contributes now about 6d. on the general rate.

529. That would be equal to about 6d. in the £ on the general rate, which is 1s. in the £? Yes.

530. Do you think that the ratepayers would be prepared to pay that additional rate in the £? As I have said, I think the Government, under the proposed scheme, is not treating the people of Parramatta in a liberal manner. The present population of the different institutions is about 3,000. The Government proposes at some future time to remove, in round numbers, about one half of that number—say, 1,500. But I think the council might fairly ask that the Government should contribute upon the basis of the 3,000 for a period of say ten years. It will cost a considerable amount of money to house these 1,500 people, and probably some years will elapse before they can be removed.

531. Does Parramatta wish to keep these old men in and about the town? We are quite satisfied if they will pay. We will keep anything that will pay. The town is not anxious to remove any of the Government institutions, as far as I know.

532. How much would you gain by the proposal you have made? Roughly speaking, about £750.

533. That will make the rate 9d.? Yes.

534. The repayment of the principal is spread over 100 years, but a number of the old people may be removed, and probably will be removed within the next three or four years. If they are removed it means so much less revenue to the council? Quite so. That is why I say that I think it would be a fair thing if the Government would agree to a payment for ten years upon the minimum basis of 3,000 inmates.

535. I think you would be wrong in proposing that the Government should give a guarantee such as you suggest for a number of years. Therefore it would be better for your council to face the matter at once, and see whether, upon your available revenue, you are in a position to accept the scheme or not? I feel sure that the council would fall in with such an arrangement as I suggest, and if it were adopted, I feel satisfied that at the end of ten years we should be able to pay the rate of 1s. in the £.

536. Do you anticipate a large increase in the population within the next ten years? I think the very fact of the town being served by the sewerage system will tend to increase the population to a considerable extent. The banks of the Parramatta River at the present time are not built upon by reason of the stench arising from the river. A very good class of residences would be erected there but for the existence of the nuisance.

537. Property on both sides of the river-banks has been practically destroyed by the open sewer? Yes.

538. Supposing your suggestion in regard to the Government guarantee is not carried out? Failing that, the Committee might see fit, in its wisdom, to recommend that the charge for Government inmates should be raised by, say, one-half the difference, and the council might then be able to meet the Government from that standpoint.

539. Either the rate should be increased per head of the stipulated number, or there should be a minimum charge of 10s. a head for 3,000 inmates for ten years;—that is your proposal in effect? Yes.

540. *Mr. Wright.*] Can you tell the Committee the total revenue received by the borough during the past three years? In 1894–5 the revenue was £10,934; in 1895–6 it was £11,610; and in 1896–7, £11,403.

541. Can you give us the details? Yes; in 1894–5 they were—general account, £3,879; water account, £4,406; night-pan account, £1,463; lighting account, £849; baths and market account, £270; street-watering account, £64. In 1895–6 the details were—general account, £4,255; water account, £4,579; night-pan account, £1,620; lighting account, £823; baths and market account, £243; street-watering account, £87. In 1896–7 the details were—general account, £3,979; water account, £4,635; night-pan account, £1,702; lighting account, £793; baths and market account, £208; street-watering account, £83.

542. There appears to be a small decrease in the lighting account. Yes. The difference altogether between the revenue of 1895–6 and 1896–7 is £207.

543. The reduction in the general account is, I presume, due to the reduced assessment on account of the reduced value of property? That, of course, would have its effect. In some years the council are more fortunate than in others in collecting back rates.

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544. Will you give us your disbursements for the same period? They were, roughly, about £9,000 for each year. That would be interest, wages, salaries, material, and all charges levied against the borough.
545. So that in 1896 you practically had the sum of £2,000 to the good? That is not so, because the water gave out for some time, and we had to pay the Water and Sewerage Board £2,400 for water.
546. Then in round figures your disbursements were £11,000? Yes; that shortage of water happened only once in fourteen years.
547. You have a municipal debt of £56,000 secured by your rates? Yes.
548. And you pay 6 per cent. for that? With the exception of £14,600, in respect of which we pay 5 per cent.
549. Is there any provision in the municipality for the extinction of that debt? No.
550. The interest in round figures would be £3,300? Yes.
551. And the working expenses of the water scheme and the interest payment is £3,805 per annum? Yes.
552. What is the cost of your municipal government in other respects—wages, salaries, repairs to streets, and other incidental expenditure? The salaries chargeable would be about £836.
553. What does it cost for the street-repairing, metalling, and rolling, and all that sort of thing? It would be impossible to get at that account very accurately.
554. Can you give the amount approximately? The total disbursement would be about £2,000.
555. When the sewerage scheme was completed you would have to add £3,800 on account of the repayment of principal and the payment of interest? Yes.
556. That would make your expenditure, approximately, £9,000 per annum? Yes.
557. You think that that would not be exceeded? No.
558. Supposing that in dry weather you had to pay another £2,000 for your water, what would you do then? The council has been waiting for some time to see what would come of this sewerage scheme. It is the intention of the council to make a larger provision for the holding of water, so that there will be no risk of the supply giving out.
559. Could you get the additional water required for the sewerage system in your catchment area without incurring a large additional cost? I think so, in a fair season.
560. It is proposed to adopt a water-carriage sewerage system, and that will involve the use of double the quantity of water you now use? That is so.
561. Could you then increase your watershed without any very great outlay? Giving my own view of the matter, I think we could.
562. Is the catchment area of the water supply becoming populated? I do not think there is any likelihood of its becoming populated. The ground is of a very rocky nature, and is unsuitable for private dwellings. It is unsuitable for agricultural purposes throughout the whole watershed.
563. Is not the watershed towards Pennant Hills becoming more populated every day? Yes, it is becoming populated. It was covered by orchards, but the orchards are being done away with on account of the land becoming more valuable. I do not regard that portion of the creek as affording the main supply. The main supply is from a creek which runs in a different direction altogether.
564. You do not think that the water is likely to become so contaminated as to become unfit for use? I do not.
565. You say that you think that Parramatta can bear the burden of this scheme, because the fact of the establishment of the sewerage system will lead to larger residential population? Yes.
566. That would mean a larger supply of water? Yes.
567. Do you think that you can obtain that larger supply from the present source? Yes. In an exceptionally dry season perhaps provision could not be made for it, but in an ordinary season we could do so. It would only be on rare occasions that we would have to resort to the Nepean supply.
568. To increase the supply would mean an increase of expenditure, and that in its turn would mean an increased burden upon the people of Parramatta? The water account would be well able to stand it.
569. Having regard to your present revenue, and the revenue which you are likely to obtain, you think you can maintain the burden involved in this expenditure of £60,000? As I have said, the Government should treat us more liberally in respect of their institutions.
570. You are aware that some time ago a scheme was submitted to this Committee making provision for the removal of the aged and infirm from Parramatta; that scheme was dealt with, and sooner or later, I presume, it will have Parliamentary sanction. You have therefore to consider that in two or three years' time the whole of the old men from the Macquarie-street and George-street asylums will be taken from Parramatta. What would be the effect upon your revenue if the Government shut up those buildings, and if they were rated simply as empty buidings. You are aware, I suppose, that the Committee can only recommend a basis of agreement to the Government. Do you think that it is likely that the Government will undertake the responsibility of paying to Parramatta for a period of ten years a large sum of money to supply sewerage for a number of persons who may be there only a few years more? I do not think there is any chance of the old people being removed in the near future, and I thought that a payment upon a basis of 3,000 for ten years was a fair proposal.
571. What you say in substance is this: that the people of Parramatta desire a sewerage scheme, but that they are not quite certain whether they can bear the cost; they want the Government to bear a certain proportion of the cost by guaranteeing a certain annual payment for ten years? That is one way of looking at it, but we do think that we are entitled to liberal treatment at the hands of the Government in respect to its institutions.
572. You think that these institutions have to a great extent caused the nuisance from which the people of Parramatta desire to be relieved? To a great extent.
573. Do you know that the Meat company has been pouring its soup into the Duck River at its confluence with the Parramatta River? I am aware of that.
574. Would not the discharge of that soup into the Duck River have an influence in filling up the Parramatta River? I have never given a thought to that part of the subject, because I had assumed that if anyone were blocking up the river the Government would step in and prevent them from doing so.
575. What would be the result of the pouring of hundreds of thousands of gallons of soup into the river at low tide;—do you not think it likely that it would be washed up the river, and that it would affect it as far as Lennox Bridge? I cannot say.
576. You have not considered that aspect of the case? No.

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577. Will you, or some other member of your council or your inspector of nuisances, visit the locality to which I refer, and ascertain, if possible, the effect of this discharge of soup upon the sanitary condition of the Parramatta River? I would suggest that the Committee should obtain the information through some other body, because we should be placed in rather an awkward position in asking our inspector of nuisances to report upon a matter outside the boundaries of the town.
578. I suppose you do recognise this fact—that the large quantity of offensive matter going into the river at the point to which I have referred would tend to pollute it up as far as Parramatta under the influence of the inflowing tide? It might have that effect.
579. A very large proportion of the nuisance then, that you have ascribed to the Government institutions, might fairly be ascribed to this inflow of soup? That may assist in polluting the river, but the most common complaint in connection with the river has been that the general drainage from various Government institutions becomes blocked-up for several months, and that suddenly a large body of matter, which has accumulated in the pipes, is discharged into the river, with the effect that a great nuisance is caused.
580. The sources of nuisance are the gaol, the lunatic asylum, and King's School, are they not? I may mention that the Government allowed King's School to connect with the system without consulting the council.
581. The benevolent asylum has an arrangement under which it buries the nightsoil? The hospital for the insane does so.
582. All that it discharges into the river is ordinary slop-water? The slop-water of the hospital for the insane contains very much objectionable matter.
583. Does the gaol discharge the whole of its drainage into the river? No.
584. It also has the pan system? Yes.
585. So that the only institution which discharges its nightsoil into the river is the King's School? That is merely connected with the drain in the same way as are the other institutions.
586. That is to say there is only a discharge of slop-water? Yes.
587. And that you think has caused the bulk of the pollution which has been created in the river? It has certainly been the cause of a great deal of complaint at Parramatta.
588. Does the Parramatta hospital drain into the river? As far as I know, it does.
589. But its night-soil is dealt with in the same way as is the night-soil of these other institutions? Yes. No complaint has been made in respect of the hospital, because there is a body of fresh water there. The nuisance that we complain of is below the dam.
590. There are two institutions for the insane at Parramatta—the hospital for the insane and the lunatic asylum? They are both one institution. There is, however, an institution at Rydalmere draining into the river, but that is outside the limits of the borough.
591. But as far as the pollution is concerned it may be treated as part and parcel of Parramatta? Yes.
592. How often are the pans emptied in the case of private dwellings in Parramatta? In some houses twice a week, but generally only once.
593. So that if a small house has to pay 3d. a week, it would amount to a considerable rate in the course of a year? Yes; it would be in the proportion of about 6d. in the £ on the general rate.
594. It would make your present municipal rate equal to 2s. 6d. or 2s. 8d.? Yes.
595. And doing away with that 6d. you think that the borough could not stand 1s. for a sewerage rate? Speaking individually I think that if a 1s. rate were forced upon the people of Parramatta they would not be treated liberally in respect of the Government institutions.
596. I understand you to say that if the Government will meet you with an annual contribution of £750 guaranteed for ten years, the council would be prepared to accept it? I think we are entitled to that.
597. Do you not think it would be well for you to convene a meeting of your fellow aldermen to consider the question? Possibly that might be a reasonable suggestion, but Parramatta is in this unfortunate position: If we had not any Government institutions we could at once say whether we would accept or reject this proposal. As it is we cannot do so, and we think that if we could obtain an expression of opinion from this Committee it might be possible to arrive at a more favourable understanding as between the council and the Government. We had a meeting on Monday night last, but it was not specially convened to deal with this matter. As you might expect there was a great diversity of opinion among the twelve aldermen, as, indeed, there would be upon any question of the kind.
598. If this Committee, after investigation, saw its way clear to recommend to Parliament a sewerage scheme which would not involve the taxpayers in a rate of more than 9d. in the £, then, to the best of your belief, the people of Parramatta would be favourable to it? I certainly think so.
599. *Mr. Fegan.*] I understand you to say that as far as you are concerned you do not wish to have the old men in the Macquarie-street and George-street asylums removed? No; I do not think there has been any direct expression of opinion to the effect that they should be removed.
600. You may remember when this Committee were considering the question of the removal of the inmates of those asylums, a public meeting was held in Parramatta in objection to their removal? I have no knowledge of it, but it may have taken place without my knowledge.
601. Does not the very existence of these asylums there stop the growth of Parramatta? It stops the expansion of the place in and about those particular portions.
602. Do you not think that what you might lose in rates through the removal of the old men to a more healthy place you would gain in a certain time through the settlement of other people in the neighbourhood of the asylum buildings? We might possibly gain in that way. I think there certainly would be some gain of the kind, and that is why I have suggested the ten years' arrangement with the Government. I think that at the end of that period there might be a sufficient increase of settlement to enable us to raise the necessary money by rate.
603. What is the rate you charge for water in the Government institutions? 10s. 6d. per head.
604. And what is your charge in respect of people outside those institutions? 9d. in the £.
605. What would that average per head? About 7s.
606. So that the Government pays you more liberally for the inmates of its institutions than you are paid by people outside? I am not in a position to say that.
607. You have said that you deal liberally with Government institutions, and, that being so, you ought to be in a position to tell us in what way you do so? What I said was that we dealt with them more liberally than the Water and Sewerage Board deals with Darlinghurst Gaol.

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608. You deal so liberally with them that it pays you to supply them with water at 10s. 6d. per head? We do not know the consumption of water. I cannot say that it pays us to supply the institutions with water at that rate. They may use three or four times the quantity per head which would be used by private individuals. Parramatta is supplied with water by meter to a very small extent. If we follow the system of the Water and Sewerage Board the whole place would be supplied by meter, and then we should know exactly what we were doing.
609. Why do you not give the supply by meter? We thought that if we could collect a rate sufficient to pay, and avoid putting the people to the expense of providing meters, we were quite justified in making that arrangment.
610. But you have not worked out the difference per head between the charge for institutions and the charge for persons outside? No.
611. You think that if the rate were 9d. that would be a fair charge? I think so.
612. If the asylums were removed, you think that within a short time there would be a number of persons in their vicinity paying the sewerage rate? It would be a long time before we would get from persons resident in the vicinity the amount we now receive from the asylums.
613. But you do think that the presence of the asylums deters people from settling there? That only applies to the immediate vicinity of the buildings.
614. You think that the people you represent will not complain of this scheme? No.
615. Do you know how many inmates there are at the Harris-street asylum? I do not know the precise number, but there are six or seven houses occupied by them.
616. Are those houses drained into the river? Yes.
617. Skin diseases, I believe, are treated in those houses? Unfortunately.
618. Who pays the water-rates in that case? The Government.
619. Those cottages will be included in the area served by this sewerage scheme? Yes.
620. *Mr. Hassall.*] Is the river polluted in any way by the operation of your pan system? In no way whatever.
621. Then where does the pollution come from? There is a certain number of natural water-courses in most towns. One or two of them in the case of Parramatta are really covered drains.
622. So that, although you have the pan system, there are other sources of pollution to the river? Certainly, to a small extent.
623. Could the existing nuisance be abated by increasing the water supply in any way, enabling you to flush the upper portion of the river? That would be impossible.
624. You think there is no chance of that? I do.
625. The only practical scheme, you think, would be the provision of a storm-water channel, and a system of sewerage which would keep the town clean? That is the only practical method of dealing with the matter.
626. But the bar to that is the expense which would be entailed upon the ratepayers of Parramatta? Yes.
627. Then your position is this—that if the Government could guarantee the payment of 10s. per head in respect of the inmates of institutions for a certain number of years it would enable you to meet your liabilities arising from these works. It would be practically offering an incentive to the town to take up the scheme? Yes.
628. In the absence of such a guarantee, do you think the burden would be too heavy for the people of Parramatta to bear? Speaking individually, I do not think they would be prepared to take up the scheme without such a guarantee.
629. You think that the £800 which the Government would have to pay would enable the council of Parramatta to collect the additional rate, and so cover its liabilities? Yes.
630. Do you think a ten years' guarantee would be sufficient? I think the council would accept ten years.
631. But nothing less? I am not sure about "nothing less"; but, on thinking the matter out, I thought that a reasonable request to make.
632. If the inmates of these institutions were removed in the next one or two years, and the Government contribution then ceased, you think that the burden would be rather more than Parramatta could carry? I am not prepared to say that it would be more than the town could take.
633. But as mayor of the borough you would not be prepared to take up the increased responsibility? Not without the voice of the council.
634. *Mr. Roberts.*] How often is a valuation of property made in the borough of Parramatta? Annually.
635. Could you say whether, within the last year or two, the valuation has been less than it was a few years ago? Between last year and the preceding year there was a difference of only about £200.
636. Has the population of Parramatta shown any increase during the last few years? I think it is remaining about stationary.
637. Do you regard the town as healthful? Generally, I do.
638. Can you trace any sickness directly to the want of a proper system of sewerage? I think the town would be very much more healthful under a proper system of sewerage.
639. Have any particular cases of sickness been traced to the nuisance in the river? The doctors have attributed certain cases of sickness to it.
640. Have you had any cases of typhoid fever? We have had some cases, but we are pretty free, comparatively speaking.
641. You compare favourably with the neighbouring districts? Yes.
642. *Mr. Farnell.*] Where do the people of Parramatta obtain their water supply from at the present? From Hunt's Creek.
643. It is shown by Mr. Johnston in his report that the establishment of a water supply has been a good investment—that you have made a profit each year? That is so.
644. I believe it has been suggested to the Minister for Public Works that it would be a good thing in the interests of Parramatta if the nuisance prevention account and the sewerage account were kept together;—are the council prepared to do that? I do not think so; and I do not think the Government has any right to take any advantage of our speculation on behalf of the people of Parramatta. The Government were not asked to contribute a penny to it. You must look at the other side of the question. Supposing Parramatta were so situated as to have a debt on the undertaking, I do not think Mr. Johnston, in his report, would have recommended a higher contribution in respect of the inmates of the asylum.

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645. Has your own water supply fulfilled all your anticipations, or have you had to depend upon any other source of supply? It has kept up a wonderfully good supply. It has given out only once during the last fourteen years, and then the season was unprecedented in the history of the Colony.
646. Have you had to pay the Water and Sewerage Board for water? We paid them £2,400 last year.
647. Although you have had to pay the board that amount, the concern as a whole has been a profitable one? Yes; there is a profit on the water account of about £2,000 a year. Mr. Johnston shows £1,700, but he is hardly accurate. I have ascertained from conversation with him that he has allowed interest on £14,600. He has reckoned that as the whole debt, but there are other sources of debt which have not gone into the books. The cost has been considerably more than that.
648. *Mr. Hoskins.*] For how long has the water supply been established? About fourteen or fifteen years.
649. Previous to the establishment of a supply, were there any complaints in Parramatta of any nuisance in the river arising from the drainage of Government institutions? I am not in a position to answer that question.
650. Has not the damming up of a portion of the water-shed for the supply of Parramatta led to a diminution of water in the river; and has it not had this effect, that there has been less water to wash away any sewage which may have been discharged into the river-bed? That is not so. Parramatta is supplied from only one source, and there there is an overflowing dam. After the flow of water has passed away in flood-time the salt water remains in the condition in which you will find it at the present time.
651. But if no portion were dammed up for the supply of water to Parramatta, would not more water be available to keep the river clear of sewage matter? I think that has very little to do with the nuisance. The flood-gates which have been erected fail to have the desired effect. They dam back a considerable quantity of water, but it has not the effect which was anticipated.
652. Supposing the sewerage system is estimated to cost, not £59,000, but with the improvements necessary for the sewage farm about £73,000, do you think the people of Parramatta would object to have the control of the sewage of Parramatta vested in the Water and Sewerage Board. The reason I ask the question is that there are other suburban municipalities which do not object to that arrangement? Our position is this: We have the water under our own control, and we think that we can reasonably ask that sewerage should also be put under our control. I think that the people would object to hand it over to the Water and Sewerage Board.
653. The Water and Sewerage Board would enforce the payment of the rates; the council may not do so? We are obliged to enforce the payment of our municipal rates, and the rate to which you refer would be enforced in the same way.
654. Do you think that the wants of the place would be satisfied if the Government made one large sewer to take away the sewage of its different institutions, instead of providing a sewerage system for the whole place? That, to a great extent, would relieve the town of what it has been complaining of for a number of years; but, as I said before, we should be quite prepared to accept the scheme upon some such basis as I have suggested.
655. *Mr. Humphery.*] You have a revenue from the pan system of about £1,600? It was £1,702 last year.
656. How much of that was contributed by the Government institutions? I think not a very large proportion, but I cannot speak accurately on that point. The hospital for the insane deals with its own night-soil, and the night-soil of the gaol is removed at a minimum cost. That would leave only the George, Harris, and Macquarie Streets institutions. Probably they would not contribute more than from £300 to £400. That would be the outside figure.
657. The residents outside would contribute then about £1,300 out of £1,700? That would be about it.
658. The Government asylums, served by the council, contributing the difference, and the lunatic asylum dealing with its own night-soil? Yes.
659. We have been informed that the cost of maintenance and interest on the scheme now before the Committee will be nearly £3,800? That is so.
660. Deducting the £1,300 contributed by the residents, that would leave you to provide how much? £2,500.
661. You say that you are prepared to accept an assurance from the Government of the payment of £1,500 a year for ten years, and to raise whatever may be necessary to cover the cost of the scheme? Yes.
662. That would mean that you would have to raise double what the residents are now paying? Yes.
663. Do you think the residents would be prepared to contribute that amount? I think so.
664. You propose to make a charge of 10s. per head upon all inmates of Government institutions remaining at Parramatta at the end of the ten years? Yes.
665. And you think that if the Government were prepared to concede the increased amount for that period there would be no difficulty in obtaining the consent of the council to sewerage works on the basis proposed by the Government? I have no reason whatever to doubt it.
666. You think that that would be a fair arrangement? Yes.
667. What about the additional cost in connection with the sewage farm;—are you prepared to provide interest upon that outlay? On looking through Mr. Davis' report, I find that provision has not been made for that extra charge.
668. Could you pay the interest on the extra amount? That would be a matter for grave consideration by the council.
669. It would be over £300 a year? Yes; it would be a heavy impost.
670. You are not prepared, without further consideration, to say whether the council would accept that burden in addition to the interest on the £59,000? No; and if that is the view of the Committee, I think the whole matter should be dealt with by the council. I came here under the impression that we were dealing with a scheme involving an expenditure of about £60,000, and that that amount would cover the whole cost. If there is to be an addition of £12,000 in the cost, it might be well for the council to consider whether they would not be acting wisely in accepting in preference No. 1 scheme.
671. *Chairman.*] What is your idea of the quality of the water with which you are supplied? The Government analyst says that it is a good second-class water, and as there are only three first-class waters throughout the United Kingdom, I do not think we can complain of having a good second-class water.

THURSDAY,

THURSDAY, 25 FEBRUARY, 1897.

Present:—

THOMAS THOMSON EWING, Esq. (Chairman).

The Hon. Frederick Thomas Humphery.	Charles Alfred Lee, Esq.
The Hon. James Hoskins.	John Lionel Fegan, Esq.
The Hon. Charles James Roberts, C.M.G.	Thomas Henry Hassall, Esq.
The Hon. Daniel O'Connor.	George Black, Esq.
Henry Clarke, Esq.	Francis Augustus Wright, Esq.

Frank Farnell, Esq.

The Committee further considered the proposed Sewerage Works for Parramatta.

Dowell Phillip O'Reilly, Esq., M.P., sworn, and examined :—

D. P. O'Reilly, Esq., M.P. 25 Feb., 1897.

672. *Chairman.*] You represent the Electoral District of Parramatta in the Legislative Assembly? Yes.

673. *Mr. Wright.*] Are you at all familiar with the scheme before the Committee? I am familiar with the general idea; but not with the details. I have not had the advantage of looking into the plans.

674. You are aware, I suppose, that the estimated cost is about £60,000? I think that in justice to the Committee I should at once state that I have always kept myself quite apart from those duties which devolve upon the Municipal Council of Parramatta. I have recognised that my position is quite outside of theirs, and that they accept the responsibility of a final decision in this matter. For that reason I consider it my duty to avoid expressing any opinion upon those purely financial aspects of the case in regard to which a responsibility devolves upon the council, and the council alone.

675. But you desire to give evidence in regard to some other aspects of the case? Yes. I should like to say that although I have not had the advantage of looking into the evidence which has been already tendered to the Committee, still, from being in the closest touch with all sections of the town, I can recognise that there is an imperative demand for a sewerage scheme, and that no partial scheme will ever meet with the approval of the people. I quite admit the necessity for looking at the matter from the Governmental position as it were, and it is to emphasise the Governmental position in relation to this scheme that I wish to give evidence on that side, and that side alone, of the question. For years past, as the Committee know, the Government has admitted its responsibility in regard to the pollution of the river, and too great stress cannot be laid on the fearful state of the stream. With the permission of the Committee I should like to read a small portion of some evidence which one of our medical men, Dr. Bowman, gave as to the state of the river. I may add that his statement is endorsed by every medical man in the town.

676. When was the evidence you are about to quote given? When Dr. Bowman waited with a deputation upon the Secretary for Public Works with reference to the fearful state of the river on 14th January, 1895.

677. It was a statement by Dr. Bowman, was it? Yes, and it was endorsed by the whole of the medical faculty in the town. He said, "There is little doubt that the accumulation of impurities from the Parramatta district is the cause of the horrible stench which comes up the river channels when there is any wind in that direction. I have traced this stench for about half a mile down the river. While the last drought lasted the water in the bed of the river was of a thick, dark, and soupy nature and fatty, and bubbled with gases of a very offensive nature. So strong and offensive was the stench in the vicinity that it was impossible for the people to keep their windows open. The question is whether there should not be some efficient system of sewerage for Parramatta, and the river not be used for the purpose. To have the district healthy it would not be sufficient to have the river scoured from time to time. At present all the soap-suds and sewage of the town finds its way into the river, and there is no doubt that the accumulation of this filth is the cause of infectious diseases, such as sore throat, diphtheria, typhoid, &c., which are so prevalent about Parramatta. From a medical point of view, the time has come when Parramatta, which has now a population of about 10,000 people, should have a proper system of drainage. As things are at present the sewage of Parramatta is a menace to the public health."

678. Dr. Bowman, I see, states that the population is about 15,000—is it anything like that? I suppose it would be from 12,000 to 15,000 as a matter of fact, but I cannot speak with absolute certainty on the point.

679. If the mayor of the borough has told us that the population is about 11,000, you would take that to be substantially correct? Yes. I presume the mayor would know.

680. He also states that the sewage of Parramatta goes into the river, but it is not a fact that there is a pan system in operation? The doctor said, I think, that soap-suds and the sewage of the town went into the river. From a medical standpoint, soap-suds are recognised as being the most infectious of all forms of sewage, because they contain the excreta of the human body; and I may mention that excreta given off through the skin is just as foul and poisonous as is the excreta which is in the pans.

681. You have no desire to express any opinion as to the appropriateness or otherwise of the scheme, and as to the ability of the council to bear the increased burden that will be thrown upon them? I think that that is a question which rests solely with the council.

682. I understand that from communications you have had with the residents of Parramatta you are certain that they desire that some system of sewerage should be adopted? That is so. Take Clay Cliff Creek, Alderman Dixon, a property-owner in the district, has himself expended over £100 in an endeavour to cleanse the creek, which runs through his property. I urged the Minister that, in consideration of the health of the district, the Department ought to continue the storm-water channel higher up the creek. I received a reply, a short extract from which I will read to the Committee. It is as follows: "If there were no possibility of the complete scheme being undertaken then, perhaps, there might be some justification for the extension of the Clay Cliff Creek canal to Marsden-street at a cost of £3,107. Under the circumstances I could not recommend its construction." So that we have festering pools on the outskirts of this storm-water channel which are awaiting the construction of the sewerage scheme, and which are, in their present condition, a constant menace to the public health. There are a large laundry and a cordial manufactory in Lansdown-street which both discharge impurities there. I have asked that the

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the storm-water channel should be completed from Church-street to Marsden-street, and I have urged that that should be done in response to a petition from over 100 residents in the district who were suffering from the foul stench. A petition was also sent to the council, and I was supported in my action on that occasion by that body.

682½. But the Minister declined to accede to your request in view of the probable adoption of a larger scheme? Yes.

683. You are familiar with the portion of the town coloured yellow on the plan? Yes.

684. And throughout that portion you think there is a general desire on the part of the residents for a system of sewerage? I can only say that I have never heard one resident argue against the necessity for a system.

685. I suppose the people quite recognise the fact that if they get a system of sewerage they will have to pay a pretty stiff rate for it? I am sure they recognise that they will have to pay for it, but to what extent I cannot say.

686. From your knowledge of the ratepayers, do you think that they will object to pay such a rate as 1s. or 9d. in the £? I recognise that the only alternative is the continued prevalence of sickness—diphtheria and typhoid for instance—and I am sure the people would be ready to do a great deal to avoid that.

687. But you cannot say for certain what they would be prepared to pay? No.

688. Can you give any information as to the position of the Government institutions of Parramatta in relation to the question of sewerage? I am glad to have been asked that question, because unless some such question had been asked me I should have had no excuse for occupying your time. The Government, as you know, has always admitted its responsibility with reference to this river pollution. You are probably also aware that the responsibility has been admitted by the expenditure of some £16,000 upon the river-bed with a view to lessen the pollution. For instance, flood-gates have been constructed which are practically inoperative, and there is not the slightest doubt that were the Government finally to deal with its own sewage—were they to inaugurate some separate scheme independently of the municipality which would dispose of all the sewage from the Government institutions—the question of the sewerage scheme for this town of 11,000 inhabitants would be as pressing a question as it ever was; and I wish strongly to urge this: that in the interests of the Government, as well as in the interests of the municipality, at the present juncture it is essential that both bodies should act in harmony. Any proposal for two separate schemes, one for the municipality and the other for the Government, would be inadvisable. It could result only in additional expense to both the Government and the municipality.

689. I suppose you are of opinion that in the event of the municipality not taking up this scheme, the Government themselves, if only to preserve the health of the inmates of their institutions, will be called upon to provide some scheme of sewerage? I quite recognise that.

690. The town of Parramatta itself, quite apart from the Government institutions, is now so thickly populated that it must have a system of sewerage? Yes.

691. Your contention is, that since both the Government institutions and the town require a system of sewerage they should combine together in one common system, reducing the cost both to the Government and to the municipality? Yes.

692. Can you tell us what first created the very serious nuisance which has been so much complained of? That question is not a very difficult one to answer. We have a town of 11,000 inhabitants, situated in a salt-water estuary, 20 miles from the sea. The tidal action is very sluggish, and it stands to reason that, with the increase of population which has taken place within the last 100 years, the constant drainage of soapsuds, street-washings, and things of that kind must have had its effect upon the estuary.

693. To what extent are the Government institutions responsible for the nuisance? I could answer that question with the assistance of the mayor's statement—that the population of Parramatta is 11,000. I believe the occupants of the Government institutions number 3,000. The form of sewage deposited in the river by the town and by the Government institutions is similar, and you can therefore mathematically state the responsibility of the Government at $\frac{3}{11}$ths, and of the town at $\frac{8}{11}$ths.

694. But the town has not always contained 11,000 inhabitants, although there have been at some periods 3,000 inmates in the Government institutions? That is an argument in favour of the municipality.

695. This outcry about the pollution of the river by Government institutions has existed to my own knowledge for the last twenty-five years. It existed when the population was much smaller, and when there were very much fewer inmates in the Government institutions? I fully recognise that, and I think that only strengthens the position of persons who say that the pollution of the river is an increasing menace to the public health.

696. Do you think the volume of sewage matter has been greater from the town or from the Government institutions? I think that at the present date the chances are that, with a town of 11,000 inhabitants who would contribute the same form of sewage as is contributed by the Government institutions, the town contributes at least as much as, if not more than, is contributed by the asylums and other buildings.

697. You must take into consideration the fact that the inmates of the Government institutions are all adults, and that many of them are men suffering from diseases which require special attention and cleanliness? That is an important point which should not be overlooked. I am not attempting for one moment to belittle the Government responsibility. On the contrary, that is a point I wish to emphasise, especially as I recognise the supreme importance of the municipality and the Government acting in harmony in the provision of a common system of sewerage.

698. If it has been stated that the Government institutions were the first and the greatest cause of offence in the river, are the Committee to understand that you coincide in that statement? From the information you have just given me, that twenty-five years ago the same complaint existed, I should think the statement had a good deal of basis in fact.

699. You are inclined to think, then, that the Government has been a large factor in the pollution of the river? I am quite convinced that that has been the case.

700. Have you a knowledge of any other nuisance existing in Parramatta which might tend to pollute the river? Yes. I have drawn the attention of the Board of Health to the fact that the Meat company has for years past been in the habit of depositing what is technically known as soup in the Duck River. The officers and men on the Parramatta steamers which pull up near where this soup is deposited, have assured me that they have retched over their dinner from the foul stench which arises from the banks along which the soup spreads at the mouth of the Duck River.

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701. You have called the attention of the Board of Health to the matter? Yes; under the *régime* of Professor Anderson Stuart.
702. With what result? Absolutely no result.
703. Was no action taken? I believe Dr. Ashburton Thompson was called upon to report.
704. In the statement by a medical man, which you read just now, reference is made to some fatty substance in the deposit? The words were "of a thick, dark, and soupy nature, and fatty."
705. Is it not likely that a great deal of that fatty substance would come from the soup? I am ready to admit that it is quite possible that some of it might come from the soup. At the same time, we must recognise that one constituent of soap is fat.
706. There is a probability that some of the offensive matter discharged into the stream at Duck River would be carried with the flood-tide up to the town? There is, especially in view of the fact that the steady north-easters of the summer drive up the river, and carry with them any scum on the surface. This is brought up to the head of the estuary in the heart of the town.
707. Where is the Convent of Subiaco drained? It must drain into the river—it is on the side of the hill.
708. The same thing applies to the asylum at Rydalmere? Yes.
709. Do you know the number of inmates in that institution? I should think there would be from 400 to 600.
710. Does the whole of the drainage from that institution go into the river? Not the whole of it. Of course the superintendent, Dr. Williamson, utilises a considerable amount of the sewage on the farm which slopes away from the bank.
711. You think that a considerable portion of the sewage is utilised on the flat? To a certain extent it is.
712. What about the drainage from the old men's asylum at the bottom of George-street? The whole of that goes into the river.
713. What is the population of that asylum? About 1,000.
714. You are sure that the people of Parramatta desire a system of sewerage, and that they are prepared to pay a fair rate for it? I am sure of it.
715. I gather from what you say that, in your opinion, the Government should bear a fair proportion of the cost of the system? Yes, that is my view.
716. *Mr. Fegan.*] Generally, you know the opinion of the ratepayers of Parramatta upon the question? I think so.
717. You said that they have asked for this system of sewerage for the reasons you have just mentioned;—do you know whether the people of Parramatta have asked for a removal of the old men from the George, Harris, and Macquarie Streets asylums? I am quite convinced that there is a general wish throughout the town that the old men should be removed out of it.
718. You think the removal of the old men would give you a better chance of the town progressing in those quarters in which the asylums are situated? I think it must undoubtedly have that effect. It would improve the value of property adjoining the asylum buildings, and it would improve the whole tone of the town.
719. You think the existence of these asylums in the town deters people from taking up their residence there? I would not go so far as to say that; but I am certain that the residents in these particular localities would be very pleased if the asylums were taken away.
720. The removal of the asylums would necessitate, according to this scheme, an extra rate of 3d. in the £ to meet interest and principal;—do you think the people would be satisfied to accept that position? That is rather a question for the aldermen, which I do not feel myself qualified to answer. At the same time, I might ask whether you are recognising the fact that in spite of the old men going, the property would still be ratable. The Government has valued it at £17,000, on which amount, I presume, the municipality could levy a rate.
721. If the old men were shifted, there would be no necessity for a system of sewerage? But the property would be ratable by the municipality.
722. If the old men were removed, would the buildings be allowed to stand there? I cannot say what the Government would do with the buildings, but they would be utilised in some way, I have no doubt.
723. Taking everything into consideration, you think there is a fair prospect of the people of Parramatta being able to pay for the sewerage scheme? Yes, and I think it is absolutely essential, not only for the people of Parramatta, but for the peace of the Health Department and the Government, who cannot divest themselves of responsibility in the matter.
724. I suppose you have approached the Minister on innumerable occasions with reference to this scheme? Yes.
725. *Mr. Hassall.*] Do you think Parliament would be prepared to bear the cost of the sewerage rate, provided the Government institutions were removed from Parramatta altogether;—do you think that, considering the rates which the people have already to pay, that they would be able to bear an increase? I should be infringing upon the position of the mayor and councillors of Parramatta if I hazarded an opinion on a matter for which they are solely responsible.
726. And you are quite of opinion that it would be beneficial to the town to have these Government institutions removed to another locality? Speaking of the benevolent asylums, I certainly think it would. Our hospitals for the insane would be a credit to any town in the Colony, and we are very proud of them. They are admirably conducted, and I think they would be a great loss to the town.
727. The institutions which you think could be removed are the Harris, George, and Macquarie Streets asylums? Yes; I think that they could be removed with great advantage to the old men, who want more air and space than they can obtain in the town.
728. Have you any knowledge of the Duck River? My sense of smell has been often offended when I have been passing there by the foul stench which has arisen from the banks.
729. Would not a great deal of that offensive matter be taken up by the tide to the head of the river? It is quite possible.
730. Do you not think that a great deal of the pollution of the river arises from that source? I could hardly admit that; but I think it quite possible that some of the pollution may be attributable to it. The main trouble is due to the sewage from the Government institutions and from the town itself.
731. Is the sewage from the Government institutions conveyed directly into the river? It is conveyed directly by a large pipe constructed at Government expense.

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732. Is the pan system in operation in the Government institutions? Yes; they do not discharge fæcal matter into the river. But the pans from the 1,000 lunatics to whom I referred have to be washed out, and the foul water goes into the river. Of course the same thing applies to the gaol. All the pans there have to be washed out, and the water with which they are scoured goes into the river.
733. That of itself would be a great source of pollution? Yes; continued day after day, and year after year.
734. *Mr. Roberts.*] I understand that one of your reasons for coming before the Committee to-day is to emphasise, in the strongest possible manner, the great necessity which exists for the doing of something for the drainage of the town? That is really my sole reason for being here to-day. I wished to urge respectfully upon this Committee that there is no finality to this question until an efficient system of sewerage has been adopted.
735. Are you able to tell the Committee that any serious illness, such as diphtheria or typhoid, has been traceable to the want of a proper system of sewerage? I am glad to say that I have a better authority than my own opinion for that assumption. In the words of Dr. Bowman, from which I have already quoted, it is said, "There is no doubt that the accumulation of impurities is the cause of sore throat, typhoid fever, and diphtheria," of which we have had so much in Parramatta.
736. At the time Dr. Bowman said that, were these diseases as prevalent as they are now? That was in January, 1895—more than a year ago. People in the lower part of the town are always complaining of sore throat, and, according to medical testimony, undoubtedly the stench in the river is at times almost unbearable.
737. Is not the district of Parramatta regarded as a healthy one? Undoubtedly. The general district is wonderfully healthy. I think you have proof of that in the King's School, which, although subject to this offensive smell, and standing near the bed of the river, has a very good record for health. The general health of the boys is good. It may be urged that they all sleep high up above the river in the top dormitories.
738. Is Parramatta more subject to outbreaks of typhoid fever than are such neighbouring towns as Liverpool? I certainly think not. Generally the position of Parramatta makes it a healthy place, although in this particular locality, of which Dr. Bowman spoke, just along the river bed, medical men seem to have traced the evil effects of pollution.
739. I thought you might be able to tell the Committee of numerous cases of typhoid fever which have been reported to you? No doubt Dr. Bowman could throw more light upon that question.
740. Have you given consideration to the scheme before the Committee for the mitigation of this nuisance? Yes, I have. I do not possess any extensive technical knowledge of the subject. I thoroughly recognise the responsibility of the council, and their capacity as a governing body, and I do not wish to infringe upon their responsibilities.
741. Do you view with favour the institution of the sewage farm? There again my opinion might possibly clash with that of the Mayor.
742. *Mr. Hoskins.*] In the event of this scheme being carried out, do you think it would be advisable to vest the sewerage of Parramatta in the Water and Sewerage Board, and to take it away from the local council? That again is a question the council would have to face and decide. I must say that we have, as compared with other councils, a body of efficient men. They are level-headed men who would be well able to control such a system. Of course the Water and Sewerage Board has already its tentacles on the municipality in the shape of storm-water channels. Whether there would be any clashing of interests in the two forms of sewerage is a question which would have to be decided subsequently.
743. In the event of this scheme being carried out at a cost of say £70,000, do you think the people of Parramatta would be ready to pay a rate of 9d. or 1s. in the £? If I had a seat in the council I might be able to express an opinion on the point.
744. *Mr. Humphery.*] Are you a resident of Parramatta? I am a resident and a ratepayer.
745. Would you yourself be willing to pay the additional rate for the advantage of being connected with the sewerage system of the proposed scheme? I suppose it might depend upon whether I had an attack of typhoid fever or not. Perhaps, out of sympathy with my neighbours, I might feel inclined to pay the increased rate.
746. *Mr. Clarke.*] Your opinion is that something should be done with the sewage of Parramatta to remove the nuisance which exists? In the interests alike of the Government and the municipality.
747. Are the Government institutions much to blame for the sewage going into the river? Undoubtedly. The Government has admitted as much.
748. In some cases they use the pan system? In all cases. But I should like to emphasise this fact, that the latrine drainage of the 1,000 lunatics at the asylum goes into the river daily, and all the pans which are used in the same institution are washed out, and the off-scouring is also conveyed into the river.
749. Independently of the pan system, you consider that slops are very offensive, and that they are, to a considerable extent, the cause of the nuisance which exists? To a very considerable extent.
750. You have seen the various plans which have been put before us by the Department;—would you express an opinion as to which you consider the most desirable of them? I think I had better keep within my own sphere of responsibility.
751. As to the nuisance which seems to exist in connection with the Meat company's works at Duck Creek, you think that is a factor in the pollution of the river? I remember that a great outcry was raised against it some time ago.
752. The Government has been approached on various occasions to remedy the nuisance, and it is only recently that any action has been taken? Some years ago the Government expended £16,000 in a concrete drain, which was subsequently taken up to metal the streets.
753. A previous Public Works Committee inquired into this very question? Yes; I believe the whole subject has been threshed out by the Public Works Committee.
754. Was the report of the Committee favourable or unfavourable to the scheme? I believe it was unfavourable, on the ground of the large expense of the scheme then proposed, although the necessity for something of the kind was quite admitted. I am satisfied that the majority of property-owners fully recognise the necessity for such a scheme in their own interest.
755. The mayor yesterday suggested that the Government should contribute a certain allowance for a fixed period of ten years, in view of the number of Government institutions in that place? I think

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in view of the standing menace to public health, which the existing system of drainage has been for some years past, the Government, together with the municipality, should thoroughly realise their responsibility in the matter. I think the Government should use its utmost endeavours to fall into line with the municipality in the bearing of the cost.

756. Have you heard that some of the paupers in the George, Harris, and Macquarie Street asylums have been removed? I believe a number has been removed, but I do not speak from any accurate knowledge.

James Johnston, clerk, Department of Public Works, sworn, and further examined:—

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757. *Chairman.*] You have some further information for the Committee? Yes, I have to submit a statement of revenue and expenditure.

758. *Mr. Humphery.*] Since you were last here you have prepared for the information of the Committee a statement showing the position of the council in connection with the proposed sewerage? I submit a statement of revenue and expenditure for the town of Parramatta for two years ending the 3rd August, 1896. It is divided into four half-years. I should like to have made it up to February, 1897, but I have been unable to get the figures from the council clerk.

759. Can you now say from any of the statements you have prepared whether the council will be able to cover the interest and redemption on account of the proposed works? I think they will be able to do so. In this transaction we are taking every account into consideration for two years, and they show an absolute net profit of £415. To that must be added a sum of £962, which they have paid out of the water supply fund to a special water account.

760. Then, as a matter of fact, the council has a surplus of about £1,400? For two years there would be an average of £700 a year.

761. In view of the figures which you have considered since you were last here, have you modified your opinion, and are you now prepared to say that the people of Parramatta can afford to pay for the proposed scheme? They could afford to pay for the proposed sewerage scheme if they were allowed to take any surplus from their general revenues, and apply it to any deficiency which may arise upon the sewerage scheme.

762. The mayor of Parramatta is of opinion that it would be equitable for the Government to allow say £1,500 a year for a period of ten years in view of the proposal to remove 1,500 of the inmates from the different institutions in a comparatively short space of time. Having regard to the nuisance created by the existence of those institutions, and the disproportionate pollution arising from the various asylums, it is thought that the contribution should be larger in proportion to that of the ordinary population. Do you agree with that? I have already expressed my opinion that the council is entitled to expect full consideration from the Government in respect of its institutions.

763. Do you think the mayor's contention is a reasonable one? What I understand the mayor to say is that the Government should continue to pay the £1,500 for so many years whether the old men are removed or not.

764. Would that be a reasonable adjustment of the difficulty which has arisen with the council over the question of proportionate contribution? I do not know that I could give you an opinion as to its reasonableness, but it seems a large amount for the Government to be asked to pay towards services rendered six or seven years after the old men will have gone.

765. There is some uncertainty as to the date of removal, is there not? The matter appears to be quite dead at present; I have heard nothing of it for some time.

766. Do you know whether many of the inmates have been recently removed from Parramatta? I do not.

767. With regard to the water supply, I understand the Minister has expressed an opinion that the surplus derived from the water supply, in consideration of the liberal contributions on account of the inmates of the Government institutions, should be applied to any deficiency in the sewerage works. Are you aware that the rate paid by the Darlinghurst Gaol authorities is higher than the rate which is at present being paid by the Parramatta institutions? I was not aware of that. I only hear of such matters as the rate in Darlinghurst Gaol incidentally. I think, so far as my recollection serves me, that the gaol was at one time paying so much per head, but that it was one of those institutions in which the Metropolitan Board determined to put in a meter.

768. You are not aware that as the result of the supply of water by meter the charge is something like £70 or £80 greater than the payment per head would be? I cannot speak definitely in the matter.

769. Assuming the information given us by the mayor yesterday to be correct, the cost in Darlinghurst Gaol for water would be 12s. per head, whereas it is proposed to allow only 10s. per head for the inmates of the Parramatta institutions? The Parramatta institutions pay for their water supply, some by meter and others at the rate of 10s. 6d. per head on the number of inmates. It is in respect of sewerage that it is proposed to pay at the rate of 10s. per head.

770. Can you see any reason for paying any less in Parramatta than is paid in Sydney? No; I cannot.

771. Then, if the mayor is right in his contention, there should be an additional allowance for the water supply in connection with these institutions? Yes; but Darlinghurst is only one of many institutions in Sydney. I could not take one as a criterion of the whole. There might be some special circumstances in the case of Darlinghurst Gaol of which the mayor was not aware.

772. But it will serve the purpose of comparison. If the Government are paying less per head in Parramatta for the water supply than it is paying in Sydney for similar institutions, why should the Parramatta council apply the surplus of its water supply account to cover any deficiency which may arise in its sewerage account? I do not say it ought to do so. What I said was that such a fusion of the accounts was quite feasible.

773. Why should it be done? One reason is that water would be used both in the water supply and sewerage system.

774. Are you prepared to recede from the position you took up, that owing to the liberality of the Government in connection with its payment of the water supply there was a larger surplus than would otherwise have existed? I cannot recede from the hard facts of the case. It is the fact that, owing to the liberal payment of the Government, the Parramatta council had a large surplus on its water account.

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775. Are you prepared to say that the contributions would be less than they are at the present time if the charge were per meter instead of per head? I do not think there would be much difference whether they charged per head, or whether the water was taken by meter.
776. Then where is there any specially liberal treatment of the council in connection with water supply? I think the payment of 10s. 6d. per head is a liberal payment.
777. What is the charge in Sydney? One shilling per 1,000 gallons.
778. That would be at the rate of 7d. in the £? Yes.
779. You are aware that the residents of Parramatta are charged 9d. in the £? I am aware of that.
780. Therefore, in proportion to the amount paid in Sydney, the Government should pay about 25 per cent. more for the water supply to the institutions in Parramatta than they pay in Sydney? That would seem to be feasible, but there are other circumstances which must be taken into consideration. I think the fact that Parramatta shows a surplus of nearly £1,700 a year in her water account, and that that amount comes almost entirely from Government institutions is sufficient to show that the council has been treated liberally.
781. How much out of the annual revenue for water is contributed by the Government? Nearly £1,700. The ratepayers contribute the interest and working expenses, and the Government institutions virtually give the account its profit.
782. If the Government institutions did not take water, then it would seem that there would be no profit? That would seem to be so.
783. In that case should the institutions at Parramatta pay the Water and Sewerage Board or the municipality anything for their water supply? I think the institutions at Parramatta should be put in exactly the same position as are the institutions in and around Sydney, by getting their water supply from the Metropolitan Board and paying for it as may be agreed on. Then it would be merely taking money out of one pocket and putting it into another. It is merely a book-keeping transaction.
784. Would there be no cost to the Government in connection with the service by the Water and Sewerage Board instead of by the municipality? There would be a little cost. There would have to be a few chains of new mains laid from the Board's pipe-line to the various institutions.
785. Your idea is that the Government should supply itself from the Water and Sewerage Board, but that they have hitherto refrained from doing so? I say so, although I do not think that view has ever been placed before the Department.
786. *Chairman.*] Have you any further statement you desire to make? Yes. I desire to produce two returns for which I was asked. The first return shows the cost of the water supply works in the different country towns, the debts as gazetted, and the annual repayment instalments, and the other return shows how the different councils are meeting their respective obligations.

FRIDAY, 26 *FEBRUARY*, 1897.

Present:—

THOMAS THOMSON EWING, Esq. (Chairman).

The Hon. Frederick Thomas Humphery.
The Hon. James Hoskins.
The Hon. Charles James Roberts, C.M.G.
The Hon. Daniel O'Connor.
Henry Clarke, Esq.
Charles Alfred Lee, Esq.
John Lionel Fegan, Esq.
Thomas Henry Hassall, Esq.
George Black, Esq.
Francis Augustus Wright, Esq.
Frank Farnell, Esq.

The Committee further considered the proposed Sewerage Works for Parramatta.

John Ashburton Thompson, M.D., President of the Board of Health, sworn, and examined:—

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787. *Chairman.*] You are Chief Medical Officer of the Government and President of the Board of Health? Yes.
788. You are aware that the question before the Committee is the insanitary condition of Parramatta;—the construction of sewerage works, it is thought, will relieve that condition? Yes.
789. You are well acquainted with the locality? Yes.
790. Can you speak generally as to the insanitary condition of the place. We should like from you a statement as to all the causes, no matter how small, of that condition? In the first place, one must divide the river into two parts—the part from the dam to the flood-gates, and the open part below that. As to the open part below, I know of only one discharge of sewage into it—that from Newington asylum. There is, or there has been—because I cannot speak exactly of the present time—a discharge of soup from the Sydney Meat-preserving works. The soup used to be carried to the top of the rise near Newington, and discharged into a tank, whence it flowed through a pipe into the river. There were some complaints by persons travelling on the boats, and, on inquiry, I found that they were then discharging the soup on to the tidal shore. I recommended them to carry their pipe out below low-water mark. I do not know whether the nuisance was abated thoroughly, but I received no further complaint. I am not aware that any nuisance was caused by the discharge to which I have referred from Newington asylum, where there are, I believe, about 500 persons. The place where the nuisance which has been commonly complained of has arisen has been in that part of the river which is enclosed between the flood-gates and the dam. A great deal has been said from time to time as to the share taken by public institutions of Parramatta in causing the nuisance; but, as you will learn from the officers of the Sewerage Branch, the sewage discharged from the institutions has been carried away through a pipe which opened only when the tidal part of the river was reached. Besides that there has always been, and still is, a considerable discharge of water which is not entirely sewage—some of it is slop-water, but some of it is manufacturing waste, especially from a brewery. This discharge has always found its way into the comparatively still water of which I am speaking, and, in my opinion, it is to that that the main nuisance which has been complained of is to be attributed. The brewery to which I refer is Vallack's brewery.

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791. The cause of the trouble above the dam is, in your opinion, the discharge of the brewery? No, it is below the dam, but above the flood-gates—between the two. The nuisance is due to the discharge from the brewery in part, but on one occasion I went down both banks and found various ditches discharging an appreciable quantity of foul water into that part of the river.

792. Do the flood-gates work now? They were altered in some respects about a year ago. I do not know what they are like now, but they are working.

793. Below the flood-gates, what source of discharge is there into the river? Below the flood-gates there is a discharge into the river from George-street asylum. I have heard that asylum taxed with causing a nuisance. It might do so, of course. I have also heard it alleged that water discharged into the river lower down, and especially the soup from the meat-works, floated up with the tide, and it has been said to be the cause of a nuisance at low water.

794. Does that appear to you to be probable? It does not.

795. Are you prepared to say definitely that the discharge from the meat-works, removed as they are to the distance shown on the map from the town of Parramatta, does not contribute to the nuisance in the river? Yes; I feel inclined to say that. It is my opinion. I do not see how any considerable quantity could possibly flow up with the tide, considering the breadth of the river, the flow of water, and all the circumstances. It might cause a nuisance, but that would be by the precipitation of the solid parts in the neighbourhood of the place of discharge. I do not see how it could float up the river, and cause a nuisance anywhere near the town itself.

796. If there were body enough, it would be backed up by the tide, would it not? I think not. At all events that is the opinion I have always held after viewing the place; but I cannot say so as a matter of fact, of course.

797. You are aware that the lunatic asylum discharges slop water below the flood gates? Yes; by the pipe I have mentioned. That is a much more important matter, because, if the flood gates be not properly managed, there can be no doubt whatever that the discharge from the pipes might wash back into the enclosed space into still water. That, however, is not the only source of pollution. A much more important source is the discharge from the road gutters and so forth in the town. The nuisance is at least shared equally between the two.

798. Your evidence amounts to this, that the river at Parramatta is in an insanitary condition; that that insanitary condition is contributed to partly by sewage from the Government institutions, but that it arises principally from the existence of so large a population on the immediate watershed;—is that the case? Yes; that is what I mean, with the reservation that the discharge from the asylum has been so arranged as to prevent it being carried back with the rising tide. That is the object of the arrangement which has been made. Whether it is successful or not I do not know.

799. You think the institutions have endeavoured to reduce the nuisance to a minimum? Yes; it is evident that that has been done. As to the discharge of soup from the meat works, I ought to say that I do not know what the meat works are doing at this moment; but not very long ago they were using their soup; they were evaporating it and manufacturing some material out of it. They may be doing so still. The time when they made the change in the arrangements, of which I have spoken, would be from three to four years ago.

800. You regard the work done by the proper use of the flood-gates as being important? Yes; I do. Understand, I am saying nothing in defence of the past state of the river. It is foul and it might be made cleaner. The only question is, how is it to be made cleaner? Officers of the Department of Public Works have done all that they can do by way of makeshift or expedient.

801. Could all the nuisance which in your opinion contributes to make the river insanitary, be diverted into proper sewerage works? Yes.

802. Including the drainage from the brewery and all that sort of thing? Certainly; every bit of it.

803. *Mr. Hoskins.*] Are we to gather from your evidence that in your opinion the insanitary condition of the river at Parramatta at the present time arises primarily from the defective sewerage of the Government institutions? Not primarily—not chiefly.

804. The people of Parramatta have made an application for a sewerage system, because they say the Government has brought them into difficulties by reason of the stench emanating from the river from the discharge into it of sewage from the Government institutions? That has always been their complaint.

805. Do you think that there is justification for it? I do not admit it. As long as Parramatta is undrained there must be a certain amount of offensive drainage into the river; but in speaking of it one cannot distinguish between that produced by the Government asylums and that produced by any number or aggregation of residences used by the townspeople.

806. And the sewage from the Government institutions being conveyed by a pipe down to a point where tidal influences operate, it is probable, is it not, that the nuisance arising from the discharge is less than that arising from the discharge from private residences? That is my opinion. I quite agree with that view.

807. The solid portion of the drainage from the institutions is all buried, is it not? Yes.

808. Have you had reports made to you by your officers to the effect that there was any great neglect in attention to the sewage of the institutions? Never.

809. The Member for the district and the mayor have informed us that a good deal of nuisance arises from the washing of the night-soil pans in the river, and the emptying of the scourings into the stream? I never heard of that.

810. If such a thing were done it would not materially add to the nuisance? It would account for a small proportion of it. Of course the practice is improper in itself, and it is one which the municipality could, I should say, prevent under their by-laws.

811. *Mr. Roberts.*] Do you regard Parramatta as being an unhealthy district for residential purposes—I mean especially in the neighbourhood of the river? No; I do not think there is any special reason for thinking that.

812. Has the town been subject to outbreaks of diphtheria and typhoid fever through the want of a proper system of sewerage? I am not aware of any incidence of those diseases which would place Parramatta above the average.

813. Do you regard Parramatta as a healthy town as compared with other towns throughout New South Wales? I believe it to be as healthy as is any other unsewered town in New South Wales.

814. Would you like to express an opinion as to the efficiency of the scheme which has been placed before the Committee? The fact is, I have not made myself acquainted with it. I received notice to come here early

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early this morning, and I have not had time to look the matter up. It must be two or three years since I went into the matter. I remember then going very carefully into the original scheme, and also into Mr. Stayton's modification of it. I should not like to say very much about the question until I had looked it up again.

815. You know that it is proposed to treat the sewage at asewage farm near the entrance of Duck River? Yes.

816. You are acquainted with the area which has been purchased there for the purpose? Yes.

817. Supposing the Department deposited from 3 to 5 feet of sand upon that property, do you think it would then be a satisfactory sewage farm? I would rather not bind myself to the particular method of construction you mention; but, of course, filter-beds which would be efficient could be constructed on that area. As regards 42 acres of the area, all that was obtained by the purchase was a foundation to build upon. You can build filter-beds there which will answer the purpose. The question as to whether the sewage ought to be carried to that point or not is rather one for an engineer, depending as it does upon the question of levels, economy, and matters upon which I am not the proper person to express an opinion.

818. *Chairman.*] In your opinion, is broad irrigation the best way of dealing with sewage? No; if the area to which you refer were to be used for the disposal of the sewage of Parramatta, I should certainly say that there ought not to be broad irrigation. You would find that it would result in the crude sewage going into the river.

819. Does it do so at Webb's Grant? Yes; but they have just now put in what it was necesssary to have at first, and that is a filter-bed. The whole of the sewage sent down to Webb's Grant never was treated. The end of the carrier was open, and the main body of sewage—a constant stream—flowed direct into a natural hollow of sand at the end of the main carrier, and from that it flowed into the sea. The irrigation area obtained from time to time exactly as much sewage as the cultivator thought was wanted. The consequence was that a nuisance was experienced at Rockdale, a place in the immediate neighbourhood, and at the beginning of May, 1895, a sand filter-bed began to be constructed.

820. If proper precautions are taken at the proposed farm at Parramatta, do you think it likely that any of the sewage will percolate through to the river? I do not, in ordinary weather; but in wet weather, when there is an unusual quantity of liquid coming down, and the soil is saturated with rain, then no purification will be effected.

821. In time of flood I take it that it would not be of so much consequence because there would then be a great body of water in the river to take the sewage away? If there were a flood that would of course depend upon the time for which it continued.

822. Will you look into the proposals of the Department and tell us whether, in your opinion, they are likely to be satisfactory? Yes.

823. *Mr. Hoskins.*] Do you approve of the system of precipitation and filtration? Certainly; it is the only way of dealing effectually with sewage.

824. You prefer that to a sewage farm? A sewage farm, of course, imports the notion of cultivation; and I think that the object of the person who would purify sewage, and the object of the person who would grow vegetables with the assistance of sewage, are opposed to each other. The crops want supplying with manure. The sewage from the town is always coming down, and it has to be dealt with continuously. The consequence is that in so far as attention is directed to cultivation of the area just so far is the main object—purification of sewage—hampered.

825. *Mr. Roberts.*] Looking at the site of the proposed sewage farm at the mouth of Duck River, and knowing, as you do, that the prevailing summer winds come from the north-east, do you think there would be any probability of a nuisance being inflicted on the people who frequent Rosehill? There ought not to be any risk of that at all, but it will depend upon the management of the farm.

826. How near to a sewage farm would it be safe for people to dwell with comfort? There are several sewage farms in England surrounded by houses, which are separated from the farm by the width of a road,—a couple of chains or so.

827. Are the Committee to understand—assuming that the sewage farm is managed in what I may term the most up-to-date manner—that no unpleasantness will be inflicted upon the persons resident in its immediate vicinity? Quite so. The slightest unpleasantness, which might arise from fresh sewage, would exist in the neighbourhood of the screening-tank. This would be placed somewhere near the middle of the plot, and the nearest of the houses could not be nearer to that point than the distance between it and the margin of the plot. I do not think that what you mentioned would be a consideration.

828. *Mr. Wright.*] As Principal Medical Officer of the Government, and President of the Board of Health, what power have you to abate nuisances? Under the Public Health Act the Board has no direct power as regards nuisances. The Public Health Act has provided an easier, cheaper, and safer way—taking legal proceedings to abate nuisances, and then, on its part, the Board of Health can call upon the municipal councils to do their duty if they have not been doing it They have not direct power to deal with nuisances.

829. Do you not think that the discharge of such a quantity of soup from the meat-works at Duck River must be injurious to health;—would not the discharge of such a quantity, in such a sluggish river as the Parramatta, necessarily cause a nuisance? I am under the impression that the company has discontinued dealing with a large proportion of the material in the way you suggest.

830. Take the discharge of soup from 330,000 sheep and 30,000 head of cattle per annum—would not the discharge of that into the river deposit a large amount of offensive matter which would float and be carried on to the foreshores, becoming ultimately very objectionable? If the amount of crude soup which you describe were passed into any river it would readily cause banks of offensive deposits.

831. You have not recently examined the discharge from the meat-works? No.

832. Would you mind calling upon one of your officials to make an examination of the works at the present time, and to ascertain exactly what is being done? I will do so.

833. You have mentioned that various institutions at Parramatta—the George-street asylum, the Rydalmere asylum, and the Convent of Subiaco—all discharge sewage matter into the river below the flood-gates? Yes.

834. Do you not think it likely that that offensive matter will be washed backwards and forwards through the flood-gates, with the result that a certain portion of it may be retained in that part of the river? Yes.

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835. Might not the action of the tide carry the soup from the meat-works up the river in the same way;—mention, for instance, has been made by one local doctor of a fatty substance in the deposit on the banks? Of course, if fat were discharged into the river it could be carried up; but I do not for one moment believe that any fat is discharged into the river, it being the business of the Meat-preserving Company to save every bit of it.

836. I suppose that there is a probability that if the discharge of soup is offensive it must tend to accentuate the offensiveness of the river further up? Yes, I suppose it would, to some extent.

837. *Mr. Humphery.*] When did you last receive a complaint from residents in the vicinity of Webb's farm? Some time before May, 1895, my attention was drawn to the matter.

838. What was the nature of the complaint? That there was an offensive smell going towards Rockdale from the sewage farm.

839. Did you run down the offensive odour and ascertain its cause? Yes.

840. With what result? The result was that I found a large lake of crude sewage. It was 200 yards long, by 50 or 60 yards wide, and judging from the measurement taken when it had been emptied, I should say from 5 to 6 feet deep.

841. How did you remove the nuisance created by the accumulation of this crude sewage? I had nothing at all to do with the sewage farm; it was a matter for the Water and Sewerage Board. Therefore I could not do anything.

842. Has the nuisance been removed? Yes. In May, 1895, they were starting the filter-beds, which were wanted, and in the meantime the lake had been drained—a way of escape had been made.

843. Would there be any difficulty in dealing in a similar way with the sewage which might be deposited on the proposed farm at Duck River in connection with the Parramatta sewerage? No. The area of 64 acres there would be large enough to enable you to adopt any useful plan which might be decided upon.

844. Of the 64 acres, a large proportion is subject to tidal influence? Forty-two acres out of the 64 are mud-flats.

845. There would be above the tidal influence 35 or 40 acres;—would that be sufficient for the treatment of the sewage in a manner similar to that in which it is treated at Webb's farm? I do not think it would; but I have already been told that the mud flats were to be reclaimed by filling them with silt 5 or 6 feet in depth. Then I think the area could be used.

846. If the sewage were treated similarly to the way in which it is treated at Webb's Grant, would the farm, in your opinion, create any nuisance? No, I think not. As far as I know, the sewage is being treated without nuisance at Webb's Grant.

847. As well treated as it could be by a system of precipitation? Yes. I do not think there need be the least difficulty about treating the sewage delivered to the area near Duck River. But as to the method by which it should be done, that is a matter for consideration; it depends upon the local circumstances.

848. In your opinion, would the river be in any way affected by the effluent? No. If the operation is properly carried out, the effluent would be so far purified as to be perfectly fit to enter any river. In my opinion, there would be no difficulty at all in procuring that amount of purification.

849. Would not the state of things be much improved if the sewage at present conveyed by the pipe from the asylums were conveyed by the main drain which it is now proposed to construct, and so on to the farm? Yes.

850. So that the Government institutions are now contributing to the pollution of the river? Yes.

851. That pollution would, in a large measure if not wholly, cease by the conveyance of the sewage on to the farm? Yes, that would be so with the sewage which the Government institutions are contributing; but you would at the same time intercept any municipal drainage, which is also polluting the river.

852. The question arises as to what proportion of nuisance is caused by the existing Government institutions draining into the river? I gathered that; but I do not see how you can settle that question.

853. In your opinion, the whole of the Government institutions should be brought under the proposed system in order to stop the present pollution of the river? There is no doubt about that. If a sewerage system is constructed at Parramatta, then both the Government institutions and private residences alike should be connected with it.

854. Is it, in your opinion, a matter of necessity that the whole of the Government institutions should be brought under the new system? Yes.

855. Are you aware whether there are, in course of construction near Parramatta, certain works for the Stock-owners' company? Yes. I have already taken precautions to prevent pollution from that source.

856. What precautions have you taken? In the first place I inspected the site, and I told the secretary what I should require in order to prevent the river from being polluted. I could tell them that, because they would require two licenses—one as a slaughtering-place, and the other as a fat-melting place. They will require to be licensed by the Board of Health as regards both occupations. Therefore I was able to say to the secretary that before I licensed them I should require them to construct in a certain way. Subsequently the engineer to the company conferred with me and we agreed as to the manner in which the waste-water of the establishment should be dealt with. I required that the effluent should be made to flow towards the river in properly constructed channels from which samples could at any time be taken, so that I could make sure at any time that purification was being steadily and properly done.

857. You are quite satisfied yourself that the establishment of the works with the precautions you have taken will not in any way cause pollution of the river? Quite satisfied.

858. If similar precautions were taken by the Sydney Meat-preserving Company referred to by Mr. Wright, would there be any pollution of the river? No, there could not be. I do not know at this moment what the works to which you refer are doing. If they are still discharging their soup in the way some gentlemen seem to think is the case they should not do so; and I will see in future that they do not.

859. Is it probable that any nuisance will be created in the future by the establishment of the Stock-owners' works? No.

860. Is it probable that the river would be in any way polluted assuming that the precautions you have mentioned are adhered to? No.

861. The difficulty at Parramatta at present appears to be in keeping the river free from pollution—that is to say, there are at present two or three sources of pollution? Yes.

862. Besides the Parramatta sewage, do you know of any other source of pollution of the river? No there is none.

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863. And you say that there will be little or no difficulty in dealing with the question of pollution from the meat-works to which you have referred? None at all.
864. Therefore, with an efficient system of sewerage at Parramatta, no further difficulty need arise in connection with any such manufactures in the neighbourhood? That is my opinion.

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Joseph Davis, Engineer for Sewerage Construction, Department of Public Works, sworn, and further examined:—

J. Davis.

865. *Chairman.*] I believe there are various facts which you desire to put before the Committee, the information having become necessary in consequence of your last examination? I have had inquiry made as to the amount paid for the sewerage service of Darlinghurst Gaol and also of Victoria Barracks. I find in respect of Darlinghurst Gaol that £245 16s. 8d. is paid per half-year, and that amount serves 578 persons, which really means that they pay for the sewerage service of the gaol 10s. per head. The amount paid in respect of Victoria Barracks is £268 12s. 4d. That serves 154 persons, and gives a rate of £1 17s. per head. As to the water service, I find that £660 per annum is paid by agreement for the supply of water for Darlinghurst Gaol, and that amounts to £1 2s. 9d. per head.

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866. *Mr. Humphery.*] That means that the Government is paying the Water and Sewerage Board 22s. in Sydney as against 10s. in Parramatta;—is that the case? Yes.
867. *Chairman.*] I suppose there is no doubt that your figures are right? They are quite right. I was so astonished by them when I first saw them that I made other inquiries. The assessor assures me that the amounts I have given are those which are paid.
868. Are there any other points to which you desire to refer? Mr. Humphery asked to be supplied with particulars of the £16,000 spent upon the Government drains of Parramatta. I find there is very great difficulty in getting the particulars, because they extend over so many years, but search is being made, and if it be possible to get the information a return will be made up, and it will be submitted to the Committee.
869. *Mr. Humphery.*] Is it the intention of the Department to raise the whole of the farm area at Parramatta in connection with this scheme? No; 40 acres.
870. Will that be ample to deal with the sewage of the present population? It will deal with very much more than will require to be dealt with. The ground ought to take the sewage of 1,000 persons per acre without any difficulty whatever.
871. Will that area be sufficient to enable you to deal with the sewage of Parramatta in a similar manner to that in which the sewage is being dealt with at Webb's farm? Yes.
872. There is a special filtration at Webb's farm since the complaint was made as to the accumulation of crude sewage in a large pond there? They have there precisely what we are proposing at Parramatta.
873. Dr. Ashburton Thompson said that two years ago complaints were made in connection with Webb's farm at Botany, and that on an inspection being made, it was found that there was an accumulation of crude sewage, which was then dealt with by a system of filtration. The system was not complete at the time of complaint, but was in course of construction. Have you, in your estimates for the Parramatta farm, made provision to deal with the sewage of Parramatta in a precisely similar way to that which now obtains at Webb's farm? Yes; on precisely similar lines. What was complained of at Webb's farm was that the sewage was turned into a lagoon there. It was highly diluted with storm-water, but still, if it were allowed to remain there in large quantities, it caused a little nuisance.
874. Will the expenditure you propose at Parramatta be sufficient, and will the area be sufficient to provide for the treatment of the sewage there in a manner similar to that in which it is being treated at Webb's farm? Yes. The area, I suppose, will be required only to treat the sewage of about 350 persons to the acre, whereas its capacity would not be exceeded if we had to deal with three times that number.
875. Do you think there is any probability of crude sewage being washed from the farm into the river? No; there would be banks round the bed. There would be no possibility of it.
876. In your opinion will any but a clear effluent reach the river? None but a clear effluent.
877. *Mr. Lee.*] In view of the statement you have recently made respecting the amount paid per head for Darlinghurst Gaol and other institutions for water and sewerage, is it the intention of the Department to bring down the estimate of revenue for the Parramatta scheme? No; as far as I could see the charge of 10s. was equitable. They are paying at the present time 6s. 8d., and having regard to the additional accommodation obtained under the proposal, I thought it was a fair thing to make them pay the balance of 3s. 4d.
878. The Department intends to adhere to the charge of 10s. per head? Yes; I think that is a fair proposal.

MONDAY,

MONDAY, 1 *MARCH*, 1897.

Present:—

THOMAS THOMSON EWING, Esq. (Chairman).

The Hon. Frederick Thomas Humphery.	John Lionel Fegan, Esq.
The Hon. James Hoskins.	Thomas Henry Hassall, Esq.
The Hon. Charles James Roberts, C.M.G.	George Black, Esq.
Henry Clarke, Esq.	Francis Augustus Wright, Esq.

Frank Farnell, Esq.

The Committee further considered the proposed Sewerage Works for Parramatta.

Edward James Love, Borough Engineer and Inspector of Nuisances, Parramatta, sworn and examined:—

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879. *Chairman.*] What is your position? I am in charge of works in the borough of Parramatta.
880. *Mr. Fegan.*] Your chief duties, I believe, are those of inspector of nuisances? Those of borough engineer are my chief duties, but the duties of that office are combined with those of inspector of nuisances.
881. How long have you occupied that position? Seventeen years next week.
882. For the borough of Parramatta alone? Yes.
883. Have you had any experience elsewhere? I had nine and a half years in the city of Sydney as assistant under Mr. Bradridge and Mr. Edward Bell.
884. You have had altogether twenty-six years experience? Yes. I should say that I had six years in the back country dealing with the conservation of water on runs.
885. You have a knowledge of the scheme now before the Committee? A general knowledge of it.
886. You have seen the plans? Yes.
887. Will you give the Committee your idea of the chief source of the nuisance which has been complained of, and also as to the portion of the municipality most affected by it? The portion where there has been most trouble through the want of sewerage, and the nuisance arising from it, is from the Church-street bridge down to the flood-gates below Charles-street.
888. At present there is no system of sewerage there? No; the Government have a drain proceeding from the asylums and emptying itself in the vicinity of the flood-gates.
889. Is the drainage of the Government institutions the chief source of nuisance? In my opinion it contributes to it to the greatest extent.
890. Will you mention the institutions which are drained by the drain to which you refer? The gaol, the lunatic asylum, and the girls' industrial school are the three greatest contributors towards it. Then we have the George-street asylum and the Macquarie-street asylum. The whole of these institutions are connected with the one drain, which discharges into the river just below the flood-gates.
891. You have been bringing this matter under the notice of the Department for a long time? For the last sixteen years.
892. Do you, as an engineer, think the proposed scheme would suffice to do away with the nuisance? I believe it would, and I have been through it with the officers of the Department. I agree with their scheme—I mean the amended scheme No. 1—taking the drainage out on to the farm.
893. That will cost, irrespective of the cost of the land for the farm, £59,000? So I am given to understand.
894. Apart from the drainage of the Government institutions, to which you have referred, what system have you for the removal of night-soil? We have the bucket system. The buckets are removed by night-carts, and are deposited about 2 miles away on the Windsor Road.
895. Near any population? No.
896. How far would that be from the source of your water supply? The nearest point would be about 1½ mile, but it is on a different water-shed.
897. Has any protest been made against the removal of night-soil by the council to that locality? Not to my knowledge.
898. And you say there is no population there? The population is very scattered; there are only a few farms.
899. Great complaints have been made, I believe, as to the stench arising through the nuisance in the river, caused in the main, as I understand you to say, by the Government institutions? Yes.
900. With reference to the farm, do you think it is necessary to have the acreage which has been purchased to deal with the Parramatta sewerage alone? Not for the Parramatta sewerage alone.
901. How many acres do you suppose would be sufficient to deal with that? From 15 to 20.
902. Do you know the cost of the land? It was exorbitant, I believe. I think from £190 to £200 an acre was paid.
903. Is it worth that amount now? No.
904. Do you think the Parramatta people would be prepared to take over the land at the amount at which it was purchased in connection with the proposed scheme? That is for the people themselves to say. I am merely a servant of the people.
905. But you are a ratepayer? Yes. Speaking as a ratepayer I should object to the price paid for the land.
906. Coming back to the question of the drainage of the asylums, do you think, if separate sewerage were provided for those institutions, the people of Parramatta would need a second scheme for the borough? Undoubtedly.
907. So that whether the asylums were there or not, it would be necessary to have a sewerage system for the borough? It would be necessary.
908. Have you been able to trace any sickness directly to the nuisance of which you have spoken? I have not traced any to it, but I have known doctors to complain of the nuisance in the river in connection with sickness. I should point out that it is contributed to by surface drainage as well as by the drainage of the institutions which I have mentioned.
909. I suppose it would be your duty to direct attention to any sickness which might be presumed to have arisen from defective drainage? Yes.

910.

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910. And it would be the duty of persons in the borough to complain to you of it? Yes.
911. Up to the present time no complaint has been made, as far as you know, of sickness arising from defective drainage? Some complaints were made before the storm-water drain was constructed on the Clay Cliff Creek—I mean the drain starting from Harris-street and running back to Church-street.
912. Who constructed that? The Government.
913. But the borough is not paying for it? Not at present.
914. Have any complaints been made since the construction of the drain? They have been very trifling.
915. Are there any cases of typhoid fever in Parramatta? There are isolated cases.
916. Have any of these cases been traced to defective drainage? No; most of the cases have been brought into Parramatta from outside districts—that is, from Smithfield, Fairfield, and Carlingford. There are one or two cases in Parramatta now. In one case the parties have only just come into the town from an outside district.
917. *Mr. Hassall.*] Do you think that if the scheme submitted by the Department had been carried out it would do away with the nuisance which has been complained of? I think so.
918. Have you any knowledge as to whether the financial position of the borough is of such a character that it will be able to contribute rates to cover interest on the cost of construction and working expenses? We are in a position to pay a fair rate.
919. What do you call a fair rate? I should say that from 7d. to 10d. would be a fair rate.
920. Do you think that the borough could stand a rate of 1s.? It would stand it, but I think it would be exorbitant. I myself, as a ratepayer, would object to it.
921. What rate would you, as a ratepayer, be prepared to pay? Anything from 7d. to 10d.
922. You think the benefits derived from the scheme would be such as to justify the payment of the additional rate? I think so.
923. And you think that other ratepayers situated similarly to yourself would be willing to pay the extra rate? The general run of ratepayers would be willing to pay it. Of course you will find objection on the part of some ratepayers to any improvement which may be proposed.
924. Are you in a position to express the opinion of the ratepayers generally in the matter? I should not like to do that. It would be for the mayor, or some person not in the position of a servant of the borough, to do that.
925. What has been the chief cause of complaint in the nuisance to which you have referred? It comes principally from the asylums. No doubt the council contribute to the nuisance themselves to a certain extent, but it would not be more than one-fifth. In the first place, there is the old Government drain running down Church-street to Macquarie-street. That empties under the bridge. There are drains emptying on each side of the Lennox Bridge. The Parramatta district hospital is connected with them, and the urine from the Court-house also flows into them. Then on the south side of the river the public schools have also been connected, and the urine from them is also taken into the river.
926. You say that the whole of that objectionable matter discharges into the river? Yes; the drain from the public school runs down Macquarie-street, turns into Charles-street, and empties into the river there. The drainage from the Macquarie-street asylum enters the same drain in Charles-street. There is also a drain running down the Clay Cliff Creek.
927. On the one hand, you have the river polluted from drainage down as far as Clay Cliff Creek, and from that point you say there is drainage down Clay Cliff Creek itself? Yes.
928. The drain to which you have referred, running along Macquarie-street and Charles-street, discharges into the river a little above the flood-gates? Yes. I ought to explain that the council put a 2-feet drain down Charles-street, and the Government thereupon connected the Macquarie-street asylum and the public school with it. Complaints have been made about the choking of that drain and of all the stuff floating out on to the surface of the river. I ought to mention that the drainage coming down from that part of the town flowed in a channel cut by Mr. Moriarty, and it used to empty at the bridge. The Colonial Architect's Department continued it from the bridge down to the flood-gates, and a syphon was put across the channel, which has made it very objectionable, because the incoming tide being as strong as the outlet objectionable matter is forced up the stream, and this matter is deposited on the rocks, and causes a nuisance.
929. The offensive matter remains there, I suppose, and festers in the sun at low tide? Yes; that was caused by the action of the Colonial Architect's Department in constructing the drain on the wrong side of the river.
930. I understand you to say that the nightsoil is buried in a watershed which cannot possibly affect the source of water supply? Quite so.
931. And you think it absolutely necessary that the sewerage scheme should be carried out to improve the condition of the borough? Yes; I think it should be carried out in the interests of the general health of the people.
932. *Mr. Roberts.*] As the inspector of nuisances at Parramatta, how often are you called upon to report as to the sanitary condition of the borough? I am supposed to report once a month to the council.
933. In making your reports, have you ever felt it your duty to refer to the want of a proper system of drainage in the borough? Yes; some years back, when the agitation first commenced. I did not report as sanitary inspector, but as officer in charge of the general works. I am referring to the time when Mr. Smyth, the engineer, was sent to the district by the Government, fifteen or sixteen years ago.
934. Have you referred to the drainage of the borough in any of your recent reports? Not since I have been acting as inspector.
935. During the past nine months the sanitary condition of the borough has been such that you have not felt it necessary to refer to this nuisance? Seeing that the matter was being dealt with by the Department, we thought that we ought not to interfere with them more than we could possibly help.
936. Has there been no outbreak of disease at any particular point which would have warranted you in bringing the matter under the notice of the mayor and aldermen? Not during the last twelve months, but the previous inspector brought the matter before the council in several of his reports.
937. I suppose you understand that the mayor and aldermen are thoroughly impressed with the necessity of a proper system of sewerage for the borough? Some of the aldermen are.
938. Is there any difference of opinion among members of the council as to the desirableness of carrying out this work? I could not say that there is. It would only be the estimated cost to which some of them would object.

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939. You think they would object to the scheme from a financial standpoint? Yes.
940. Do they regard the amount which the Government are asking them to pay as excessive? Yes; if you mean 1s. in the £. I think most of them regard that as excessive.
941. With that exception, are the mayor and aldermen anxious that some such scheme as that before us should be carried out? A majority of the aldermen are, but I would not say that the whole of them were.
942. Do they object to the scheme on any other than financial grounds? No.
943. Do they favour any other scheme? I have never heard them; although I have heard one of the aldermen object to the land purchased for the sewage farm as not being suitable for the purpose. I do not know, however, that the gentleman to whom I refer has had any experience in such matters.
944. Have you yourself formed any opinion as to the desirableness of establishing a sewage farm at the mouth of Duck River? Yes; I went into the matter with Mr. Smyth a long time ago, but I could not see that there was any objection to it. I think the land will deal with the whole of the sewage matter without raising any nuisance to speak of.
945. You think that if the farm were well managed it could be carried out without being a nuisance to the surrounding neighbourhood? Yes; to the neighbourhood as it exists at the present time.
946. Do you know Webb's farm? Yes; I was at Botany and also at Adelaide. I went to Adelaide purposely to see the sewerage scheme there.
947. From what you have seen do you think that any nuisance will arise from the farm in the direction of Rosehill? No; I do not think so, if the farm is properly managed.
948. Having in view the fact that it is intended in the near future to remove all the old men from the George-street, Harris-street, and Macquarie-street asylums, do you think the proposed sewerage system would be necessary for the borough? It would be just as necessary as if the inmates were not to be removed at all.
949. Do not the Government institutions contribute largely to the alleged nuisance? They do; but the greatest portion comes from the upper part of the Government institutions, so to speak. At the present time we remove the night-soil from the George-street and Macquarie-street Asylums on the bucket system. The gaol and lunatic asylum remove their night-soil themselves, and put it into a farm on the west side of the Parramatta River.
950. *Chairman.*] Does that farm really form part of the watershed at Parramatta? Yes. I ought to say that all these buckets are washed there, and the refuse is emptied into a drain which conveys it into the Parramatta River. The same thing is done by the lunatic asylum. We empty the buckets of the industrial schools, and also from the Macquarie-street and George-street asylums, although they sometimes empty the buckets themselves into a drain which empties directly into the river, without giving us the trouble of carting it away. At the Macquarie-street asylum they used to put it into a dung-pit for manuring their gardens, and it used to drain from that dung-pit into a surface drain until the council compelled them to connect with the Charles-street drain. That is why I say that there is more nuisance arising from the upper portion than from the lower portion of the Government institutions. The buckets are washed at Rydalmere, and they have a 12-inch drain emptying into the river beside the Subiaco Creek. The refuse is emptied direct into an underground drain which goes into the river.
951. *Mr. Roberts.*] You mention these facts to show the necessity for the carrying out of some such scheme as that under consideration? Yes. Perhaps you will allow me to say that the Government gave the King's School permission sometime ago to connect with the drain running from the Government institutions.
952. Do you favour the scheme now before the Committee in preference to any other scheme? In preference to any others which can be worked out in the district.
953. *Mr. Hoskins.*] Were you residing in Parramatta previous to the council making a water reserve for the supply of the town with water? I joined the service of the council for the purpose of carrying it out.
954. You could not say whether any complaints were made by the people of Parramatta as to the nuisance which existed in the river prior to the carrying out of that scheme? Yes. I have seen correspondence in the office containing complaints as to the asylums creating a nuisance under the Lennox-street Bridge; in fact, when I went there there was an agitation on the subject. I saw several reports in which complaints were made.
955. Is much water impounded by the dam erected by the corporation? A considerable quantity of water; it backs up in the creek for a mile and a half.
956. If that dam had not been erected would there not have been enough water in the creek to flush the river and keep it clear of nuisance? There would not be in such weather as we are having now.
957. But in average seasons? No; that creek in any case would not affect the matter. It is the smallest catchment of any of the creeks which flow into the Parramatta River above the bridge. There is water coming down creeks with three times the catchment area to flush the river.
958. Is not refuse water from Vallack's brewery emptied into the river? No; they have a meter, and I know what quantity of water they use. They take their water from the Parramatta supply.
959. But the Parramatta supply, I understand, runs short, and the council have had to obtain water from the Water and Sewerage Board? No; we are using the Parramatta water at the present time.
960. Then the people of Parramatta are supplied with water from the local scheme as well as from the Nepean? They were some time since, but at present we are using our local water.
961. I understand that all the refuse water from Vallack's brewery, as well as the drainage from the streets, is emptied into the river? Not all. Of course all the water on the water-shed of the river goes into it.
962. Practically all the drainage of Parramatta empties into the river? Yes. All the houses are not connected. I do not suppose that more than a third of them are connected.
963. How do they get rid of their slop-water? Mostly over the surface of the ground. In my own case not a particle of it goes off the ground.
964. Would you not think that the drainage from Vallack's brewery and private residences caused twice as much of the nuisance which exists in Parramatta as is caused by the drainage from the asylums? I do not think so, because there are no urinals in private residences connected with the drainage into the river, nor are there any pans washed there. The whole of the urine from the institutions to which I have referred goes into the river.

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965. What is done with the urine from private residences? It is carried away in the pans at night. That is the only way they can get rid of it. We do not allow them to drain it into the street.
966. Do you not think the removal of the urine in your carts is likely to create as much nuisance as is caused by the washing of the pans in connection with the institutions to which you have referred? No, I do not think so. The refuse to which you refer is emptied into the river, and at low tide it spreads over the surface of the rocks. The urine from private residences is removed at night, and is carried in carts to a place outside of the borough.
967. If the drainage from the asylums is carried to a point in the river where the tidal influence is felt, would there not likely be less nuisance from that drainage than from the emptying of pans in the manner you describe? No; because when the tide is coming in some of the offensive matter is carried back on to the rocks as far as the dam at King's School.
968. *Mr. Humphery.*] You have no doubt as to the offensive nature of the drainage at the present time into the Parramatta River close to and in the town? I have no doubt about it whatever.
969. You have no doubt that it is caused by the imperfect system which now exists? Yes, from the town and the Government institutions.
970. I think you said that at the present time Parramatta was not receiving any water from the Water and Sewerage Board? It is not at present.
971. What is the average daily consumption? The average is about 430,000 gallons. In summer-time it runs up to 720,000 gallons.
972. What is the lowest? In winter after rain it runs down to from 270,000 to 320,000.
973. What is the charge for water by meter? One shilling per 1,000 gallons for those who take over 1,000,000 gallons; the other prices are 1s. 6d. and 2s.
974. And the rate is what? Ninepence in the £.
975. I think you said you were a ratepayer? Yes.
976. What is the amount you pay annually to the general rate? £20. I pay £40 altogether. The lighting and water rate is equal to the general rate.
977. I am speaking of the rate you pay in respect of your private residence? £3 2s. 6d. for the general rate.
978. I suppose your pans cost the same as do the pans of other residents? Yes; I pay 13s. a year.
979. Do you think it is sufficient to have a pan emptied once a week? I think it is enough where there is a small family. There are only four at my place. I think once a week is quite sufficient then.
980. Does not the pan become very offensive towards the end of the week? No; we use disinfectants continuously.
981. You would have to pay very much more for your connection with the proposed system of sewerage? Yes; it would be over £2 at 9d. in the £.
982. Is it the general practice in Parramatta to empty the pans once a week? Once a week, unless in the case of buildings in which there is a large number of residents, such as hotels and other cases of that kind. In those instances there would be three or four pans and they would be emptied three or four times a week, as might be deemed necessary. In some cases the urine drains into a receptacle which is emptied every night by carts, instead of going into a drain as is the case with Government institutions.
983. That would be a special service? Yes.
984. How many inmates are there in the Rydalmere Asylum? I think 480.
985. It is not proposed to connect Rydalmere with the sewerage system under consideration? I think it would be advisable to do so, but it has not been proposed.
986. Unless that asylum were connected with the system, it would necessarily continue to pollute the Parramatta River? Yes; it would continue to create a nuisance, and it could readily be connected. There is plenty of fall to carry it across to the other side.
987. For what distance above the proposed sewage farm would the nuisance in connection with that asylum be still continued? About 1½ mile.
988. How far is it from the boundary of Parramatta? It is right on the boundary.
989. You think, therefore, that unless the Rydalmere Asylum were connected with the system it would be still imperfect? There would be a certain amount of nuisance left, but the drainage there would go into deeper water, where it would not be so objectionable as in the upper portion where the rocks are exposed at low tide.
990. It is proposed to drain Parramatta and to discharge the sewage on to a farm near the entrance of Duck River;—if the Rydalmere Asylum continues to pollute the Parramatta River for a distance of 1½ mile above the farm, it stands to reason, does it not, that the system must be imperfect? Yes.
991. If you allow the pollution of the river by 500 persons at Rydalmere, where do you get the perfect system to cleanse the river down to the farm? I take it that the drainage of Rydalmere would be included in the system, although it is outside the limits of the borough.
992. Were you under the impression that Rydalmere was to be included in the system? I did not understand that it was to be, but I should naturally conclude that it would be.
993. Are there any sources of pollution in the river besides the Rydalmere Asylum above the farm? No; I do not know of any others. I do not think any nuisance arises from Subiaco. They utilise most of their night-soil there in the gardens.
994. You have heard something about the soup which is put into the meat-works at Duck River? Yes.
995. Is that a source of nuisance at the present time? I cannot say whether it is so or not at present. It depends upon what quantity they are putting in, and where they are putting it in. If they are emptying any large quantity of soup there it would certainly be objectionable, because it would be carried up to Parramatta by the incoming tide, and would be left to fester upon the rocks.
996. Below the proposed farm? Yes.
997. *Mr. H. Clarke.*] You are of opinion that something should be done to remedy the nuisance that at present exists in the Parramatta River? Yes.
998. Do you consider that any of the schemes which have been suggested by the Department would be sufficient for the purpose? I do. I think the scheme before the Committee would answer.
999. Do you know what is intended to be done at the farm;—is it intended to grow vegetables? I do not know. It is possible they may grow fodder.

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1000. You think the plans which include the farm would be preferable to the Claycliff Creek scheme? Yes. I think there would be less nuisance arising from it. Eventually Granville would also participate in the sewage farm. It is the only point to which it can drain.
1001. You think that all the Government institutions should be connected with the proposed system? Every one of them.
1002. In the washing out of the pans which is the better material to use—sand or sawdust? Sawdust would be the best deodorant you could use for that purpose.
1003. The solid matter from some of the institutions is carried away, you say? Yes; at the Macquarie-street and George-street Asylums.
1004. Is that matter left exposed to the sun, or is it buried in the ground? It is buried.
1005. Does the place where the soil is buried form part of the watershed of the Parramatta? Yes.
1006. And you think that no nuisance can arise there from the burying of offensive matter? I do not think so.
1007. *Mr. Wright.*] Are you familiar with the sources of the Parramatta water supply? Yes; I have run them all pretty well out.
1008. You get your water from Hunt's Creek? Yes.
1009. Where does Hunt's Creek take its rise? Away back at Carlingford.
1010. Is not the country there fairly covered with residences? Yes; a number of residences have been erected there within the last five years.
1011. Do you think that under those circumstances the water is likely to remain pure, or is it likely to become contaminated? It is not likely to improve with the erection of residences on the shed. But all the water is filtered after it is pumped up from the dam. It all goes through filter-beds, which are just on the rise of Gilbert's farm.
1012. Does that elevation give you enough gravitation? Yes; we can put the water into the highest houses on May's Hill.
1013. You are burying night-soil, I understand, on the banks of the Toongabbie Creek;—how far would it be from the junction of the river? Following the creek round, it would be about 1½ or 2 miles.
1014. You think that no contamination is likely to arise from the burying of night-soil there? I do not think so, except, perhaps, a little in very heavy rains, when the ground would be thoroughly charged with water.
1015. Is there not a considerable settlement on Toongabbie Creek itself, between the spot where you bury the night-soil and the confluence of the creek with the main stream? The residences are very scattered.
1016. How do the people get their water supply? Mostly from the river.
1017. They do not take water from the Toongabbie Creek? Not as a rule. They only do so in very dry weather.
1018. You see the portion of the plan coloured in dark brown, which is to have no reticulation;—is that thickly populated? No.
1019. Is there not a considerable settlement there? I do not suppose there are twenty houses all through that section.
1020. Beyond the Catholic cemetery is it not fairly thickly settled? Yes.
1021. The people there will derive no benefit from the system? I was given to understand that they would.
1022. Nearly one-half of the area of Parramatta would be unsewered under this scheme? Yes; but it is very sparsely inhabited.
1023. Are you familiar with the financial position of the council? Yes.
1024. You know the council has a debt at present of £56,000? Yes.
1025. And that no provision has been made to extinguish that debt by annual repayment? No.
1026. The council are paying 6 per cent. for the money? Yes.
1027. Do you think that in addition to that debt the council can stand a further debt of about £70,000, and still meet its liabilities? Yes.
1028. You have had to pay the Water and Sewerage Board a considerable sum of money for water? We took £2,400 worth from them in eight months.
1029. That would represent pretty well all the revenue you would obtain from your own water supply? No; we receive from £4,000 to £5,000 from our own supply.
1030. Have there ever been any complaints made by the townspeople as to the quality of water with which they have been supplied? At times of heavy flood.
1031. You think that the occupation of your shed for residential purposes must necessarily contaminate the water? That would naturally be the case.
1032. Do you think persons would pay the heavy rate they are now paying for water more or less impure, when they could obtain a pure supply from the Prospect reservoir? I do not know.
1033. Do you think there is any probability of Parramatta having to abandon her own scheme of water supply, and to obtain water from the Water and Sewerage Board? There is no necessity for it. The expenditure of £1,500 would give us such a supply as to obviate the necessity of the taking of any water from the Water and Sewerage Board.
1034. How would you obtain the additional supply? By raising the dam. As to the people being prepared to take the water from the Nepean, I would rather take the local water, after it has been filtered, because I think it preferable.
1035. You know that modern scientists tell us that filtering is of no use? If you are going to filter the supply from Prospect well and good, but until it is filtered I would keep it out.
1036. The catchment area of the Prospect supply is remarkably good, because there are no inhabitants there? Oh, yes, there are.
1037. Supposing there were 1,000 more people settled upon the source of your water supply than are there at the present time, what do you think would be the effect upon the water? I can only refer you to the London supply, which, when filtered, is recognised as being one of the purest supplies there are.
1038. You say that it is immaterial how impure the source of supply is, so long as the water is put through filter-beds? Quite so.
1039. And you think the ratepayers of Parramatta, as a rule, take that view? Yes.
1040. And you think there is no fear of an agitation springing up, necessitating the council abandoning their present water supply, and deriving a supply from Prospect? If they did so, the Water Supply Board would take the matter over, and it would still be of advantage if the town were properly sewered.

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1041. But you would lose a large revenue which you now derive from the water supply? Yes.
1042. In view of the possibility of the loss of that revenue, and a considerable amount of revenue from the Government asylums, do you think that the ratepayers of Parramatta are able to bear the additional burden? We are not losing the asylums, because they would share the burden.
1043. You are aware, I suppose, that sometime ago this Committee decided to recommend the removal of all the destitute old men from Parramatta? Yes.
1044. That would deprive Parramatta of at least 1,300 of the indigent poor? Yes. It would affect our revenue to the extent of £750 or £800.
1045. Would not that be a serious loss to the council side by side with their additional obligations? Yes.
1046. But, without the assistance the Government render you through the asylums, you think that you would be quite justified in going to this expenditure? Yes; the £750 would be a levy upon the ratepayers—they would have to meet it.
1047. Do you think the townspeople would be prepared to pay a sewerage rate of from 9d. to 1s. in the £? I do not think they could go to 1s.
1048. The estimated revenue from this scheme is £3,800, including the Government contribution of 10s. per head? Yes.
1049. Do you think that if the sources of revenue to which I have referred were taken away the people of Parramatta would still be favourable to this scheme? Yes.
1050. A system of sewerage is required for Parramatta, you think, quite independently of the Government asylums? It would be beneficial.
1051. It would make the place more healthy and popular? Yes.
1052. You are acquainted with the sources of pollution of the river? Yes.
1053. It is polluted by slops, you say, from the Government establishments? Yes.
1054. Do you think that Rydalmere Asylum adds much to the offensiveness in the river? I think it will if the buildings increase. They are sending new patients there every day. I think there are 500 there now.
1055. How many residents are there at the Subiaco Convent? I could not tell you exactly, but I should think between thirty and forty altogether—there would not be more than fifty.
1056. Have you been in the neighbourhood of Duck River? Yes.
1057. Have you noticed any offensive smell there? Yes, at low tide.
1058. Do you know the process of manufacture which is now being carried out by the Sydney Meat Preserving Company? I know they have been in the habit of tipping refuse into the river.
1059. Do you think that this has contributed to the offensiveness of the river? I have no doubt but that it has done so occasionally. I ought to point out, however, that the company discharge a great quantity of refuse into Haslem's Creek, which is also a tributary of the river.
1060. All the refuse from the works comes into the river by one means or other? Yes, either by Silverwater or Haslem's Creek.
1061. Do you think that it has had as bad an effect as the whole of the sewage of Parramatta and the asylums combined? I do not think so.
1062. We have been told by a medical expert that the foreshores of the river below the town near the flood-gates are all covered by a filthy scum? Periodically. A good deal of that emanates from Haslem's Creek, more so, I think, than from the tip at Silverwater.
1063. Haslem's Creek runs into Homebush Bay? Yes.
1064. Is there a more offensive discharge from that creek do you think than from Duck River? Yes; I have found it so in crossing the bridge on the Sydney Road.
1065. *Chairman.*] What is the rise and fall of the tide below the town of Parramatta? It flows up to the dam at King's School. The rise and fall there is about 2 feet.
1066. Is that affected at all by the flood-gates? The flood-gates if kept closed give us about 18 inches of water.
1067. *Mr. Fegan.*] Would not that be likely to create a great nuisance? Yes, if it were not let off periodically.
1068. *Chairman.*] What is the rise and fall of the tide below the flood-gates? There is a rise and fall of 4 feet.
1069. What is the rate of the tide running up and down? It is very slow indeed. It would be about 1 mile an hour from (say) Duck River. I suppose there would be about half an hour between the two tides.
1070. How long is the tide running? About five-and-a-half hours each way. There is half an hour of still water.
1071. How far is the mouth of Duck Creek from the asylum? By the river, I suppose it would be about 2½ miles.
1072. And it would be about 3½ miles or 3 miles up to the dam? Just about that. It is three-quarters of a mile from George-street Asylum to the dam.
1073. In your opinion, if objectionable matter were deposited adjacent to the junction of Duck River with the Parramatta River, would it flow up until intercepted by the dam? If the gates were open.
1074. If they were not it would be stopped at the gates? Yes.
1075. So that if it were a fact that objectionable matter comes down Haslem's Creek and Duck River from works in the vicinity, it contributes to some extent to the pollution of the river? To some extent.
1076. Is there anything further you desire to say? In speaking of the council depositing their night-soil at Toongabbie Creek, I forgot to mention that the lunatic asylum, in which there are 1,100 inmates, cart all their stuff from the night-pans and deposit it on the other side of the creek, on what they call their farm ground. It is on the watershed also, and is about a mile below where the council deposit their night-soil.

TUESDAY,

TUESDAY, 2 *MARCH*, 1897.

Present:—

THOMAS THOMSON EWING, Esq. (CHAIRMAN).

The Hon. FREDERICK THOMAS HUMPHERY.
The Hon. JAMES HOSKINS.
The Hon. CHARLES JAMES ROBERTS, C.M.G.
The Hon. DANIEL O'CONNOR.
HENRY CLARKE, Esq.
CHARLES ALFRED LEE, Esq.
JOHN LIONEL FEGAN, Esq.
THOMAS HENRY HASSALL, Esq.
GEORGE BLACK, Esq.
FRANCIS AUGUSTUS WRIGHT, Esq.
FRANK FARNELL, Esq.

The Committee further considered the proposed Sewerage Works for Parramatta.

Joseph Davis, Engineer for Sewerage Construction, Department of Public Works, sworn and further examined:—

J. Davis. 2 Mar., 1897.

1077. *Chairman.*] You have had an opportunity to look into the question of the industrial home, near Rydalmere? Yes.
1078. Can you bring the drainage of that institution across properly to the sewage farm? Yes.
1079. What will it cost to bring it across? £1,500.
1080. Your yearly return will be how much at the ordinary rate? It will be about £263, at 10s. a head.
1081. It will pay you handsomely to do it? Yes. The annual cost will be about £60; there will be no expense except interest and repayment of capital.

John Ashburton Thompson, M.D., President of the Board of Health, sworn and further examined:—

J. A. Thompson, M.D. 2 Mar., 1897.

1082. *Mr. Humphery.*] Since you were last before the Committee you have refreshed your memory with regard to the scheme before the Committee, and are now prepared to give us your views in regard to it? Yes. I propose to give the Committee my views on certain matters of principle, and I should like to say, first of all, that I will divide the subject into two parts for the sake of clearness, one being the matter of collection, and the other the matter of disposal. As I have not very much to say on the matter of collection, I had perhaps better begin with and get rid of it. You have had before you evidence that there is some difference of opinion between the engineers who have been concerned in this matter as to whether the plan of collection should be the partly-combined or the separate. You had sometime ago a good deal of evidence from Mr. Stayton, who was very strong indeed against the separate system, and then more recently you had equally strong evidence from Mr. Napier Bell in favour of the separate system. Mr. Napier Bell alone spoke from practical experience. Now, among the advantages of the separate system are these: If you collect only the foul water which is discharged from the town, and no rain, then you know exactly how much you will have to deal with. You know the quantity exactly; because it is very slightly in excess of the quantity that is brought into the town for drinking purposes. Then, secondly, the composition of the sewage with which you will have to deal is uniformly the same. It has, invariably, the same composition. If you admit the rain you have to deal with sewage which is more or less diluted with the quantity of rain-water which happens to fall. If you keep the rain out you know what the composition of the sewage will be, after you have once ascertained it—it will not change unless the habits of the people change. That is a most important point wherever sewage is dealt with—the most important point in relation to disposal. It does not matter whether you are going to dispose of it by a chemical method or by filtration. In both cases it is very important indeed that you should know what you have to deal with, so that you should be able to manage your disposal works in a scientific or business-like way. There are subsidiary advantages in the separate system—one is in the lessened size of pipe which it is necessary to employ. I see that 9 inches has been mentioned in evidence before you as the dimension of the smallest lateral which ought to be used. Upon that point the American practice differs. The apprehension that with 6-inch pipes the sewage will choke them up is not borne out in practice. The Americans are perfectly satisfied with 6-inch laterals, and they know most about the system, which, however, is very much used in England at this day. There was one other point about the size of the sewer. It has been stated that if the size of these sewers is made smaller the grades must be made steeper. You will remember that Mr. Napier Bell mentioned that matter, and said that there was not any need to alter the grades laid down for larger pipes, the reason being that the size of the smaller pipes would be proportioned to the amount of sewage to be carried by them. It must be such that at the time of greatest flow they run half-full, and if they run half-full at time of greatest flow, then, on the low grade, these pipes will keep themselves clean just as well as if the proportion were somewhat less, with a steeper incline. As far as I am qualified to speak upon that point, I agree entirely with Mr. Bell. If the pipes are properly proportioned there is no necessity to alter the grade already laid down for the larger channels in the scheme before you—a partly-combined scheme. Mr. Stayton's evidence was very strong against adoption of the separate system, and I am sorry that he is not here now to join in this discussion. He is a very able engineer. I do not wish for one moment to say anything at all derogatory to him, but there is no denying this: that he is essentially conservative, and as regards the comparative merits of the separate and the combined or partly-combined systems, there is no reason to think from his evidence that he is at all well informed as to the separate system. On the contrary, he tells us nothing, and again and again he uses phrases which show that he is not well posted in the subject. There must be in America at this day more than 100 towns which are sewered strictly on the separate system, and some of them are towns precisely similar to those with which we have to deal here—small towns, which if they were

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were obliged to fall back upon the very expensive combined system could not afford to be sewered for some time to come. In England there are a great many towns—I am not able to give you a list, but Slough is one of them—which have been sewered on the strictly separate system for many years. Another town is Guildford, which has been sewered on that system for five or six years. Another is Dorking, which has been sewered on that system for about seven years. And mention of Dorking reminds me that Mr. Stayton used that town to illustrate a statement he made. He said that he went to Dorking, and that he went over the works, and after he had returned here he told you he saw it stated in the newspapers that the separate system had failed there, because no rain-water was admitted to the sewers. He told you from the newspapers also that the system had been altered from the separate to the partly-combined by admission of rain-water, and that from that time forth there was no trouble. Mr. Stayton got that information from newspapers which I have not seen, and he was able to accept it. As soon, however, as I saw his statement in his report on the methods of sewage disposal into which he had inquired during a visit to England, I perceived at once that the cause of the failure that had occurred in the sewers of this particular little town could not have been properly stated. I do not know how anyone could accept it as the cause of failure. The statement was that when the sewers had no rain-water in them they got stopped up, and that when rain-water was admitted to them the stoppages ceased to occur; but you know that even in England one has spells of dry weather, and if the sewers were kept clear only by rain-water—and that was Mr. Stayton's statement—after provision had been made for admitting rain-water they would still have been stopped from time to time when there was no rain-water to enter them. Seeing that a gentleman in Mr. Stayton's position had made that statement, which the Committee had no means of checking, I wrote to the town surveyor of Dorking, the gentleman in charge of the scheme, and I asked him what the case was. He replied to me in a letter which I have before me, and which is dated January, 1892. He said that no rain-water at all was admitted to the sewers, and that the separate system originally instituted was continued. There had at first been trouble from stoppage, but it arose in this way: The local authorities had not taken the power, which it is essential that every sewerage authority should have, to order what the water-closet fittings should be. The consequence was that in some of the smaller properties the owners would not go to the expense of putting into the closets the necessary flush-tank. The amount of water supplied was insufficient, and the 4-inch house-drains naturally got stopped up. When the stoppage had entirely closed the drain, the gradual accumulation of water by successive discharges behind it at last dislodged the obstruction, and it was discharged in a nearly solid state into the lateral in the street, and under those conditions the lateral could not pass it on. This stoppage would never have occurred had the sewerage authorities had the power referred to, because they would have put flush-tanks into the closets. The cause of obstruction in the Dorking scheme had nothing whatever to do with the principle of construction; that is to say, it had nothing to do with the separate system as distinguished from the partly-combined. It is worth while to make that clear. I have great respect for Mr. Stayton; I know that he believed what he told you; but you had no opportunity of checking what he said. It seems that it was a mistake. Now, another objection raised by Mr. Stayton to the separate system was the one which has always been made by the old English school: that you must have a double channel—a channel for your sewage, and another channel for your rain-water. I do not wish to discuss that at length, but I should like to consider it in relation to the town which it is now proposed to sewer—Parramatta. I would ask you this: Has Parramatta ever complained of inconvenience from storm-water. Never. This storm-water at present is satisfactorily disposed of without any set of pipes whatever. Mr. Bell told you that Parramatta was specially well situated for the running of storm-water into the river by natural surface channels. The people of Parramatta have never complained: and I do not in the least understand why, because they are going to have sewers to carry off their foul water, sewers to carry off their flood-water, which they do not want, should be forced on them, or spoken of as though they were necessary. Parramatta is quite contented with the flood-waters flowing by natural channels into the river, and it will remain so contented if that way of dealing with the flood-waters is continued. There is no occasion to alter it; no complaints have been made; and therefore the separate system of sewerage, as far as that goes, and as far as the other objections I have mentioned go, might well be applied to Parramatta. I have spoken already of constancy in the quantity of sewage to be dealt with, and of constancy in the quality of the sewage to be dealt with, as very important matters indeed—matters facilitating the process of disposal, so that I entirely concur with Mr. Bell's recommendation. I think the separate system is the best system for such a town as Parramatta—that it must be cheaper than any other system, and that there are many towns in New South Wales which might be sewered on that cheaper system which otherwise would not be sewered for a long time to come if they had to be sewered upon the more expensive partly-combined plan. Now, the only other point which concerns me in this matter is the question of disposal. That is entirely different from the matter of which I have been speaking, which is collection. I think there is one point which it is necessary I should advert to before continuing. I may be quite wrong about it, but it has been in my mind for a good many years. It is this: Unless I am very much mistaken in what has occurred, this Committee has never had an opportunity of approaching this inquiry free and unbiassed, the reason being that before this matter was submitted to it the land at Duck River, which it has been proposed to utilise in connection with the scheme, had already been acquired. This land had been acquired for a purpose for which, in its natural state, it was entirely unsuited—for the purpose of disposing of the sewage of Parramatta; and having been so acquired the Committee was obliged to consider the money which had been spent on it. It was obliged to consider, also, the money that would have to be expended upon the land before it could be made fit for the purpose for which it was acquired, and it seems to me that those circumstances must have greatly hampered the Committee in its deliberations Now, I cannot entertain any consideration of that sort. I have nothing to do with such financial aspects of the case as those. All I have to speak of is the best way of disposing of the sewage. As to this, every one of importance who has been before you has, I think, agreed that the very best plan of all, if you had the opportunity, would be to run it straight into the sea. I, myself, have no doubt about that. I would ask you to notice, in passing, that the very best method of all, when you have the opportunity, is considered to be one of throwing the sewage away, so to speak, and that the best plan is not thought to be one of applying it to land for the sake of the crops to be grown with it; and then, secondly, with the same limitation as to opportunity, the means which every one of importance has agreed to be the next best is the broad irrigation method of dealing with sewage. Where broad irrigation is not possible—and that is the present case—one has to resort to other methods.

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Some of them are chemical, some of them are biological, some of them are a combination of the two. It is very difficult to make the matter quite clear. The chemical way of disposing of sewage is now practically given up—I mean as a sole way, complete and sufficient in itself. People are beginning to take an entirely different view of the best way of purifying sewage. Opinion is coming round; and it is now thought that sewage will be best destroyed by those organisms intended by nature to destroy it. I do not think I need spend time in speaking of the chemical methods—I do not think you will employ those, and I feel, from the evidence given to you, and from the questions which have been asked of witnesses, as well as from your previous reports, that you are inclined to deal with the sewage by filtering it through the soil. Dealing with sewage by medium of land—and I use the word "land" in a very wide sense, to include not only land in its natural state, but also filter-beds constructed for the purification of sewage—is the biological method to which I have referred. Before I go further I would ask you to notice this: that the international system of filtration, of which you have heard so much, is not, as I think it has here been taken to be, a chemical method. It is a method to be included in that of disposal by passing through land—it is a filter, and the sewage is destroyed by micro-organisms. This, also, I would point out—although with reluctance—Mr. Stayton was not aware of. When Professor Stuart made the remark that the engineers must, to some extent, follow the biologists, Mr. Stayton repudiated it, at the very time that he was strongly urging a method of disposal which depended precisely upon this biological principle—the international method. From that an important consequence followed. Had Mr. Stayton been aware that the international method was the same in principle as the passing of sewage through the soil he would have advocated that particular company a little less strongly; and he might then have succeeded in persuading you to what would have been a perfectly correct practice. In the present case we cannot send the sewage into the sea. We cannot use broad irrigation, but we can use another plan which has been proposed, and that is intermittent filtration through beds of sand. We can cover these mud-flats with sand; and then, under intelligent management and proper restriction, the sewage may be passed through it and dealt with on the biological method, which is the only practical method. This is the position: In order to get the sewage to these mud-flats you have to carry it some 2½ miles. That may be involved in local circumstances. It may be necessary to carry it so far; I do not know. But if local engineering circumstances do not demand it, then it might be quite feasible on every score to deal with the sewage at some point short of the proposed place of filtration. That would save the expense of carrying the sewage so much further. And as a matter of fact the sewage could be dealt with at Clay Cliff Creek perfectly well—that is, at the pumping-station. Now, the process of purification, although it depends upon micro-organisms, nevertheless is a matter of exact measurement and management. We know pretty well what result will be yielded by any material which may be used for filters. We know how much sewage thoroughly will purify, and how much more sewage it will purify, to a less degree. That being the case, I will put it to you for your consideration,—whether the business is likely to be more successfully conducted when the sewage is scattered over a sandbank which is not under perfect control, or when dealt with by it passing through filter-beds which are under perfect control as to the time of their filling, as to the time of their being emptied, as to the time of aeration, and as to the material of which they are made. I think that no one could give any other answer than that this business will be most successful when the conditions under which it is carried on are most thoroughly under control. Then there is the question whether the sewage must be carried as far as the sewage farm, when at a great expenditure the latter has been made somewhat suitable for the purpose for which it was acquired; and whether, when the farm has been rendered suitable, it will really do all that is expected of it. The capacities of different kinds of material for dealing with sewage are pretty well ascertained. Here we come again to the question of expense involved in the making up of this area. Sand, on the whole, and not a fine sand, is the best material. I understand that coarse sand cannot be got at very many points of the harbour. If that is the case it is pretty clear that unless the circumstances happen to be favourable, and this has never been shown, the sand will have to be obtained specially for the sewage-farm from those points, in which case it must be a charge upon the capital expenditure. The statement has been made that the farm is to be filled with the material obtained in the ordinary course of deepening parts of the harbour, but it has been admitted that this will consist only partly of sand, and mainly of river silt. Now, consider this: sewage can be purified by passing it through river silt, but river silt will not purify nearly the same quantity as will sand. Sand can deprive sewage of 99 per cent. of organic matter contained in it. Suitable sand, properly used, will do that, and the effluent will be clear, and not putrifiable. It will approach in quality to the water which is delivered by mains to many towns in point of organic purity, and it will be better water than is supplied to Parramatta at the present moment. But if silt is used it will not purify more than one-third of the sewage to the same degree of purity. So that the question of the filling up of the farm is a very important practical question, and I think, from reading the evidence, that it is one, perhaps, to which sufficient attention has not been directed. I think I have now sufficiently indicated the principles by which I am guided in considering this matter. My recommendation comes to this: that it will be infinitely better to dismiss from our minds every thought of cultivation. Cultivation has something, but very little, to do with the purification of sewage. It does not matter. Do not let a place intended for the purification of sewage be hampered by the requirement of attending to the needs of agriculture. The two purposes are absolutely opposed one to the other. When rain is falling, and the soil of the sewage farm is saturated, it cannot deal with sewage; and, of course, on the other hand, when the soil is saturated the cultivator does not want any sewage. But the sewage comes down regularly every hour of the day, and has to be got rid of day by day. Therefore my recommendation comes to this: that the collected sewage should be purified by filters constructed on recognised principles at a point as near the beginning of the outfall sewer as possible—that is to say, the pumping-station. That old notion of cultivating the sewage farm should be thrown to the winds as not worth consideration, as presenting an obstacle and a difficulty—trouble and no profit Then there is the large question whether the sewage is likely to be better dealt with on an area of sand but little under control than it could be dealt with by filters properly constructed in view of known scientific principles. I think that is all I have to say at this stage.

1083. You do not express an opinion as to whether filtration should take place at the pumping station? That is purely an engineering matter. I cannot say anything about that. From the second report of the Committee I understood them to come to the conclusion that the sewage could be dealt with at the pumping station.

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1084. *Mr. Wright.*] No. 1 scheme provides for it, does it not? Yes, that is quite true. It could be dealt with there; but it is not a matter that concerns me, and I wish to guard myself from interfering with matters of which I have no special knowledge. But as to the question as to whether the sewage is best dealt with by being spread over an area of sand, or by being put through well-governed filters, I have no doubt whatever. The business is likely to succeed to the extent to which it is under the control of the operator. Therefore I say that it would be better to put the sewage through filter-beds than to put it through land by a process of uncontrolled irrigation.

1085. *Mr. Black.*] I understand you to say that soil will absorb sewage only up to a certain point with any pretensions to filtration,—that is to say, after passing a certain amount of sewage through soil without an interval of rest, its power to filter is exhausted? An interval of rest is essential.

1086. If land be cultivated does not vegetation withdraw from the soil certain organic elements which form a constituent part of the sewage? It is very doubtful whether plant life does that at all. Plant life takes from the soil the products of the disintegration and transformation of the sewage brought about by micro-organisms, but plant life is useful also in aiding evaporation.

1087. That is to say, sewage has to go through a certain organic change before it is of any use to the plant? Practically, that is the case.

1088. That is one of the reasons why you consider that a system of sewage filtration, and the use of the land through which it is filtered for agricultural purposes, cannot go on side by side? No; that is not the reason. They can go on side by side, but as a matter of business they had better not go on side by side.

1089. I have always thought—ignorantly I admit—that if land were cultivated it would pass through it more sewage than if it were not cultivated, that is with a view to filtration? It appears that that is not the case, but it used to be thought to be the case, and not so very long ago.

1090. *Mr. Hoskins.*] Will you tell the Committee which system you prefer, the precipitation and filtration of the liquid sewage at Claycliff Creek, the burning of the solids in destructors, and the disposal of the refuse, or the conveyance of the liquid sewage to the proposed farm at Duck River;—which system involves the least danger to the health of the residents? I incline to the precipitation and filtration scheme.

1091. And the burning of the solids? Yes. You must get rid of the sludge somehow, and it can be burnt.

1092. Then there would be no necessity for the sewage farm at all? Under that scheme there would be no sewage farm.

1093. *Mr. Humphery.*] Have you compared the cost of the two proposals? No; I have not.

1094. Have you compared the cost of annual maintenance? No.

1095. Assuming that scheme No. 2 was a similar system to that pursued at Webb's Farm, and assuming it to be the cheaper of the two, would you see any objection to it? I am not very well fitted to go into the question of cost, but I think that the more certain, the more ascertained process, is likely in the long run to be the cheaper—I mean the system in which the conditions are the most certain.

1096. Do you condemn the system at present pursued at Webb's farm? No; certainly not. Webb's Farm is in the condition in which the site at Duck River would be if it were built up with similar sand.

1097. Assuming that similar sand could be obtained for Duck River to that which exists at Webb's Farm, then would there be any objection, in your opinion, to the adoption of the system known as No. 2 scheme? Webb's Grant is an exceptional place. It is much more isolated. There is a great thickness of natural bed of sand, and there is very little to be done to it in order to utilise it.

1098. The question is whether the system would be a satisfactory system, supposing the conditions to be similar in the two places? Certainly. It would be a natural filter.

1099. Then is your objection to the Duck River site that the quality of the sand would be different in character? That is an important point.

1100. Assuming the annual cost to be less than the cost of precipitation and filtration, the only objection in your opinion would be that the sand used would be of a different character from that which is used at Webb's Farm? No; because if you could deal with the sewage at the pumping station, you would save the carriage down to the farm, and so on.

1101. I am speaking of your objection from the sanitary point of view? Providing the site is made up with sand, it would be perfectly suitable. Of course the place would have to be under-drained, and the process would have to be properly handled. I do not know that there is any objection at all to dealing with sewage in that way, except that it is in many respects an uncertain one. You may deal with sewage by putting it through sand and other material in tanks under conditions in which you would know exactly what you were doing.

1102. You are referring to a scheme of precipitation and filtration, such as you have suggested at Claycliff Creek? That is what I should prefer.

1103. If it should appear, as a matter of economy, that it were desirable to use the site at Duck River as proposed, what recommendation are you prepared to make as to the sand which would be used in making the necessary filter-beds? Only that the sand should be good clean sand of the largest grain which is procurable.

1104. Do you know of any sand of the description which you have given which would be readily obtainable? As far as I know the blown sand round about Sydney would answer perfectly well. I do not know of any trustworthy experiments having been made in the treatment of sewage. One point to consider in connection with Webb's Grant is that you have practically an unlimited area, but you set up quite a different set of things when you commence to deal with a limited area, such as you have at Parramatta. I cannot institute a comparison between the capabilities of Webb's Grant and the capabilities of Duck River, because I do not know what Webb's Grant is capable of doing.

1105. It is a question of whether the area is sufficient to deal with the sewage proposed? You are going to deal with the sewage by an unrestricted and ungoverned process of filtration. If you dealt with it by a governed filtration in constructed tanks, then for dealing with 400,000 gallons of sewage in twenty-four hours you need not have more than 4 acres, plus 2 or 3 more necessary for rest-tanks. You can put 100,000 gallons through 1 acre of suitably constructed filter-beds—that is, to produce a certain satisfactory degree of purification.

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1106. If the filter-beds at Duck River be constructed similarly to those which have been constructed at Webb's Farm, would they answer the purpose? I do not know how they are constructed and used at Webb's Grant.

1107. Then it depends almost wholly upon the nature of the sand? It is a first essential that the sand should be of a suitable character.

1108. *Mr. Wright.*] Would the effluent from a filter-bed such as you describe be perfectly innocuous? Yes. Of course it depends entirely upon how it is handled. The filtration of sewage is not a simple matter of letting it run over the soil and leaving it. It has to be handled and managed.

1109. Do you think that the filling up of the proposed bed from 2 feet to from 6 to 7 feet with sand would answer the purpose? I think it would.

1110. On the whole, then, you think that the sewage farm might answer? I think that all idea of farming there should be got rid of. It is of no consequence to the disposal of the sewage. Nothing can be made out of it. If you can adopt broad irrigation, then I have no objection to your cultivating. But if you are going to have merely filter-beds, it is best not to plant anything on the top of them. Do not hamper your filter-beds by planting things on them, but let us know exactly what we are doing.

1111. Would the effluent of sewage matter dealt with in the way you describe contain the germs of typhoid? No; as far as has been ascertained the germs of disease do not live to get through the filters.

1112. So that you think filter-beds are, after all, the best way of preventing disease as well as of treating sewage? I think they are a good way. But fresh discoveries are being made every day. At the present moment persons are considering a way of dealing with sewage which we ought to test, and in regard to which I ought to be able to give you definite information as the result of experiment. The system I refer to is the Exeter plan—that is, the turning of it into a tank, and leaving it to purify in the dark; it does not produce much smell. It is afterwards put into another tank and exposed to air and light. The result is said to be a clear effluent, and you have no sludge.

1113. What becomes of the sludge in that case? Anything strictly mineral must remain, but the other matter is eaten up by the micro-organisms. It is fermented away—none remains.

1114. If you were establishing a system of sewage for a large institution containing 2,000 inmates, and the determination of the system rested with you, what would you recommend? It would depend entirely upon the circumstances.

1115. In some cases, I presume, you would be prepared to admit that water carriage was good, and that in other cases treatment by filtration was good, while in other cases you might recommend a sewage farm? Just so. If I had to sewer such a place as you refer to I should first of all make a few experiments to find out what I was working with, and what I should be able to do.

1116. You are not prepared to express an opinion as to the relative cost of the different systems? No. I have spoken to you only of principles.

1117. *Mr. Lee.*] In the event of a sewage farm being adopted, would there be any obnoxious odour arising from the sand before filtration;—would there be nothing objectionable while the process was going on? No.

1118. Supposing the proprietors of the Meat-preserving Works in the neighbourhood of the proposed farm are under the impression that the existence of the farm would be detrimental to their business, should you say there was any ground for their apprehension? I do not think so.

1119. You do not think there is the slightest danger of the existence of the farm having any effect upon the meat in the process of tinning? No, I do not think so. The sewage is wet as it comes on to the land, and it goes down into it. There is not anything to blow about. I do not think the persons to whom you refer have the slightest ground for their fear.

1120. You do not think the germs may dry, and may blow away, and be brought into contact with the food? I do not think so at all. I do not think there is the least occasion to fear that.

1121. *Mr. Wright.*] I spoke to you the other day about the discharge from the Sydney Meat Preserving Company's Works at Duck River;—have you had any time to make any inquiry about that matter? I made some inquiry. I find they are dealing with the matter very much as I explained to you. They produce 6,000 gallons of soup every day; 2,000 gallons are evaporated, the resulting material is made into dog biscuits, the other 4,000 gallons are run to a little hill close to Newington, and are discharged thence from a cistern on top of the hill down a pipe, the mouth of which is always below water.

1122. Is not the water there very offensive? There is not any offence in the neighbourhood of the wharf, but whether when the steamers go there and stir up the bottom it becomes offensive I do not know.

1123. The crew of one of the boats which has to remain at this place at night have begged that some alteration may be made in the arrangement, because they say that they cannot sleep there, and that they cannot retain any food in their stomachs by reason of the highly offensive odours which arise. The nuisance, therefore, must be very serious? It is of course a very improper and undesirable proceeding. I daresay that what you say is true. I should not be at all surprised to find that it was so. I have again and again urged the manager of the company to find some way of dealing with the soup apart from throwing it into the river. New machinery is now being obtained by the company to do so, and when that is here they will be able to deal with the whole quantity they produce. They will evaporate it, and therefore that particular nuisance will be removed.

1124. Has the Board of Health no power to put an end to a nuisance of that sort? Under the Noxious Trades Act I think we could stop it by saying, "You must stop your business until you can find a way of dealing with your soup inoffensively."

1125. *Mr. Roberts.*] What, in your opinion, is the weak point in the No. 2 scheme;—you do not appear to be altogether satisfied with it? In the first place, you have not got a farm, you have to make it; and you are going to spend £14,000 in doing so, because you cannot put the sewage on to a mud flat. If you want to deal with sewage there you might do it by putting filter-beds on the part of the property above high water. Then you would not be bothered by any farm, and you would have a limited and definite purpose.

1126. I was under the impression that the weak point, according to your notion, appeared to be that the solid material would not be destroyed before being deposited on to the sewage farm? Long before the sewage reaches the farm there will be no solid at all in it. Sewage is a grey liquid; there is little visible solid matter in it. The solids are all dissolved or suspended.

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1127. Do you not think it would be necessary to provide for the destruction of the solid matter before it reaches the farm? It does not exist as solid matter when it is 100 yards away from the house from which it has been discharged.
1128. *Mr. Hassall.*] Do you think the running of the sewage out to the proposed farm is the most desirable way of disposing of it? It may be a perfectly effective way. I think the dealing with sewage under the circumstances by filtration is certainly the best method. As to whether it would be better to do it precisely by running it on to a large area, or by having limited filter-beds constructed in a particular way, is a different thing altogether. The principle is right. It is the only effectual way in which you can deal with sewage.
1129. *Mr. Fegan.*] Have you been able to trace any sickness to the want of sewerage in Parramatta? Our vital statistics are so dealt with at present that I cannot institute a comparison between Parramatta and any other town in the Colony.
1130. Still you have not been able to trace any sickness directly to the absence of sewerage? No.
1131. So that whether any sickness be due to the want of sewerage or not, you cannot say anything about it? Perhaps that is the best way in which to put it.

Joseph Davis, Engineer for Sewerage Construction, Department of Public Works, sworn and further examined:—

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1132. *Mr. Humphery.*] You have some further information to give the Committee with reference to the proposal before it? Since I was before the Committee previously I have had levels taken from the lunatic asylum at Rydalmere, which is about 30 chains on the north side of the river, across the railway bridge, along the railway embankment, to the tramway avenue, and I find that by laying a cast-iron pipe the sewage from the lunatic asylum can be conveyed to the farm by gravitation, about 50 chains, at a cost of £1,500, involving an annual payment of £60 interest and sinking fund.
1133. How many inmates are there at the present time? 527 at the present time.
1134. Have you estimated that they will contribute 10s. a head? Yes, a contribution amounting to £263 10s. Then I was asked to say precisely how much of the farm it would be necessary to reclaim to provide for the needs of the present population of Parramatta.
1135. In giving evidence on that point, you had better have regard to the evidence which has been given this afternoon by Dr. Ashburton Thompson? To provide for the present population of Parramatta I estimate that 14 acres of filter-bed will be required, and that it will cost to fill in, at 7¼d. a ton, £4,375. Then, again, there is the cost of the land, and preparing the land, there being an amount already spent of £6,931. If 14 acres of it were appropriated for the present requirements of Parramatta, it would amount to £1,565. So that as far as the farm is concerned for the present requirements of Parramatta an expenditure of £4,375 would be required in addition to the expenditure of £1,565.
1136. That would be the proportion, you think, of the expenditure already incurred? Yes. There is another matter into which the Committee asked me to inquire, and that was in reference to the £16,000 said to have been expended on the drain leading from the lunatic asylum and the girls' industrial schools. I can find records showing that expenditure occurred there as early as 1870. I have been able to trace £15,092 7s. 2d. It appears that the Harbours and Rivers Department expended £7,722 17s. between the years 1870 and 1879. The Government Architect expended during the same period £1,301 16s. 3d. In addition to that there has been expended on the dam and training-walls by the Harbours and Rivers Department £6,067 13s. 11d., making the total I have already given. These are the whole of the particulars I have been able to get.
1137. Do you adhere to the evidence you have already given, that not more than £100 of that expenditure can be utilised in connection with the present scheme? Yes.
1138. *Mr. Lee.*] I suppose that in course of time the sand which it is proposed to put upon the farm would become fully charged;—how is it proposed to renew it? It is not proposed to renew it. The sand will be better after it has been used for twelve months, and micro-organisms have been cultivated there, than on the first day it is put in. It is proved, by experience, that after the filters have been used for some months they purify infinitely better than on the first day of their use.
1139. Your theory is that the more the sand is used the more adapted it will be for the purification of the sewage put on to it? The more it is judiciously used.
1140. We must assume, of course, that that will be done;—this is land with a mud bottom, and so much sand will be put on to it as an absorbent? No, as a filtration agent.
1141. The effluent water must pass through it? Yes.
1142. The more solid matter being dealt with by decomposition? No; it is not decomposition in the ordinary sense of the term. It would be disintegration. The micro-organisms act upon the organic matter and break it up.
1143. It is, after all, one process of decomposition;—after a course of years will not the bed become so charged with organic matter as to be almost unequal to taking up any ordinary sewage? No; the organic matter will be dealt with as it is put on by the micro-organisms. This will be continuous, and the effluent will continue to drain into the river.
1144. The first coating of sand will, according to your theory, be all that will be required? The purification will go on within 6 inches of the surface. Pretty well all the purification takes place within that distance.
1145. There will be no after expense on the part of the Government or the municipal council in the renewal of the sand? Certainly not. It is altogether a mistake to renew filters if they have been properly constructed. When a filter appears to get foul, or when it has been supposed to get foul, it has been proved by scientists to be better capable of dealing with the sewage than it ever was.
1146. Suppose a site should be required at a future time for the further depositing of silt? Then the sewage farm must not be the place. It must not be deposited on the upper 5 feet. That must be sand, if the sewage is to be purified.
1147. What do you think of Dr. Thompson's idea of treating the sewage at the pumping-station? It can be done scientifically and effectually. It is a question of cost. It must be considered that we have never had a free hand in this matter. We have always had to bear the burden of the site of the farm.

J. Davis. 2 Mar., 1897.

1148. Will you explain what you mean by that? I mean this: that in 1882, an engineer was sent to Parramatta who proposed this site for the farm. In 1890 a question arose as to the depositing of the silt from the river, and it was known that this was an eligible site for dealing with the sewage from Parramatta. The land was resumed, and that being so, any step which has been taken subsequent to that date has had to be taken with a view to the farm which has been already acquired.
1149. It was thought necessary, in fact, to utilise the resumption? Yes.
1150. Are you prepared now to say that there is any site in the neighbourhood of the sewage farm as convenient as, or more convenient, than the proposed site? I think that much the same thing could be got a little nearer, supposing it had been thought advisable to treat the sewage in the way in which it is proposed to be treated. I think a site could be obtained nearer the town than the site you are referring to. Supposing this to be so, there would have been a saving in the rising main which costs close upon £5,000. I presume that at the time the land was resumed at Duck River it was not thought that the Government were going to pay close on £6,000 for it.
1151. Would it be an advantage to have a sewage farm close to the pumping station? It would be less expensive. There would be no advantage beyond that.
1152. It would surely be an advantage if you could save the annual expenditure? There would be a slight difference annually.
1153. Is the sewage farm at the present time a serious item of expense in connection with the matter? If the farm had not been there in all probability what would have been adopted would have been a precipitation and filtration scheme which would deal with the sewage effectually and scientifically, and would do all that could be desired from any point of view.
1154. The Parramatta people do not wish to be compelled to take over a bad speculation on the part of the Government,—they want an efficient and cheap system of sewerage,—and the Committee would like to know whether you can suggest any idea superior to that of a farm, which has been foisted on to us, it seems, by a previous resumption? I did not say foist. Under the circumstances, I believe that the proposal before the Committee is the best one. Of course we could submit another scheme for the treatment of the sewage at Clay Cliff Creek. We only require about 14 acres of land to deal with the sewage of Parramatta at the present time. Of course, if the Committee think that the filling-in of the farm, as well as the acquisition of the land, should be charged to Parramatta, that kills the whole thing at once.
1155. Parramatta would be charged with the first cost? Yes; but we did not propose to charge anything for the filling-in of the land.
1156. They will be charged with the whole cost of the land, although only 14 acres is required for dealing with the sewage? Yes.
1157. What saving would there be if you could treat the sewage at Claycliff Creek? It would be £52,500 against £59,000.
1158. What would be the difference in maintenance? Precipitation and filtration would necessarily cost more in working expenses than would the sewage farm.
1159. Much more? The working expenses in connection with scheme No. 1 would be £2,152, and in connection with scheme No. 2, £1,433.
1160. Have you had any complaints lodged with you, as to the establishment of this farm, by the proprietors of the meat works in the neighbourhood? We have received no complaints of that sort. They would probably have to go to the Board of Health.
1161. *Mr. Hoskins.*] In the 14 acres you have spoken of would the subsoil be drained? Yes; provision is made for that in our estimate.
1162. *Mr. Wright.*] You heard Dr. Thompson's evidence? Yes.
1163. What do you think of his views of the sewage farm? I think that, on the whole, he is right. I should agree with him.
1164. He said he did not think anything of the idea of cultivation on the sewage farm? He was speaking of intermittent downward filtration, and not of broad irrigation.
1165. Did he mean to imply by that, do you think, that vegetation had no effect in taking up any portion of the sewage matter? I think that what he would mean would be that vegetable life has very little effect in breaking up the sewage, as such; and that it has been proved conclusively that the chief agents are micro-organisms and not vegetation. What vegetation would do would be to lighten the ground, so that oxygen could get down to the micro-organisms.
1166. The site of the sewage farm is very stiff clay? The upper portion is clay and ironstone, but it is not stiff clay.
1167. Is the whole of it covered with water at spring-tide? About 40 acres are covered. I do not know whether the Committee wish me to say anything in regard to the separate system of sewerage, because in Parramatta there is no advantage to be gained by a separate system. No doubt a separate system in many cases could be adopted with advantage from the point of view of cost.
1168. The evidence shows that the initial cost would be similar, but the annual cost would be about the same? Yes.
1169. So that the proposed system is more effective than the separate system? I agree with Dr. Thompson as to the separate system. It is an old English practice to admit a certain proportion of rain-water, but there is no doubt that it is a very "rule of thumb process." They have adopted a separate system in Melbourne, although the engineer they brought out advised the English system, which is out of place in our semi-tropical rains.
1170. *Mr. Roberts.*] Is not No. 2 scheme the one which the municipal council of Parramatta requested the Government to send to this Committee for consideration? Yes.
1171. Leaving out the cost of maintenance, do you think the object of providing a proper system of sewerage would be better carried out if No. 1 scheme were adopted? No, I do not think so. I think the treatment of the sewage would be as effectual in one case as it is in the other. It resolves itself simply into a question of cost.
1172. *Mr. Humphery.*] In connection with No. 1 scheme, have you taken into consideration the drainage of the Rydalmere Asylum? That would be brought down at a little more cost to Claycliff Creek.
1173. As to the proportion of 14 acres for the reception of the sewage, have you taken into consideration the necessity of providing a description of sand different from that which it was proposed to use in the first

first instance? I proposed to fill the lower portion up to high-water mark with river silt, but anything above that would be pure sand—sand similar to that used in the reclamations at White, Johnstone, and Rozelle Bays. J. Davis. 2 Mar., 1897.

1174. Where do you obtain that sand from? I cannot give you that information. The sand is obtained by the Harbours and Rivers Department.

1175. Are you prepared to say that that sand is of the description which the President of the Board of Health deems essential for the proper dealing with sewage? I can say positively, with regard to the White Bay reclamation, that it is the right description of sand. The stormwater-channel was constructed after the reclamation, and a trench had to be cut through the sand 5 or 6 feet down to put in the concrete. That was the case at Neutral Bay and Careening Cove, and in all three cases it was suitable sand.

1176. You think it would be equally suitable with the sand at Webb's Farm? It was a coarser sand than that if anything.

1177. You estimated for that description of sand in connection with this farm? Yes; I should not propose to put anything else in.

1178. Where did you obtain your estimate of cost? From Mr. Portus's evidence, given before the Committee when the matter was under consideration on the second occasion.

1179. Are you satisfied that the amount given would cover the cost? I should say that it would do so amply.

1180. *Mr. H. Clarke.*] Why is this so-called farm called a farm when, according to Dr. Thompson's evidence, it is not proposed to grow any crop, or anything of that kind upon it? Perhaps it is a misnomer, but all filtration areas go by that name.

1181. Are any of the sewage farms in the neighbourhood of London cultivated? When broad irrigation is possible they are cultivated. The farm in Adelaide is cultivated, and the farm in Melbourne is to be cultivated.

1182. Is the farm at Webb's Grant cultivated? To a small extent, but it has never been a success.

1183. If it can be done in other parts of the world, why could it not be done on the proposed farm at Duck River? It could be done, but not profitably.

1184. I understand you to mean that the area is not large enough? That is so.

1185. Do you not think that through the continuous deposit of sewage matter the 14 acres would eventually become very offensive to people in the neighbourhood? No, I think not. The sewage is burnt up as it goes into the sand by the action of the natural scavengers which exist there.

WEDNESDAY, 3 MARCH, 1897.

Present:—

THOMAS THOMSON EWING, Esq. (Chairman).

The Hon. Frederick Thomas Humphery.	Charles Alfred Lee, Esq.
The Hon. James Hoskins.	John Lionel Fegan, Esq.
The Hon. Charles James Roberts, C.M.G.	Thomas Henry Hassall, Esq.
The Hon. Daniel O'Connor.	George Black, Esq.
Henry Clarke, Esq.	Francis Augustus Wright, Esq.

Frank Farnell, Esq.

The Committee further considered the proposed Sewerage Works for Parramatta.

Cuthbert Fetherstonhaugh, Managing Director of the Stock-owners' Meat Company of New South Wales, sworn and examined:—

1186. *Mr. Hassall.*] You are managing director of the Stock-owners' Meat Company of New South Wales? Yes. C. Fetherstonhaugh. 3 Mar., 1897.

1187. You addressed a letter to the Committee, under date the 23rd February, in reference to the proposal to construct sewerage works at Parramatta? Yes.

1188. I believe you represent the company, which has large works in the immediate vicinity of the proposed sewage farm? Our company has in course of construction, and more than half finished, works which will have cost £40,000, and employing, perhaps, 200 hands. The works will not be more than a few hundred yards distant from the nearest point on the sewage farm.

1189. You wish to make a statement as to the way in which your company is affected by the proposed work? I think the construction of a sewage farm in close proximity to works like ours, employing so many people, will prove to be injurious to our business.

1190. Will you state your principal objection to the farm in the proposed situation? I understand that all the sewage from Parramatta and the Government institutions in that direction is to be carried to a station on the Claycliff Creek, where the garbage only will be destroyed; and that the sewage, carrying in suspension all the excrement and other offensive matter from the town, will, from that point, be pumped on to the proposed sewage farm, and there disposed of by being put through filter-beds. According to the evidence which I have read, the land to be used for the farm is, in its normal state, unsuited for the purpose; but it is proposed to make it suitable by covering it with some 5 feet of silt and sand; and it is contended by those who are in favour of having a sewage farm at that place, and of disposing of the sewage in that way, that this arrangement will enable them to get rid of the sewage without offering any nuisance to the neighbourhood. I cannot in the evidence see anything to show that the excrement and other matter which will come down with the sewage will in any way be deodorised or disinfected, or that any steps will be taken to prevent its becoming a nuisance. No doubt the effluent will be innocuous, and there is no reason why it should not be allowed to flow into the river. But a certain amount of sewage, I presume, will be left to dry on the surface. Among this may be excrement, and what is there to prevent it from being blown about and becoming a source of contamination to the surrounding neighbourhood. We know that excrement is the first vehicle for the conveyance of typhoid germs. What I am afraid of is, that the sewage will in this way become a source of contagion, not only to our works but to our workpeople, and that their ultimate reluctance to live in the neighbourhood will involve a serious loss to the company.

C. Fetherston-haugh. 3 Mar., 1897.

1191. What is the area of land occupied by the company? The area of land upon which our works are situated is 14 acres; but the area belonging to the company there is 167 acres. Our works are between the tramway-line and river, to the north-west of the proposed sewage farm.
1192. You have purchased some land comprised in the Elizabeth Farm Estate, which practically surrounds the sewage farm, and you have a frontage to the Duck River as well as to the Parramatta River? Yes.
1193. Your land practically surrounds the proposed farm? Yes.
1194. What operations do you propose to carry out on your works? We shall boil down, make extract, chill for export and local use, and can. Those will be the chief operations; and, as I have said, we shall have about 200 employees.
1195. Do you propose to erect residences on your land for your workmen? If they do not reside exactly on our land they will reside quite close to it.
1196. At all events there will be a certain number of persons residing in the vicinity of the proposed sewage farm? Yes; there will be a large number, directly we start work. There is very nice land for building purposes in the township of Rosehill, which is already laid out, and elsewhere adjoining us.
1197. What is the level of the land to which you refer? It is about 5 or 6 feet above the level of the land upon which it is proposed to deal with the sewage.
1198. Do you know the character of the lower portion of the proposed sewage farm? It is swampy.
1199. Is it liable to inundation at high tide? Yes, all the lower portion is covered.
1200. So that, to make use of it, it would be necessary to erect fascines, and to fill up the land with sand or other material which will absorb the sewage? Yes; it will have to be filled up to the extent of several feet to get above high-water mark.
1201. So that, in its natural state, there is no chance of the land being drained? No; the land is hard, gravelly land.
1202. What effect would the carrying out of this sewage farm have upon your proposed work? I think it will be injurious in a good many ways. For instance, we deal with a very perishable article, meat, and assuming the sewage farm were alongside of our works, it might be thought that our product might be affected by it. Our main contention, however, is that it would be injurious to our workpeople. We have no wish to obstruct in any way the provision of a sewerage system for Parramatta. In fact we would be only too glad to assist it in every possible way.
1203. Do you think it would be possible to find a better locality for a sewage farm? No doubt it might be possible to find a better one, although it might cost more money; for instance, there is one up towards Toongabbie, to the north of Prospect. It would be much better from another point of view, because the effluent would constitute a large body of fluid which would assist to do that which is now so much wanted, that is, to scour the river, and lessen the chances of noxious matter accumulating.
1204. Is the locality to which you are now referring on a different watershed from that to which you are now referring? No; it is on the same watershed.
1205. Is it practicable to carry out a scheme of that character, having regard to the configuration of Parramatta and the area that has to be drained? I understand that it is perfectly practicable, and that the only objection to it is the cost.
1206. The adoption of that site would involve pumping to a higher level than the level of the land near the river? Yes; and there is also the acquisition of land to be considered; but it will have the advantage of being away from population.
1207. How much money have you already expended upon the construction of your works? Some £25,000. With the land it will run into over £40,000. We are putting up a very extensive packing house of five storeys.
1208. You are providing every facility for dealing with meat for export and home consumption? Yes, and for dealing with all the by-products.
1209. You propose to carry out your works under perfect sanitary conditions? Yes; we have been very strictly tied down by the Board of Health. They will not even allow us to put our wash-up water from the slaughter-houses into the Parramatta River without our putting filter-beds in.
1210. How do you propose to deal with the offensive matter which will arise from your operations? We shall take care of all that. We shall convert everything into a valuable product. Our boiling-down waste product will be turned into fertiliser, our blood will be turned into fertiliser, and the soup from the digestors, which is the most offensive material, will be evaporated, and will also be turned into a valuable material.
1211. And you have purchased the necessary machinery for the whole of these operations? Yes.
1212. You do not think there is any chance of pollution to the river following upon your operations? No; it is not possible.
1213. Are you aware of any other manufacturing establishments in the vicinity of the river? There are two or three small boiling-down places on the opposite side of Duck River.
1214. Do you know the Sydney Meat Preserving Company's works? Yes; they would be about 1½ mile from our place as the crow flies.
1215. Do you know whether they discharge soup into the river? I cannot say.
1216. *Mr. Roberts.*] When your company purchased their land were they not aware that upon 60 acres of the adjoining land it was proposed to create a sewage farm;—did they not know that that land had been purchased for that purpose? We were quite aware of that; but we were told that there was not the least likelihood of the land being used for a sewage farm.
1217. Then the present proposal comes somewhat in the nature of a surprise to your company? Very much so.
1218. Have you obtained any opinion from experts as to the probability of a nuisance being created by the sewage farm? I have had a conversation with Mr. Davis, the engineer, and he assures me that under proper management there would not be any nuisance whatever. I asked him a question as to the possibility of germs being blown about from the dry solids, and he did not appear to me to be clear as to the possibilities of danger arising from that source. However, I may have misunderstood him. The general effect of what he said was that there would be no nuisance whatever if the farm were properly managed.
1219. The evidence adduced before this Committee certainly points in that direction? I understood Mr. Davis to say that so long as the filter-beds were not allowed to get sewage sick, as it is called, there would be no danger, but that if they were allowed to get sewage sick there would be danger at once. It would appear, therefore, that in the absence of the best management there would be danger.

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1220. Do you know Webb's Farm? No; but I understand it is better suited for a sewage farm, because there is an enormous depth of sand there. This is hard ground.
1221. But you know that it is proposed to deposit about 5 feet of sand on the ground at Parramatta? Yes.
1222. *Mr. Hoskins.*] Are you in a position to speak of sewage farms in the old country? No.
1223. You have read, I suppose, of the existence of sewage farms there surrounded by a dense population, and you know that not the slightest inconvenience is occasioned to the surrounding inhabitants? I have heard that it is so, but I cannot speak of it of my own knowledge.
1224. You fear that if a sewage farm is established on the proposed site at Parramatta it will prejudicially affect the health of the people working in your establishment, and that it may also prejudicially affect the sale of your products? I do.
1225. Supposing the President of the Board of Health has stated that if the farm is properly managed there will not be the slightest danger to persons in the locality, and that no nuisance would be created, do you not think that that evidence would be of value? I should think that any opinion coming from him would be of value. But was not the opinion qualified?
1226. The only qualification was that the greatest care should be taken in the management of the farm? That is precisely the point I am urging.
1227. I suppose you recognise that it is necessary in order to promote the health of the people of Parramatta that some means should be taken to dispose of the sewage of the place? Yes.
1228. You are acquainted with the method of disposing of the sewage by precipitation and filtration? I have read of it, but I am not an authority upon such subjects. I think that system would seem to be the better of the two, but I express the opinion with a great deal of diffidence.
1229. The precipitation and filtration proposed in connection with No. 1 scheme would take place not very far from the site of your works? There would be others in the vicinity of Claycliff Creek who would be affected I suppose. It would not affect us at all.
1230. I understand then that you would prefer to see No. 1 scheme brought into operation? Speaking from a selfish point of view I should prefer that scheme.
1231. Your objection to the sewage farm is that it will seriously militate against your business? That is it exactly.
1232. Although in addition to the evidence of the President of the Board of Health we have the testimony of engineers that no offensive odour would be emitted by the sewage farm and that no injury would be caused to persons residing in the neighbourhood? That, I presume, is under careful management.
1233. Therefore if you were assured that every step was taken to ensure perfect management your objection would not be as strong as it is at the present moment? If I were satisfied that there would be no nuisance whatever arising from the farm any objection to it on my part would be foolish, because unquestionably the disposal of the sewage would be a good thing for Parramatta. We have no experience of a sewage farm on land similar to that at Parramatta. Even at Botany, where the conditions are much more favourable, there is, I understand, a nuisance sometimes.
1234. You quite understand that if a nuisance is created, persons in the neighbourhood of the farm would have their remedy at law? Yes.
1235. *Mr. Humphery.*] The President of the Board of Health was questioned yesterday as to the probable effect which the proposed sewage farm would have upon your industry. He was asked whether he thought there was the slightest danger of its having any effect on the meat in the process of tinning, and he said he did not think so. He pointed out that the sewage was wet as it came on to the land, and that as it went down into the sand there would not be anything to blow about. He said he did not think the persons who apprehended danger from that source had the slightest ground for their fears. In reply to a further question he said he did not think there was any danger of particles of dry sewage matter being brought into contact with the meat. With that assurance is your objection removed? It is removed to some extent.
1236. Are you now prepared to withdraw your objection to the creation of the farm? The opinion you have read is satisfactory as far as it goes. We have to consider public opinion in a matter of this kind.
1237. But I am referring to your individual objection. Are you prepared to withdraw that? Scarcely so. It seems to me that the question depends upon good management. That might or might not exist. Of course we have our remedy at law, but it is very unsatisfactory to go to law with the Government, or with anyone else for the matter of that. I wish you to take my objection for what it is worth. We do not wish to obstruct the scheme; on the contrary we should like to see one carried out. Then again I have not all the evidence before me, and I am not here as an expert. I am merely putting my views before you in a common-sense way, and I am quite sure that the matter is safe in your hands.
1238. But your company are spending a large sum of money upon these works, and that expenditure will lead to a large annual expenditure. You say at the same time that your works may be prejudicially affected by the proposal under consideration. Therefore the Committee would naturally pay considerable regard to your evidence. We have the evidence of the President of the Board of Health to the effect that your enterprise will not be prejudicially affected by the establishment of this farm, and we should like to know whether you are satisfied with his assurance? It is very satisfactory indeed as far as it goes, and it is a great help to us. Still I would much sooner that the proposed sewage farm were not placed there. I am sure that in the long run it will do us harm.
1239. I suppose you are aware that objection has been raised to the establishment of your works on the banks of the river, and that fears are entertained that their establishment will lead to a further pollution of the stream? All I can say is that the Board of Health has bound us down very tightly as to any noxious results from our operations. They have taken good care that we shall not create any nuisance.
1240. The Board having been so careful to adopt precautions so far as your enterprise is concerned, do you not think you may trust them to be equally careful in preventing injury to your business through the establishment of a sewage farm? I am still inclined to think that the establishment of the farm will ultimately do us harm. However, I am satisfied that the matter will be thoroughly dealt with by this Committee.
1241. *Mr. Clarke.*] You are satisfied that Parramatta should have a system of sewage? There is no doubt about that.
1242. And you know that the President of the Board of Health says that the existence of sewage on the farm will not have any bad effect upon the neighbourhood? I admit that his evidence seems to meet my objection.

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1243. Are you taking proper steps to remove any nuisance that might arise from your own works? We are turning the whole of our refuse into some valuable product, and the only water we want to get rid of is wash-up water from the slaughter floor, and that will have to go through filter-beds before it passes into the river.
1244. *Mr. Fegan.*] Have you marked out any allotments for your workmen? No; there are township allotments already pegged out there.
1245. On your own land? No; we intend to use our land for stock.
1246. You are not building cottages for your workmen on your own area? Not to any great extent, but there is a township laid out in the neighbourhood.
1247. Are there many persons residing at present on these township allotments near the site of the proposed sewage farm? There is only one dwelling there at the present time.
1248. And as far as the erection of cottages for your workmen is concerned you have so far done nothing? No.
1249. Would it be detrimental to your works if your employees, in consequence of any nuisance arising from the farm, determined to live at a distance from your works? It would be better to have them near us. We should be very sorry if any considerable number of our workmen could not get residences near us.
1250. It would be convenient both for the company and its workmen that they should reside near its works? Yes; but I incline to think that mere sentiment will prevent many persons from living in the neighbourhood of the farm.
1251. Do you not think that persons residing there now have as much to say against the removal of your works as you would have against the removal of the proposed farms? There are not supposed to be any offensive smells arising from our works.
1252. You have had a great deal to do with works of this description? Yes.
1253. And you know that offensive smells must arise from such operations? The only very offensive smell which arises is from the soup. That we propose to evaporate in this case, although it is not done in the country.
1254. You are acquainted with the works at Aberdeen? Yes.
1255. You know the stench which arises from them? That was from the "hash-magandes" fertilisers when they had no driers. It was dried in the open air; now it is treated in a drier and there is no smell.
1256. You think that a certain amount of danger will result to your works from the carrying out of the No. 2 scheme? The danger, I think, is chiefly to our hands, and not to the meat. Of course the existence of the farm there might affect the sale of our products materially.
1257. *Chairman.*] What price did you pay for the land which you have in the vicinity of the farm? I have no objection, from our point of view, to mentioning the price, but perhaps it would not be fair to the former owners of the land to do so; in fact I almost think there was an understanding that the price was not to be divulged.
1258. What was the date of your purchase? It would be about nine months ago. The land we own on the southern side of the river is bounded by the railway-line on the north, and follows down the Rosehill township; it then turns a few chains to the west along Devon-street, and then goes southerly to Duck River; and the remainder of the boundary is formed by Duck River and the sewage farm.
1259. You have already given us some particulars as to the number of hands you intend to employ? Yes; but we have not yet formed any definite plan with regard to them—that is, as to whether they reside on the land or not. They may live in Parramatta, but they will be on the works during the whole of the day, and sometimes during a portion of the night.

Henry Skinner Forsyth, Manager of the Australian Kerosene Oil and Mineral Company, sworn, and examined:—

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1260. *Mr. Roberts.*] What is your position? I am manager of the Australian Kerosene Oil and Mineral Company.
1261. Does your company own any land in the vicinity of the proposed sewage farm? We have about 56 acres left.
1262. Do you know what frontage you have to the river? I could not say, speaking from memory. The property to which I refer adjoins the land described by Mr. Fetherstonhaugh. It is on the western side, and embraces all the land, between the river and the tram line, as far west as opposite the outlet of Vineyard Creek.
1263. How far distant would the eastern boundary of your land be from the proposed sewage farm? I should think about 300 yards.
1264. Have you any works erected there? Yes; we have been carrying on business there for the last twelve years.
1265. How many hands are you employing? About sixty at the present time.
1266. Do you apprehend any nuisance from the creation of the sewage farm? I do.
1267. Have your fears been allayed in any way from what you have heard of the testimony of the President of the Board of Health? No, not in the slightest.
1268. Notwithstanding the statements of the President of the Board of Health you view with apprehension the creation of this farm? Yes.
1269. Do you fear that the health of your employees will be injured by the creation of the farm? I am not in a position to speak with regard to their health, but I am satisfied that the existence of the farm there will deter a number of them from living in the neighbourhood.
1270. And you think your business would suffer therefrom? Not our active business, but the value of our land would be affected considerably.
1271. You think it will be depreciated? I do, materially.
1272. You heard the evidence elicited from Mr. Fetherstonhaugh;—have you anything to add to it? Well, as to the site of the proposed farm, I think it is too low. You would have to build it up 4 or 5 feet to be above high-water level, and after a few years your filter-beds would be so impregnated as to require renewal. It will be impossible to prevent that.

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1273. Will you explain what causes you to think that it will be necessary to renew the sand periodically? It will become so thoroughly impregnated. It will have to be turned over, and the sewage will become mixed up with it.
1274. Would you be surprised to hear that yesterday an engineer in the employ of the Government told this Committee that the longer the sand remained there the better it would become for the purpose of filtration? That may be so, but the statement does not appeal to me.
1275. You would not accept that opinion? Certainly I do not.
1276. Have you ever seen any sewage farms elsewhere? In England, but not out here.
1277. Were the farms you saw under proper management from the point of view of the prevention of nuisance? All that I can remember about them is that you could always tell from the smell when you were in their neighbourhood.
1278. Do you not think that that would be due to imagination to some extent? It might be, but I do not think so.
1279. Have you seen Webb's Farm? No.
1280. Are you aware that owing to the able management of that farm no nuisance is apparent? I cannot speak of that from my own knowledge.
1281. Is there any suggestion you would like to put before the Committee;—would you suggest any other site? No; I cannot do that.
1282. *Mr. Black.*] You said, I think, that you thought the site for the farm was ill-chosen, because the land was so low-lying;—is the land covered at high tide? Yes. I live exactly opposite, on the land at the top of the hill, and I look down upon the land every day, so that I am in a position to speak with some authority on the subject.
1283. Is the whole of it covered at high tide? Not all. Of course there are variations in the tide.
1284. Do you know to what depth the land is covered? I could not tell you.
1285. You think it would be necessary to raise it to a considerable height? I am sure of it, and I doubt whether the formation of the land would bear the weight you would have to put upon the top of it.
1286. Is it spongy? I think it would be underneath.
1287. Is it mangrove swamp? No, it is just outside the mangrove, but it is a similar sort of land. Part of it is mangrove. It is perfectly sound to walk over at low tide.
1288. *Mr. Hoskins.*] You said that when you were in England you could always tell when you were in the vicinity of a sewage farm from the smell? Yes.
1289. Were these sewage farms in the vicinity of residences? Some of them. Others were on the banks of the Thames.
1290. Could you say whether the presence of the sewage farms offered any impediment to the disposal of land in the neighbourhood? I was too young at the time to form an opinion upon that point.
1291. At all events the presence of the sewage farms did not appear to prevent persons from residing there? No.
1292. Do you think that a smell such as you have spoken of would prejudicially affect the health of people in the locality? It would prejudice settlement in the locality. The question of health is another matter. I cannot enter into that.
1293. In what respect do you differ from the evidence of Dr. Thompson? I could not get myself to believe that with the discharge of a large body of sewage on to 4-foot beds of sands the sand would not become so pregnated that, regarded as a filtration bed, it would have to be renewed from time to time.
1294. It is proposed to get the sand from the silt raised in the harbour by dredges, so that its renewal would not be a serious undertaking? Upon that point I am not prepared to offer any opinion.
1295. Would you consider the presence of the farm prejudicial to the sale of land in the Rosehill township? Most certainly I should.
1296. *Mr. Humphery.*] Your land appears to be in close proximity to that marked red on the plan? Yes.
1297. The portion marked red is the proposed pumping station on Claycliff Creek;—under No. 1 scheme the sewage would be treated there instead of being treated at the Duck River farm, as proposed under No. 2 scheme;—does your objection apply equally to the treatment of sewage at Claycliff Creek? The same principle would hold good there, so far as I am concerned.
1298. No. 1 scheme proposes to deal with the sewage by precipitation and filtration, and you think that the objection you have raised to the sewage farm would apply also to that method, so far as settlement in close proximity to the process is concerned? Yes; the same objection would apply in both cases.
1299. Seeing that Parramatta must have a sewerage scheme of some sort, are you prepared to make any suggestion? No, I am not.
1300. You think that all schemes which may have the effect of bringing the treatment of the sewage in proximity to your land would be equally objectionable and prejudicial to the interests of those you represent? Yes.
1301. *Mr. Lee.*] Do you not also urge it as an objection that the establishment of the proposed sewage farm alongside the Meat Preserving Company's works is likely to prove detrimental to the works? I think it will prove detrimental to the sale of the product.
1302. Is not meat in the various stages of its treatment liable to absorb germs;—is it not as liable as water to do so? Personally I think it is even more liable.
1303. Is not what is called soup the mother or cultivator of a large number of microbes? I have always understood so.
1304. Supposing the scheme stopped short at the red patch shown on the plan, and that the sewage were collected there and destroyed, would not that overcome your objection? It would help to do so, because it would be enclosed, I take it.
1305. Your great objection is to the open sewerage processes? Yes.
1306. You do not urge any objection to the provision for a sewerage system for Parramatta? No.
1307. You want the sewage so controlled that it will not be a nuisance to those around it? Quite so.
1308. *Mr. Fegan.*] You said that you had noticed a large population surrounding the sewage farms on the banks of the Thames;—what would be the reason of the population in their vicinity? Because I suppose the people there could not afford to go anywhere else.
1309. Might not some of them have been there before the sewage farms were established? In some cases they probably were.

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1310. You do not think it at all likely that they would go to those localities if they could obtain residences elsewhere? No; I have never seen building sites rushed in the vicinity of sewage farms.
1311. *Mr. Black.*] Do you think the land which has been purchased for use as a sewage farm could be used for any other purpose? I do not think much could be done with it, unless you reclaimed the whole area by building up a fascine.
1312. *Mr. Humphery.*] Have you read a description of the proposed scheme No. 1? No.
1313. I presumed when I was examining you just now that you had done so? I have not had an opportunity to do so.

WEDNESDAY, 10 *MARCH*, 1897.

Present:—

THOMAS THOMSON EWING, Esq. (Chairman).

The Hon. Frederick Thomas Humphery.	Charles Alfred Lee, Esq.
The Hon. James Hoskins.	John Lionel Fegan, Esq.
The Hon. Charles James Roberts, C.M.G.	Thomas Henry Hassall, Esq.
The Hon. Daniel O'Connor.	George Black, Esq.
Henry Clarke, Esq.	Francis Augustus Wright, Esq.

Frank Farnell, Esq.

The Committee further considered the proposed Sewerage Works for Parramatta.

John Richard Palmer, Mayor of Granville, sworn, and examined:—

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1314. *Mr. Hoskins.*] The Committee received, I believe, an intimation that you desired to give evidence, believing that the proposed sewerage farm at Duck River would be inimical to the health of the people of Granville? Yes.
1315. Is there any statement you wish to make? I think there is nothing more than is contained in the protest which was sent to you from the borough council.
1316. Has the result of the working of sewage farms at any particular place been brought under your notice? I have no personal knowledge of any sewage farms, although I have visited the Botany farm and have inspected it. What I mean to say is, that I have no knowledge of the technical working of sewage farms, although I have a general idea of it.
1317. Are you in a position to speak from experience as to whether the proximity of a sewage farm to residences would be likely to be a nuisance to the residents? I have no personal experience in the matter. I can only speak from reading.
1318. Your objection to the establishment of a sewage farm on the proposed site arises from your apprehension that a nuisance may be created? I am pretty certain that there will be a nuisance.
1319. On what do you base that view? The personal experience I gained when I visited the Botany sewage farm.
1320. What objection have you to that? Simply to the bad odour arising from it. It must necessarily affect the neighbourhood. I believe there is evidence that it does so at times under certain climatic conditions.
1321. You have not heard of persons residing within a short distance of the sewage farm at Botany complaining of any nuisance which may be created by the farm? I do not know personally of any complaints.
1322. Your idea, then, that the proposed farm will be a nuisance to the residents of Granville arises from your visit to the sewage farm at Botany, although you admit that you have never heard of persons there complaining of any nuisance? In addition to visiting the Botany farm I have read that persons in close proximity to sewage farms have complained from time to time of a nuisance.
1323. Where? In various parts of England.
1324. How would you get rid of the sewage if you did not deal with it by means of a farm? There are several systems in use, and of these the sewage farm seems to me to be the most objectionable. If it could be shifted from time to time the nuisance might be got over to some extent.
1325. The sewage in this particular instance will be discharged on to 40 acres, and it would not cover more than from 5 to 6 acres;—so that when that one portion has been saturated with sewage it will be possible to divert the sewage to another portion? Of course a great deal depends upon the size of the farm.
1326. But the arrangement I mention would meet your objection, would it not? Not wholly, I think; because the farms as a rule do not increase in size, whereas the population is continuously increasing. The area which is being dealt with therefore is more quickly supplied with sewage.
1327. You are aware that there are sewage farms all around London; for instance, there is one at Croydon;—have you ever heard that the farm at Croydon has been complained of as creating a nuisance? Yes, at times.
1328. Has the population at Granville increased lately, or is it increasing? At the present time I should scarcely be justified in saying that it is increasing; but we have a population of about 5,000.
1329. As the population of your borough increases—and we have a right to suppose it will do—how do you propose to get rid of your sewage? So far as Granville is concerned, there has not been any necessity for us to consider the matter. We have an ample area on which we can deal with the solid matter by burying it. We have not yet been confronted with any difficulty in getting rid of the night-soil, and I am not prepared to give the Committee any idea of what we should consider the best means of getting rid of our sewage when the time for consideration has arrived.
1330. You say you bury the solid matter, but what becomes of the slops? They either flow on to the allotments of individual owners or go into the gutters.
1331. And where eventually are the slops which go into the gutters taken? At the present time they flow into the creeks.
1332. Does not that assist to create a nuisance in the creeks? At the present time it has not been found a nuisance, but it undoubtedly must become a nuisance in the course of time.

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1333. *Chairman.*] The proposed sewage farm is within the municipal boundaries of Granville? Not now; it is 2 miles from the railway station. The land was resumed and vested in the Minister for Works sometime ago, and is now an area outside of the incorporation.
1334. *Mr. Hoskins.*] Into what creeks does the slop-water of which you have spoken flow? Into Duck Creek and A'Beckett Creek.
1335. Medical men who have given attention to the subject have informed us that there is as much danger of disease from slop-water as from the solid sewage matter? I believe that is so, and especially in regard to diphtheria.
1336. Therefore, if you get rid of your slop-water by draining it into your creeks, is there not a probability of there being as great a danger to the health of the residents of Granville from that practice as there would be from the establishment of a sewage farm 2 miles distant from the centre of the borough? I must say yes to that question; but it does not cover the whole ground. We hope to find a much better method of getting rid of our sewage than a sewage farm. The question, however, has not yet confronted us. The district, at the present time, is much wedded to the crematory system; but, in any case, the council will have ample evidence before them before they give any opinion in the matter.
1337. Suppose the sewage of Parramatta were all filtered, and that the solid matter was disposed of by means of destructors, would you have any apprehension of danger to the health of the residents of Granville from the adoption of such a scheme? I dare say the system you speak of would reduce the danger to a minimum, but we must not forget that Granville is, if anything, a manufacturing district, and we think that the establishment of a sewage farm in close proximity to the mouth of one of our creeks, which can be readily made navigable, will interfere with the future industries of the place.
1338. Although the residents are at the present time assisting to convert the creeks into a highly objectionable state? There is no other course open at the present time. Only a portion of the slop-water is dealt with in the way I describe, because, as a rule, the allotments are of a fairly large size, and, being under some sort of cultivation, absorb the liquid sewage in such a way as to cause no nuisance.
1339. The President of the Board of Health has assured the Committee that if proper care be taken in the management of the proposed sewage farm, and if the sewage is thoroughly filtered, there will be no danger to the health of the persons residing in the neighbourhood. We have also the evidence of the engineering officers of the Public Works Department to the same effect? That may be so; and even if it were so, it seems to us that the site chosen is altogether unsuitable for a farm. If it be finally decided to establish a sewage farm in the district, there is a large area of agricultural land on the other side of Parramatta which would undoubtedly be benefited by the establishment of the farm, and which could be made available at once without any expense attaching to reclamation or the making up of the land. I believe that the land at Duck River would have to be built up about 6 feet before the farm could be established there. I admit of course that some portion of the work is already done.
1340. You think the Government will be taking a wise course in the interests of the residents of Granville if they select as a site for the sewage farm some land in the neighbourhood of Toongabbie? Yes, if there must be a sewage farm; but, if I understand the feeling of the people of Granville aright, they are opposed to the establishment of a sewage farm anywhere in the neighbourhood.
1341. Do you know that the Botany farm has been considerably improved, and that by the use of filter-beds the complaint which was at one time made in regard to it has been altogether removed? I was not aware that improvements had been made which had done away with the nuisance I have spoken of. I saw some of the filter-beds when I was there.
1342. *Mr. Humphery.*] Are the stock-owners' meat works and the Kerosene Co.'s Works in the municipality of Granville? They are.
1343. How far from the sewage farm towards Parramatta is the land embraced in your municipality;—does your boundary, for instance, extend from the sewage farm to Clay Cliff Creek? Yes.
1344. And you object to Parramatta putting a sewer through about 1½ mile of land comprised in the borough of Granville? We do most strongly; and the more so from the fact that we have reason to believe that it would be necessary to erect some sort of pumping station there. I cannot say, of course, what nuisance is likely to arise from a pumping station; but it is apprehended that there will be a certain degree of nuisance arising from it, and the land in the immediate vicinity of the proposed pumping station is exceedingly difficult land to deal with. It is always more or less flooded.
1345. How do you deal with the slops passing through the town—you have gutters, I suppose? Yes.
1346. Do you flush the gutters? Yes; we are allowed to use the water of the Metropolitan Water and Sewerage Board for that purpose at night-time.
1347. Do these gutters drain into Duck River? The principal part of the municipality of Granville drains into Duck River and its tributaries, the northern one of which is shown on the map, but the southern ones do not come within the scope of the large map. Then there is the drainage into A'Beckett's Creek. That would be on one side of the line. On the other side the drainage flows into a portion of Duck River.
1348. Then Granville contributes considerably to the present pollution of Duck River? To such pollution as there is.
1349. Is it not much polluted at the present time? Not from slop-water. The principal source of pollution at the present time is the refuse from the manufactories on its banks.
1350. These are within the borough of Granville? Yes.
1351. How do you dispose of the night-soil? By burying it. We have used for years Hudson's Farm. It is within the borough, at the back of Hudson's works.
1352. At what distance from the works? Some few hundred yards.
1353. Are there any houses in proximity to the land? Yes; it is surrounded by houses.
1354. Has it not been regarded as objectionable to have work of that kind carried on in proximity to residences? At one time it was objected to, but much greater care is now taken, and there has not been any objection raised now for some time.
1355. Does no offensive odour arise from the carts passing through the borough, near the residences, to the depôt? Undoubtedly, but the work is done at night, and that difficulty is therefore minimised.
1356. You believe that before long it will be necessary for the Council of Granville to deal with the question of sewerage? We are fully alive to that fact.
1357. But up to the present time you have not given the matter any consideration? No.

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1358. Therefore, although Parramatta may take steps for dealing with its sewage at a considerable cost to its ratepayers, the borough of Granville will continue its present system of polluting the Parramatta River below its junction with Duck River? That is scarcely the way in which we look at it. I understand that the district has been dealt with by surveyors in connection with the Metropolitan Water Supply and Sewerage Scheme for the Western Suburbs, so it is possible we may not be called upon to deal with the sewage matters ourselves at all.
1359. You think there is a prospect of Granville being included in the sewerage system of the Metropolitan Water Supply and Sewerage Board? I take that to be so from the presence of the Board's surveyors in the district. It was stated that that was their object.
1360. On that branch of the subject you are not prepared to say much at present? No.
1361. You hold that the establishment of a sewage farm on the proposed site would be highly objectionable as far as Granville is concerned, and you tell us that it would meet with your opposition? Yes.
1362. *Mr. H. Clarke.*] You said, I believe, that you were down at the Botany sewage farm sometime ago? Some five years ago.
1363. You said that at that time the farm was objectionable by reason of the smell arising from it? Yes.
1364. Have you heard that since the time to which you refer considerable improvements have been made upon the farm, and that the smell now amounts to very little indeed? I was not aware of that.
1365. The Committee went to the farm on Friday last and did not observe an offensive odour to any great extent;—do you consider, from the nature of the soil, Webb's Grant would be more suitable for a sewage farm than would the proposed site at Parramatta? Certainly. We look upon the site at Granville as practically useless for a sewage farm until a considerable amount of money has been expended upon it.
1366. The soil there is of no great depth? No, and it is very glutinous.
1367. Do you think that the putting of several feet of sand on the top of it would remove that defect? It might prevent any immediate nuisance, but the question arises as to whether the surrounding country will not become affected, because the land is always in a more or less swampy condition. The sewage would simply pass through the sand, and a great deal of it would eventually find its way into the river, and be spread on the flats.
1368. You know that the site of the proposed farm is being reclaimed? Yes.
1369. When the reclamation is completed the area will be larger than that of the dry portion of land at the present time? Yes.
1370. Do you know whether the Sydney Meat Preserving Company drain any of their soup into the Duck River at the present time? Not into the Duck River, but into a creek with much less fall than that. It is not in the borough of Granville at all.
1371. Do you think that that practice is objectionable? I think it is highly objectionable.
1372. Can you trace any cases of sickness to it? I have heard of no case of sickness directly traceable to it.
1373. You know the new Meat Preserving Company's works which are being erected in Granville? Yes.
1374. Do you think any nuisance is likely to arise from them? I do not know how they are going to deal with their refuse, but a certain portion of it, I think, must pass into the Parramatta River. I understand they propose to minimise the nuisance as much as possible by treating the refuse in various ways.
1375. Have they not adopted a similar process lately at the Sydney Meat Preserving Company's works, with the result that the works are not so offensive as they formerly were? Yes. I understand that they have now improved machinery. The nuisance is due to the small fall in the creek into which the objectionable matter is discharged. Unless in time of heavy rain it scarcely ever gets flushed out.
1376. Do you object to the scheme for the treatment of sewage at Clay Cliff Creek? What we object to is any sewerage works along the boundary-line of our borough. We see no reason why a sewage farm should be established anywhere in that direction, because the sewage can easily be dealt with elsewhere.
1377. You know the way, I suppose, in which it is proposed to treat the sewage at Clay Cliff Creek? I have not considered that particular scheme, but I know there are a number of systems.
1378. I suppose you admit that it is necessary that the drainage of Parramatta should be removed somewhere? I am not here to speak on behalf of Parramatta, but there can be no doubt that the principal source of pollution of the river is to be found in the Government institutions there. There are several schemes by which the sewage could be dealt with without Parramatta taking it out of its own boundaries. If it should be decided to establish a sewage farm, then there is no reason why it could not be established on land on the other side of the town, where the land itself would be benefited. The surrounding districts of Ermington and Rydalmere take the same view of this matter as does Granville. They think the district would be considerably prejudiced by the existence of a sewage farm. The establishment of the farm would affect Rydalmere more immediately than it would affect us.
1379. *Mr. Lee.*] In what portion of Parramatta do you say there is plenty of land available for a sewage farm? Perhaps I am not justified in mentioning districts, but you might take the Toongabbie and Wentworthville districts on the western side of Parramatta.
1380. Are you aware that the proposed system deals largely with sewage matter from Government institutions? Yes, I understand that that is the principal cause of the consideration of the matter at the present time.
1381. And that the system is to remove the nuisance which has existed so long in the Parramatta River? Yes.
1382. Do you think the contour of the country will admit of sewage matter being taken by gravitation to the westward of Parramatta? Yes; I think there are places there to which it may be taken. There may be engineering difficulties. Of course a great deal depends upon the system; but I should think the syphon system would get over them.
1383. You know that there is available land to the west of Parramatta, but whether it is suitable for a farm from an engineering point of view you do not pretend to say? No.
1384. What is the terminal point of the western suburbs system at the present time? It has not reached anywhere near Granville; I doubt whether it has reached Strathfield yet.
1385. You protest, on behalf of the borough of Granville, against the establishment of any sewerage system near your boundary? I cannot say that we should object to the establishment of any system there; but we do object to a sewage farm there.
1386. You object to that because you think there would be a certain disagreeable smell arising from it, and that there might possibly be a dissemination of disease? Yes. 1387.

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1387. If that would affect your borough would it not equally affect Parramatta? From what I know of the country, I should say not equally so.
1388. But supposing an easterly wind were blowing, would not a similar nuisance prevail at Parramatta as at Granville? I think if an easterly wind were blowing Granville would get the largest portion of the nuisance.
1389. But if an odour did arise from the farm, Parramatta would be affected as well as Granville? Naturally that would be so.
1390. And you admit that you will shortly have to consider a sewerage system for Granville? Yes.
1391. You know where the proposed pumping-station is to be located? Yes.
1392. Suppose the sewage farm idea were abandoned, and that there were filtration and destruction at Clay Cliff Creek, would you have any objection to that scheme? I do not think there would be any objection to destruction by cremation.
1393. But if no objectionable smell arose from the place you would have nothing further to say in the matter? No. We do not object to the scheme because Parramatta is having it carried out; what we object to, broadly, is the establishment of a sewage farm in our vicinity.
1394. But supposing a suitable system of filtration and destruction were adopted, your objection would cease? Yes; in fact we might like to take advantage of such a system.
1395. When it came to the establishment of a sewerage system for Granville could you not connect with the pumping-station, and deposit your sewage there to be destroyed? Yes; if it were destroyed in the manner I suggest. We certainly have no objection to the introduction of a better scheme for dealing with our night-soil. The people of Granville seem to favour at present a crematory system. If that were adopted I can see no objection to both districts using the same system.
1396. You would be tolerably close to the pumping-station in that case? Yes, but it would not be near the centre of our population. It would be so far removed from us that we should get no nuisance from it.
1397. What would be the distance from the centre of your borough to the site of your pumping-station? It would be quite 1½ mile. I would point out, however, that the sewage could not be conveyed there by gravitation from the centre of the district, because there is a large hill between the site of the proposed pumping-station and the creek.
1398. If that system were carried out a pumping-station would be necessary? Unless a very deep system of gravitation were adopted. But I do not think the scheme could be carried out by gravitation.
1399. The question is, whether one set of works could be made available for the two towns;—do you think it could? I think it could. I think a system could be devised which would serve Parramatta, Granville, and several other surrounding districts. The whole district would hail with pleasure some such scheme. We have no desire to have a separate manner of disposing of our sewage if any means can be discovered which would be suitable to the entire district.
1400. The only doubt you appear to have in the matter would be on the score of engineering difficulty? Yes.
1401. If the engineering difficulty could be disposed of you think some plan of the kind would be quite feasible? Yes.
1402. Do you suffer in Granville from any odour from the Parramatta River? Not in the populated part of the borough, but, approaching the river shores, there is sometimes an objectionable smell, although it is not so objectionable as this Committee has been led to believe by some of the statements made before it. I myself have never experienced anything nearly so objectionable as that which I have seen described.
1403. You know that at present the sewage matter is treated in the most objectionable way? Yes.
1404. If there be no objectionable odour arising from that, as far as your borough is concerned, how is a nuisance likely to arise when the sewage is properly treated on a sewage farm? No doubt the nuisance in the town of Parramatta is very great, but when you reach the boundary of Granville it is dispersed to a great extent. I do not think we can be said to experience any nuisance from the river.
1405. *Mr. Wright.*] You know that the scheme before the Committee is a gravitation scheme? Yes.
1406. If you went to the west or north of Parramatta for a farm you would be at a higher elevation than at Parramatta itself? Yes; I understand that that would be the case.
1407. You are also aware that the establishment of a farm in the districts you have named would tend to pollute water coming into the Parramatta River? It might possibly do it—it would depend upon the situation.
1408. You see that any scheme of gravitation to the westward would be impracticable? Yes.
1409. Do you know the nature of the soil at Toongabbie and Wentworthville? I should describe the land as fairly good agricultural land.
1410. It is clay soil, is it not? No; it is soil of rather a loamy description. There is a certain amount of clay in it.
1411. But no sand? No.
1412. Have you experienced any nuisance from the discharge of soup by the meat works? Granville has experienced no nuisance whatever from that source. We are practically free from it.
1413. And you do not experience any nuisance from the foul state of the Parramatta River itself? Not in the centre of the borough.
1414. If you experience no nuisance from these sources how could you experience any nuisance from the establishment of a sewage farm at such a distance? That would be a collection instead of a distribution of sewage, and from that fact alone there would be a greater probability of a nuisance arising.
1415. Is there not a great collection of sewage at the mouth of Duck River? Not sewage, but manufacturing refuse.
1416. But the nuisance does not reach you? No.
1417. When you visited the sewage farm at Webb's Grant did you smell anything as offensive there as is the discharge from the meat works? It was a more sickly smell than that arising from the soup.
1418. Since Granville finds no nuisance from the admitted pollution of the river, is it at all probable that there would be any nuisance arising from the farm at Duck River? No; except from the fact that it is a collecting depôt, and you have to consider the large proportion of sewage which would be conveyed there. The whole of the sewage of Parramatta does not, at present, pass into the Parramatta River, but it would pass into this farm.
1419. But supposing the sewage were treated scientifically on the site of the farm? I think you would find that even in the case of some of the best-managed farms in England—at Croydon, for instance—there is an unbearable odour on certain warm days.

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1420. That is not our experience in New South Wales, because a quarter of a mile from Webb's Grant no odour can be detected at all, and at that farm a much larger body of sewage is dealt with than would be dealt with at Parramatta;—do you think the farm would be offensive to persons 1½ mile away from it? I do not think it would be immediately offensive to the people of Granville, but we feel that in course of time it must be so. The immediate nuisance would be felt by those residing near to the farm.
1421. What is the population of Granville? Somewhere about 5,000; it is a straggling population. We have a population about the town of perhaps 2,000.
1422. What is your population on the northern side of the river? About 2,000.
1423. And that is the only portion of the population which would be affected by the farm? That would be the portion more immediately affected.
1424. Is the financial position of Granville strong enough to warrant it in joining in a scheme of this sort, and in having its streets reticulated? Before I could answer that question I should like to know what the expense would be. The matter would have to be carefully considered. We are not in a position to pay a heavy rate.
1425. The only portion of the borough which could stand it would be the more central portion? Yes.
1426. And if that portion were properly sewered the scattered portion could be dealt with by the pan system? Yes.
1427. Do you allow any of the residents to bury their own night-soil? Yes; the allotments, in most cases, are large, and where it can be shown that there is a fair amount of cultivation we give permission to the occupier to bury the night-soil.
1428. In that case no system of sewage would be required in the sparsely-populated portion of the borough? Not at present.
1429. But you think that the central portion of the borough could afford to join Parramatta in a suitable scheme? Yes.
1430. *Mr. Fegan.*] Have any public meetings been called in your municipality in reference to this disposal? Not on this occasion; but when the scheme was under consideration before there were meetings.
1431. You have considered the scheme now before the Committee? Yes. There is a general objection throughout the borough to the scheme. I have not heard one voice raised in its favour.
1432. That, I suppose, is due to the fact that the scheme involves a sewage farm; but there is not the same objections to the other proposal,—is there? No; in fact I have gone so far as to obtain certain papers with a view to the treatment of our own sewage in a similar way.
1433. Have you taken into consideration the fact that the sewage farm will be under proper supervision? Yes.
1434. And do you consider that under those circumstances there is likely to be any greater nuisance arising from the farm than arises from your present method of disposing of your night-soil? Of course the burial of our night-soil is carried on under the supervision of the inspector of nuisances.
1435. But until the nuisance is pointed out, I suppose the inspector does not trouble his head about it? That is so. Of course if the burial is not properly carried out anywhere it causes a nuisance. We find that the people generally have sufficient regard for their own health to dispose of the night-soil properly. During all my years experience in the borough there have not been more than half a dozen complaints of improperly dealing with the matter.
1436. What is the debt of your municipality? £16,000.
1437. Do you think the establishment of the proposed sewage farm at Duck Creek would retard the progress of your municipality, and therefore burden the taxpayers? That is our view of the case.
1438. You think that with the establishment of manufactures in the district you are entitled to look forward to a considerable increase in population? Yes. I may mention that already some persons have threatened to leave the district if the sewage farm is established.
1439. Will you tell the Committee what works are there already in your municipality? There are Hudson's, the Kerosene Company's works, the new meat works, four tanneries, and a tweed factory.
1440. Where does the drainage of these works go to? It passes through a portion of the municipality into the creeks I have mentioned.
1441. Is there any nuisance created by these works? Some of them are highly objectionable, but steps have been taken from time to time to have the nuisance minimised.
1442. Has the Board of Health taken up the matter on your representations? I cannot say that the Board of Health have taken any action in the matter yet, but they have been informed of the existence of the nuisance, and of the feeling in regard to it.
1443. Have they taken no action to abate the nuisance up to the present time? Not up to the present time. The tanneries and the tweed works have taken measures themselves to minimise the nuisance upon our representation.
1444. If there were any additional nuisance you think it would be almost impossible for persons to live in the locality? We think that all these manufactures can be carried on without any nuisance to the district, and we are determined that they shall be. The creek offers the readiest means for getting rid of the refuse, and we think that it could be got rid of without causing a nuisance to anyone. We are continually taking steps in that direction.
1445. You say that the Board of Health have taken no steps to get rid of the nuisance you complain of? They have taken certain steps in the district with reference to the boiling-down establishments and the tanneries, but in other respects I do not know that they have taken any action.
1446. Is it not on account of the large number of persons employed in these works that no strenuous opposition has been offered to the nuisances which exist? That is the fact.
1447. *Mr. Hassall.*] What is the distance from the centre of Granville to the proposed sewage farm? From 1¾ to 2 miles.
1448. The land is higher at Granville than at the site of the proposed farm? Yes.
1449. I suppose that the land between Duck River and Parramatta River is low-lying and is not likely to become densely populated? Not in the immediate future; but we look forward to a time when the whole of the district will be populated—when it must become populated.
1450. In the event of its becoming populated will not a sewerage system have to be adopted for it? There is no doubt of that; but we object to any nuisance being created upon our boundaries when there is no necessity

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necessity for it—that is to say, when a farm can be established elsewhere. Besides, if the farm is established at Duck River, they will have to come 2 miles through our boundary to deal with the material.
1451. The farm is about the same distance from Parramatta as from Granville? Yes.
1452. So that the people of Parramatta would be equally affected by any nuisance which might arise as would the people of Granville? No; I think you will find that the easterly wind would take the nuisance over a greater portion of Granville than of Parramatta.
1453. But it will be necessary to provide a system of sewerage for Granville itself? In course of time it must be so.
1454. And might not the system be managed side by side with the sewage of Parramatta? No doubt it might.
1455. Would not it be to the advantage of Granville to have this system in working order, so that at some future time the sewage of the place might be disposed of on the same site? I can only say with reference to that, that the council, speaking for the people, seems to be totally opposed to the establishment of any sewage farm in the district.
1456. What do they propose to do themselves, then? We do not propose to have a sewage farm. The district is much more inclined to the crematory process. It has been stated that even from the farm products water having a bad odour is exuded when they are pressed. When I was at Webb's Grant I took particular notice of the growth there, and I noticed that it was not at all of the healthy character of the growth on other land. I remember that being pointed out at the time.
1457. *Mr. Roberts.*] Is your council unanimous in objecting to the establishment of the proposed sewage farm? Absolutely.
1458. Have you, or has any member of your council, any personal knowledge of the operation of sewage farms? I cannot say that I have any personal knowledge, except such as I have gained at Webb's Grant; and I do not know that any other member of the council has any.
1459. Are you not aware that the farms have been found to work satisfactorily in other parts of the world? There seems to be such a difference of opinion with regard to the question that we prefer not to be troubled with a farm at all. I think that the evidence given before the Committee five years ago shows the great conflict of lay and scientific opinion in regard to the matter.

Joseph Davis, Engineer for Sewerage Construction, Department of Public Works, sworn, and further examined:—

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1460. *Chairman.*] There are three ways of dealing with the sewage of Parramatta—one is by connection with the sewerage of Sydney;—is that possible? It is possible, but not practicable.
1461. The other two ways by which the sewage can be dealt with are a system of intermittent downward filtration, such as is proposed in No. 2 scheme, or a system of precipitation and filtration? Yes.
1462. Therefore the case, as far as Parramatta is concerned, is limited to a decision by the Committee as to whether the sewage farm is, all things considered, better than dealing with the sewage by means of precipitation or filtration? Exactly; that is the case.
1463. The Committee would like to know why these stormwater channels were built in Parramatta? They were required.
1464. What for? The creeks were a nuisance and a certain sum of money was voted to have the nuisance remedied—a sum of £16,000.
1465. Were the creeks in so bad a state that it was necessary to take steps in connection with them? They were at that time.
1466. They were really in a very bad state? Yes.
1467. What was the cause of pollution? Slops from the houses, not from the Government institutions.
1468. Was there sufficient pollution, for instance, from the houses at Grose-street, on the northern bank of the Parramatta River, to necessitate the stormwater channel which was constructed there? Yes; it was very bad up to Ross-street.
1469. It is generally acknowledged that there is no connection between surface water and sewage—that the two things ought to be kept separate? That is my opinion. I think it should be done as far as possible, but other engineers might not agree with me.
1470. There is a general consensus of opinion on the point? Yes.
1471. The Committee find themselves in this position: there are two systems which modern engineers regard as entirely different, the system of dealing with stormwater and the system of dealing with sewage;—we find them both together in the system at Parramatta? To some extent, but not to a great extent.
1472. For instance you have £16,000 charged to the proposed sewerage works at Parramatta which legitimately should not belong to it? Not to the proposed sewerage scheme. You must bear in mind all the circumstances of the case. Parramatta was in this position: there was a terrible nuisance in these creeks, and, in anticipation of the scheme, it was thought advisable to give the town a measure of relief by the construction of storm-water channels. These were carried out cheaply, and they were effectual, as far as they went.
1473. Had it been possible to carry out sewerage works for Parramatta at once the evil in connection with these creeks, where the storm-water channels have been placed, would have been done away with? Yes.
1474. When the sewerage is completed will there be any longer much need for the storm-water channels? They will be useful still, but they will not be of the same use as now.
1475. Will they be very necessary? Not absolutely necessary.
1476. The case is this: that these storm-water channels were essential at one time because of the pollution of the creeks, but on the completion of the sewerage scheme they will be no longer essential, although they will do a great deal of good? They will do a great deal of good.
1477. A portion of the length will still be justifiable, but still £16,000 need not have been spent? The whole of the amount expended would perhaps have been expended eventually, but it might not have been expended in the immediate future. It was before the time, in that respect, but it met a serious want at times.
1478. The scheme you have recommended to us is a partially-separate system? It is a partially-separate system, inasmuch as you get relief from the fact of the existence of storm-water channels at certain points along

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along the sewer. There are overflows which give relief to the sewer, and enable it to be reduced in size, compared with what it would be if you had to take the whole of the storm-water down to the pumping-station.

1479. No. 3 scheme is a separate system? Yes; and so also is No. 4.

1480. How much larger pipes do you require in No. 2 than in No. 1 scheme—one being a partially-separate, and the other a separate system? They are virtually the same; there is very little difference. That arises from the fact that we are able to run off the storm-water at so many points along the outfall sewer.

1481. That is the explanation till you get to Clay Cliff Creek; then the vital difference between the two systems appears; in one instance—that is in the No. 3 scheme—the sewage is dealt with at Clay Cliff Creek, and in case of No. 2 scheme it goes on to the sewage farm? Yes. The sewage under No. 1 scheme is also dealt with at Clay Cliff Creek. If you take Nos. 1 and 2 schemes you will get a parallel.

1482. You will notice that in the estimate on page 13 of the printed evidence the sewers under scheme No. 1 are given as £24,471; if you now turn to scheme No. 3, upon page 17, you will find sewers given there as £23,111; you have already explained that under the partially separate system you can reduce to some extent the size of the pipe; your pipes in No. 3 scheme are 9 inches in diameter;—supposing we are informed on good authority that 4-inch and 6-inch pipes are abundantly large for reticulation under the separate system? I question the authority for the statement that 4-inch pipes are large enough, but as to the 6-inch pipes I entirely concur in that.

1483. Suppose you make your reticulation sewers 6-inch then instead of 9-inch? You could not make them all 6-inch. In some cases you would require 9-inch to carry away the sewage. As to the upper end of the system, 6-inch might be substituted, but the difference in price would be very little. The same trench would be required, and the difference in cost would not amount to more than 6d. a foot.

1484. Your outfall sewer in No. 3 scheme at Clay Cliff Creek is 21 inches;—could you reduce that? No.

1485. You can suggest no alteration in cost either as regards the size of the pipes or the material of which they are made? Only so far as the upper portion of the system is concerned, and then, as I have already pointed out, the difference in price would be very small.

1486. Take the item of machinery, pumps, &c., under scheme No. 3;—that is purely for the lifting of the sewage into the filter-beds at Clay Cliff Creek? Yes.

1487. In one case you have to drive the sewage a mile or a mile and a half, and in the other instance you have only to get it a sufficient height to put it into the filter-beds, and it seems an odd thing that you should want the same power in the one case as in the other? If one went into the thing theoretically one might make a little difference, but the difference in head was so very small that it was not worth while making a separate estimate. It would not make more than £250 difference.

1488. Then we come to the amount of the storm-water sewers, £14,864;—under scheme No. 3 they will be partially useful only? Yes.

1489. Under the same scheme we have an amount of £6,931 for the amount spent on the farm;—the scheme has no connection with it, but it appears to be an obligation incurred in connection with Parramatta? Yes.

1490. Supposing it were decided that the wisest course in connection with country towns would be to have precipitation and filtration, or some other system of the kind, in preference to a sewage farm; and that, therefore, a mistake had been made in purchasing this site for a farm at Parramatta? Estimates have shown that what was done many years ago has come out all right.

1491. But if a mistake has been made in purchasing a site for a farm at all it becomes matter for consideration whether Parramatta or the Government ought to bear the responsibility of it? I do not think it is admitted so far that any mistake has been made.

1492. As to precipitation and filtration you are aware that there is a large number of experiments at present in existence? Yes.

1493. And you know that the same result can be obtained without using much chemicals? Yes; but the plant as proposed will come in for that only to a small extent.

1494. The cost of scheme No. 2 for treating the sewage of Duck River, including the cost of 14 acres of resumed land, is £53,943, and the annual cost £3,391? Yes.

1495. Does that include the cost of the sand? No.

1496. How much more would it be for the sand? £4,375.

1497. So that, roughly, the amount would be £58,000? Yes.

1498. That, you believe, would be the cost of an effective system of intermittent downward filtration, in filter-beds under proper control? Yes.

1499. You do not regard the scheme as a sewage farm at all? No.

1500. To the £58,000 you have given us you have to add on account of Rydalmere—how much? Say, £1,500, making the amount £60,000 altogether.

1501. Will you prepare a statement showing how the thing is going to pay—that is, how Parramatta, plus the Government institutions, are going to bear the cost? Yes.

1502. *Mr. Wright.*] What is the depth of the main sewer at the pumping station? It is 1 foot below the level of high-water-mark.

1503. At what height above high-water-mark is the outflow pipe of the sewage farm? About 10 feet.

1504. You allow 15 feet for your fall? Yes; and then there is the friction; 25 feet includes everything.

1505. Is not 15 feet a large amount to allow? It would appear so, but the ground between the pumping station and the farm is much higher than the farm, and it must be borne in mind that the sewage has to be lifted over that.

THURSDAY,

THURSDAY, 11 *MARCH*, 1897.

Present:—

THOMAS THOMSON EWING, Esq. (Chairman).

The Hon. Frederick Thomas Humphery.	Charles Alfred Lee, Esq.
The Hon. James Hoskins.	John Lionel Fegan, Esq.
The Hon. Charles James Roberts, C.M.G.	Thomas Henry Hassall, Esq.
The Hon. Daniel O'Connor.	George Black, Esq.
Henry Clarke, Esq.	Francis Augustus Wright, Esq.

Frank Farnell, Esq.

The Committee further considered the proposed Sewerage Works for Parramatta.

William Mogford Hamlet, Government Analyst, sworn, and examined:—

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1506. *Mr. Humphery.*] You have made some analyses of the water which is being used at the present time in the town of Parramatta? I have made certain analyses of the Parramatta water extending over several years.

1507. Are you prepared to make any statement on the subject? No; I have no papers of any kind with me.

1508. Are you prepared, without reference to your papers, to give the Committee information as to the quality of the Parramatta water supply? Yes, generally my results have been that the water was bad.

1509. When you say bad, do you mean unfit for use? I mean unfit for human consumption.

1510. You are speaking now of the water supply from North Rock? I really do not know where the supply comes from.

1511. Where did you get your samples from? I had samples sent me by Dr. Manning and by the Board of Health; also from certain inspectors who were told off to take samples.

1512. When did you last make an examination of the water? I cannot exactly remember—I think it would be about twelve months ago.

1513. Did you furnish the result of your investigation to the mayor of Parramatta? No, to the Medical Adviser to the Government.

1514. Do you know whether your report was communicated to the mayor? I have no idea.

1515. Will you state briefly the particulars of your report? I cannot give you the exact figures, but the organic impurity was considerably above the standard laid down by the English authorities. On some occasions the organic purity came within the standard, that is to say, it was just within the border; in other words, it was a question of doubt as to whether the water would be fit or unfit for consumption.

1516. Do you say that the use of that water would be detrimental to health? No; I cannot altogether say that. What I say is, that organic impurity was present in such a degree that if an epidemic happened to be raging in Parramatta the water would serve as a feeding ground for the micro-organisms producing such an epidemic,—say typhoid, diphtheria, or what not.

1517. And you say that the water was unfit for human consumption? Yes, on that ground, because any water which contains organic matter derived from urine or human excreta is polluted to such an extent that, given the conditions for producing an epidemic, it will become a feeding ground for the micro-organisms. On that account I should condemn it.

1518. Are you prepared to say that the pollution of the water is due to the nature of the watershed? I cannot very well answer that question, because I have not been over the watershed.

1519. Can you state generally what, in your opinion, is the cause of the impurity of the water? The impurity I found in the water was due to animal and vegetable pollution; and the animal pollution would probably be derived from surface drainage.

1520. From the watershed? I assume so.

1521. We have been told that the Parramatta water is generally classified as No. 2, that is to say, it is inferior to the Metropolitan Water and Sewerage Board supply, but that otherwise it may be regarded as suitable for human consumption. You do not agree with that conclusion? The samples sent to me varied, but I think that in the majority of instances I condemned the water. On certain occasions the water has just come between the border between what is good and what is bad.

1522. I suppose that the water, during a period of dry weather, would be inferior to the water after a heavy rain? At some interval after a heavy rain, because, supposing the water to be bad in time of dry weather, if there were a heavy downpour of rain the water immediately after the rain would not be so good as it would be sometime afterwards.

1523. That would be due to the immediate washing of the watershed by the rain? Yes.

1524. You are not prepared to offer any opinion as to the advisableness of the use of this water by the inhabitants of Parramatta? I should recommend that the water be purified.

1525. Could it, in your opinion, be purified at a small cost? Yes.

1526. What method would you suggest? Aeration and filtration.

1527. Have you formed any opinion as to what the cost would be? I have not, but I could obtain the details if you would give me some little time.

1528. Is there any other water supply with which you are familiar which has been similarly treated? Yes; I recommended aeration and filtration in the case of the Maitland supply, and it has been attended with success, I am happy to say.

1529. You do not know what the cost has been? No; I have nothing to do with that.

1530. Is the water at Maitland now fit for human consumption? Yes.

1531. Before the adoption of your suggestion was the water affected there in a similar way to the water at Parramatta? It was unfit for human consumption.

1532. Can you say whether it was inferior water to the water from the North Rock at Parramatta? I cannot say without reference to my figures, but I know that it came within the category of water which I declare to be unfit for human consumption.

1533. As far as you can remember it was just as unfit for human consumption as is the water used at Parramatta? Yes.

1534. Is there any reason why the water supply at Parramatta should not be rendered equally satisfactory by the adoption of a similar method? Before answering that question I should prefer to see the watershed,

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watershed, and to know more about it. It is quite possible that the conditions obtaining there may be different from those obtaining at Maitland.

1535. In what respect do you apprehend that there would be any difference in the conditions which obtain? Well there might be an increase in buildings or in the number of farms round about the gathering ground of the water. That would affect it, of course.

1536. Was the impurity of the Maitland water supply directly attributable to surface drainage? Yes; and to organic growth in a large natural reservoir at Walcha. The Maitland supply, I should explain, is drawn partly from a large natural reservoir and partly from the Hunter River. When they first took water from the reservoir to the west of Walcha it was very impure, and they afterwards mixed it with water from the Hunter River, allowing the two to flow into a reservoir, and then filtering the supply.

1537. Is the supply still impure? No, it is very much improved.

1538. You ascribe that to the processes of filtration and aeration? Yes. The great principle in the purification of water is to drive atmospheric air into it directly, or by allowing the water to be thrown up into the atmosphere in the form of spray, so that it will meet the air in its fall.

1539. *Mr. Lee.*] Have you had occasion to analyse the effluent water from the Botany sewage works? Certainly. I do it periodically—every three months.

1540. Can you tell the Committee whether that effluent water contains any deleterious matter? Yes, it does.

1541. Of what nature? Organic matter directly derivable from human excreta in the form of albuminoid ammonia—that is to say, animal matter in process of decomposition. In analysis it figures as albuminoid ammonia; it is present in excess.

1542. And if that water was stored, what would be the result? If you stored it in the presence of light, and if you stored it in darkness, you would have different conditions. If you alternately stored it in the dark and in the light, it would tend to purify itself; but stored in an open reservoir I should think it would become a nuisance.

1543. But if it passed away directly into the sea water, would it become a nuisance; and would the nuisance eventually find its way to the foreshores? No, I think not.

1544. You think that the mere fact of the water escaping in that way would utterly destroy the nuisance? Yes.

1545. Have you had occasion to analyse the precipitates on the surface? Yes.

1546. Of what do they consist? Chiefly of fatty matter, of hair, animal debris, paper, and undecomposed animal matter.

1547. Have you discovered any organisms of disease in it? That is not exactly my province. It must obviously contain the germs of disease. That is well known; but it has not been my business to look for them.

1548. If the germs of disease were found to exist in the precipitates, do you think they would be liable to be distributed by the wind, and so to cause an epidemic? If they were exposed to a large surface the sunlight would destroy them.

1549. Is there any fixed period of exposure before the germs would be destroyed? No; I do not think it is known.

1550. How would the precipitate be affected under different conditions of weather—take, for instance, gloomy weather? The destruction of the organisms would in that case be retarded considerably.

1551. The moment the sunlight came continuously they would disappear? They would gradually become disintegrated and lose their vitality.

1552. Has it been within your province to inquire into the deposit of sewage matter on the surface in this way? Yes.

1553. Have you discovered in the course of your reading a satisfactory way of dealing with sewage matter on the surface? Some years ago the question came before me. The difficulty attending sewage farms was brought under my notice from the point of view of dealing with the film on the surface. My suggestion was to have it raked into heaps and burnt. If that were done properly I think there would be no nuisance at all from a sewage farm, and it would so freshen the surface of the filter-beds that they might be used again.

1554. Has it come within your experience that a bed of sand, natural or otherwise, which might be used for a number of years as a filter-bed for sewage, would in the course of time become surcharged? Certainly. It would become sewage-sick.

1555. Is it the fact that the more you use these sewage-beds the better they become for their purpose? If you give the beds alternating periods of rest and activity they will regain their former filtering power.

1556. The period allowed for the proper disintegration and decomposition of the organic matter would depend, I presume, upon circumstances? It would depend upon the nature of the filtering medium.

1557. What rest should a sand-bed fairly charged under a system of filtration have? Given the conditions of rapid flow, I should think that ten days or a fortnight ought to revivify it.

1558. That you think would be enough to restore it to its natural capability without any element of danger? Yes. But I should recommend in all cases that the surface be raked over, and that the sludge should be put into heaps and burnt. I would not allow filter-beds to be used unless that were done.

1559. You consider that imperative? Yes.

1560. No matter how well the sewage-bed was doing its work, you think the precipitate should be collected and destroyed by fire? Yes; my reason is that the fatty matter pervades the whole surface of the bed and forms a skin, which is a barrier to proper and efficient filtration. If the bed were raked over and the stuff were burnt, the bed would be almost as good as new.

1561. Suppose that this material instead of being collected and destroyed were ploughed in, would not that have the same effect? It would take a longer time to do it.

1562. Do I understand that from a chemical point of view you are of opinion that the various germs of disease and microbes would become destroyed upon an ordinary sewage farm under the ordinary conditions of air and sunlight? Yes.

1563. You do not anticipate any danger of disease from the precipitate on the surface? No.

1564. And you think that is a perfectly safe and sound basis to go upon? Yes. You must remember that disease germs are present everywhere; they are present in George-street as much as on the surface of the sewage farm at Botany.

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1565. Have you any objection to the system of sewage farms? Given a suitable site, and a sufficient area of land and good management, there ought to be no objection. My objection to a sewage farm would be when it was too contracted in area and too near a town.
1566. A large area would mean a greater opportunity for giving the land the desired rest? Yes; you want alternate periods of rest and filtration.
1567. But notwithstanding all the precautions which are taken you still strongly recommend the collection and destruction of the precipitate? Yes.
1568. *Mr. Clarke.*] You have dealt only with such samples of Parramatta water as have been handed to you? Yes.
1569. Can you say where the water came from? Only from the particulars contained on the labels of the bottles.
1570. Would it not be more satisfactory if you yourself were to take the samples from various places? It would, of course. I took the samples of water sent to me in good faith. I assume that the men who took them knew what they were doing.
1571. Would it not be more satisfactory if you yourself were to examine the whole of the watershed and judge whether the supply was good or otherwise? Yes.
1572. I suppose you sampled the Prospect water supply? I did not do it myself; but to prevent any tricks being played on me I had a bottle encased in wickerwork and fastened with a lock and key. The man who took the samples had one key and I had the other.
1573. The water supply of Prospect is good? It is an excellent water.
1574. *Mr. Wright.*] Are you aware that they have a system of filtration in connection with the Parramatta water supply at the present time? I only know from hearsay. I have seen sometimes on the labels of the bottles that the water was taken from a filter-bed.
1575. You do not know the catchment area at all? No.
1576. Do you think the creek from which the supply is drawn, and which is some 5 miles in length, would suffer much from the adjacent farms and orchards? It would suffer some contamination from the farms.
1577. Would it be sufficient to make the water impure? I should think not; but of course I am speaking without a knowledge of the number of farms.
1578. Suppose that bone-dust and other manures is used by the orchardists, would not that have the effect of contaminating the water supply? Slightly.
1579. Suppose, for instance, the refuse from the digestors at the meat works were used as manure, would not that contaminate the supply? In a properly managed farm everything would be done to utilise the whole of the organic matter which is put into the soil.
1580. Would there not be a certain escape of organic matter, even from a properly managed orchard? There might be a little.
1581. Have the samples of water you had from Parramatta been drawn from the ordinary service pipes? I remember that two of the samples were taken at a time when there was considerable discussion going on at Parramatta with regard to the character of the supply.
1582. Was that in dry weather? Yes; and the water was specially bad then.
1583. It has been pointed out that once or twice the Parramatta supply has almost entirely failed, and that the town has had to obtain a supply from Prospect;—at those times the water would naturally be more impure than at any other time;—do you remember whether it was at those particular periods that you received samples for analysis? I remember receiving some samples at a time when there was considerable discussion going on in the place as to the purity of the supply.
1584. Could you make it convenient to obtain a sample of the water from directly below the filter-beds and to analyse it for the information of the Committee? I will do so.
1585. You said just now that in the purification of water aeration was necessary above everything else? Aeration and filtration, and sometimes subsidence to allow the matter in suspension to become deposited. We know that at all times the London water supply has involved the question of subsidence. Considerable controversy has taken place as to the number of tons of suspended matter which are consumed by the London public in the course of a year. If the water were placed in a quiet tank this matter would naturally subside. The aeration would oxidise the water, and the filtration would clear it.
1586. You are stongly impressed with the necessity of air passing through the water? Yes; on the principle of the running stream.
1587. Leaving the question of water supply, and going back to the question of sewerage, you seem to think that a fortnight's rest would be sufficient to enable any given portion of the sewage farm which has been used for filtration to recover its natural condition? Yes.
1588. Would the whole of the sewage matter put on to the soil pass away in fourteen days? Probably not the whole of it, but enough to allow the soil to be used over again.
1589. You are firm in your belief that if the soil be not given a rest it will, in a comparatively short time, become so surcharged as to be unfit to receive sewage? Yes.
1590. Would you consider an area of 30 acres ample to treat the sewage of a population of 11,000 or 12,000? I could hardly answer that without having a sample of the soil.
1591. It is proposed to cover the site of the farm with silt and sand, and it is intended to use areas of 14 acres in rotation? I am hardly prepared to give an answer to that question. Of course a good black soil is the ideal soil for a sewage farm.
1592. You are aware that sand will absorb a great deal of matter in twenty-four hours, and that the sewage comes down on to the farm in quite a liquid state, free from sludge? Of course your bed must be well drained. If it were saturated with water to start with, it would be incapable of doing its work.
1593. Supposing subsoil drainage were carried out, and that the effluent could get away pretty rapidly, do you think the system would answer? Then, of course, the conditions would be more favourable. I remember once giving evidence with reference to a sewage farm near Goulburn. I had prepared some experimental filter-beds. I remember that the soil at Goulburn was remarkably good for the purpose,—far better than sand and silt would be.
1594. Suppose the filter-beds were 5 feet in depth, and were of sand, what would be the condition of the effluent? It would be quite good enough to pass into a tidal river like the Parramatta River.
1595. *Mr. Fegan.*] Did you notice any great difference in the samples of the water which you analysed from Parramatta? They varied very much. Sometimes they were comparatively clear, and at other times muddy and dirty.

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1596. Was there very much difference in your analyses? I cannot remember the extent of the difference, but there was certainly a difference.
1597. Was the difference so great that you would think that the water did not come from the same source? Yes, I remember saying so. I remember discovering that one of the samples of water was Prospect water, and of course that gave the same result as the Sydney water.
1598. In the one case, therefore, you had to make as good a report as in the case of the ordinary Prospect water, and in other cases you reported that the water was not fit for human consumption; it shows, therefore, that it is necessary that you should have some one whom you can really trust to take the samples? Yes.
1599. *Mr. Roberts.*] You know the mouth of Duck River? Yes—assuming that you are referring to the place where the steamers stop.
1600. Do you think the site selected for the sewage farm is a suitable one, and that it is not likely to inflict discomfort on the residents of the neighbourhood? I should not like to say before seeing it.
1601. Do you think it likely that the prevailing north-east winds would be likely to blow any objectionable matter up into the town of Parramatta? I do not think so. You may go on to the sewage farm at Botany and hardly know that you are there.
1602. Do you know Granville? Yes.
1603. Do you know the distance of Granville from the site of the intended farm? No.
1604. Supposing the distance were 2 miles, would you think there would be any likelihood of unpleasantness arising to the people of Granville from the establishment of the farm? Not now; but if Granville became a much bigger place, and extended to within a mile of the farm, it might be objectionable.
1605. Would you regard a distance of 1 mile as being too near to the farm to be pleasant? I should not like to live nearer a sewage farm than 1 mile.
1606. Will you kindly tell the Committee your chief reasons for making that statement? The chief reason would arise from the opening of the gates from the main carrier or reservoir for the sewage. Then there would probably be a nuisance if the prevailing winds were coming in your direction. If I were living within 1 mile of the farm, and the wind was coming directly from it, I should expect some nuisance at the moment of the unlocking of the flood-gates to allow the sewage to pass on to the filter-beds.
1607. Even if you were a mile away? Yes.
1608. But outside of a mile you think you might feel perfectly safe? I should think so.
1609. In view of the statement you have just made, would it appear to you that the people of Granville had good ground for complaint in regard to the proposed scheme? If they are anticipating the growth of their borough they would naturally have ground for complaint.
1610. And you think any complaint they might make would be worth consideration? I quite think so.
1611. *Mr. Black.*] Is your objection to living within a mile of the sewage farm founded upon any likely unpleasantness, or upon any danger to health? Well, the unpleasantness itself might have an effect on one's health in the course of time.
1612. What I mean is, would there be any likelihood of danger to health arising from the presence of the sewage farm? Not more than I have said.
1613. What you mean is, that there would be a certain amount of unpleasantness arising from the bad odour? Yes.
1614. But at such a distance there would not be any great danger to health? Probably not.
1615. We have been informed that the Meat Preserving Works are in course of construction within a quarter of a mile of the main discharge;—do you think there would be any danger of disease germs being carried from the sewage farm on to the meat prior to its being tinned? Prior to cooking there might be a danger, but in the process of cooking the disease germ would be killed.
1616. Suppose the germs came into contact with the meat which was cooked as it was about to be tinned, do you think there would be any possibility of the germs surviving contact with the heated meat? It would be impossible for the germs to survive the high temperature at which they cook the meat.
1617. The only danger is that the meat might become tainted whilst being stored at the works prior to being cooked? That might be the case; but the process of cooking would destroy them.
1618. Supposing the meat, prior to being tinned, were stored in a cool chamber? I think the objection, on account of the proximity of meat-preserving works to a sewage farm, is largely a matter of sentiment; it is more a matter of sentiment than of actual danger. The temperature of the bath into which they put the tins would be such as to destroy the germs.
1619. And in the case of chilled meat the temperature would be too low? Yes.
1620. On both those grounds you think the danger of the meat becoming contaminated would be very small? Yes.
1621. If between the meat-preserving works and the sewage farm, a grove of trees, say some of our native eucalypti, were grown, would that be a sort of filter which would considerably reduce any danger which might exist? It might reduce it slightly, but not very much. If disease germs are in the wind they are very soon dispersed pretty generally.
1622. Do you think the presence of a sewage farm at the site indicated would be very objectionable to persons living just on the other side of the river? No, I think not.
1623. Do you think that persons who now reside on the other side of the river, or who are likely to erect residences on that side, or around the meat works, the works being within half a mile of the proposed sewage farm, would be likely to be prejudicially affected by the existence of the farm there? As I say, I think they would suffer from a nuisance engendered by the discharge of the pent-up sewage.
1624. Do you think that at such a distance there would be any unpleasantness? I would suggest a mile as a standard distance from the farm for anyone to live.
1625. You think the passage through the air of disease germs would render them innocuous before they reached the distance you name? It would tend to dilute them—to cause them to be diffused. Before they had passed over a mile I daresay they would be killed. I think the exposure to the atmosphere and the sunlight would destroy them.
1626. And you consider that residence within half a mile of a sewage farm is dangerous to health? I think that persons living within that radius would be likely to be subjected to a nuisance; but I must draw a distinction between dangerous to health and nuisance, because some recent researches have shown

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shown that the sewer-men of London and Paris lead remarkably healthy lives,—I mean the men who are constantly in and about the sewers.
1627. May not that be due to the fact that they have undergone a process of inoculation? There may be something in that. I am not prepared to say.
1628. *Mr. O'Connor.*] Have you analysed any water from Parramatta within the past twelve months? I forget the dates of my analyses. What I have been saying to-day has covered a period of about six years.
1629. You know that the water which is now being used in Parramatta is supplied from Prospect? I understand that when the Parramatta supply falls short the authorities fall back upon the Prospect water.
1630. Is there any statement you desire to make to the Committee? Yes. I desire to state, for the information of the Committee, that an entirely new method of dealing with sewage has been brought about in connection with the town of Exeter. The author of this process says that all our previous knowledge has been entirely useless, and that we must make an entirely new departure.
1631. *Chairman.*] What is the process? The alternate treatment of sewage by different micro-organisms. It is based upon the principle that fæcal matter, when deposited upon the soil, is rapidly disintegrated by micro-organisms, and that if you only know what organisms to use, and put them into a tank full of sewage in which they can do their work, and then transfer your tankful to another tank with different micro-organisms, the process of purification would be complete, and the effluent might be allowed to run into a stream, or on to land, without creating any nuisance whatever.
1632. You think we shall be able to breed these scavengers and put them into the tanks? Yes.
1633. Has this system passed the experimental stage? It has been put into practice, but for a very short time only.
1634. Would it be much cheaper than any other system? Yes; if it turns out to be the success which its author claims for it, I think it would be very desirable to adopt it.
1635. Have you any information as to the cost? None whatever.
1636. You are not prepared to give the Committee any information as to the probable success of the system? No; I know very little about the success of the thing, beyond the statement of the originator.
1637. Have any other methods of treating sewage been practised that are likely to prove more successful than is that now under consideration? Yes, there have been several precipitation processes, but I have not followed them in all their details. It is possible that Dr. Ashburton Thompson could help you in that matter.
1638. *Mr. Hoskins.*] Are you familiar with the Liernur system? Yes; but I have never seen it at work.

Joseph William Withers, Alderman, Borough of Parramatta, sworn, and examined:—

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1639. *Mr. Clarke.*] You are an alderman of the borough of Parramatta? Yes.
1640. You are familiar with the scheme before the Committee? Yes.
1641. You know that one of the schemes submitted by the Department involves the establishment of a sewage farm at Duck River? Yes.
1642. Of which of the schemes do you approve? I am opposed to the sewage farm on account of the nature of the ground, the area, and its proximity to residences.
1643. Would not the 35 acres, in your opinion, be sufficient for a sewage farm? I should not like to express an opinion as to that; but I think the soil is entirely unsuited for the purpose. It is a clayey soil.
1644. You know that it is intended to cover that soil with 5 feet of sand? I know that it is intended to take some shale and clay out of the river, and to put it on to the land, and on the top of that to put a certain quantity of sand.
1645. Would not that meet your objection to the site? I do not think it would.
1646. You heard Mr. Hamlet's evidence. He seems to think that by using only a portion of the filter-bed at a time the farm might be successfully worked? Yes. I will not put my opinion against his. I would not have come here at all, but I have been worried by a great many residents to come and give evidence.
1647. Is it not necessary, in your opinion, that Parramatta should have some system of sewerage? Not at present as I think that if the nuisance created by the Government institutions were removed it would be found that very little nuisance indeed is created by the residents.
1648. Would there not be a nuisance from the discharge of slops into the river? There is very little discharged into the river from the town. There would be no nuisance which could not be easily dealt with. The principal nuisance is the river nuisance, and that is caused by the discharge of the sewage from the gaol, the lunatic asylum, and the poor-houses.
1649. Where is the nuisance from the poor-houses? The nuisance arises from the fact that all this drainage is concentrated in one spot.
1650. What system is adopted in getting rid of the solid matter in these institutions? The urine and slops are discharged into the river, and the solid matter is taken away by night-carts and is buried on a farm on the Windsor-road, about 1 mile from the outskirts of Parramatta.
1651. Is not the deposit of the night-soil at such a short distance from Parramatta injurious to the public health? I have never heard that it is.
1652. Does no offensive odour arise from the ground? No; the drains are made every day, and the night-soil is buried at night. I have never heard of any complaint about it.
1653. But in course of time you will have to get a larger area of land? It is sandy soil. It is extremely good for the purpose, and some very good orchards have been made out of it.
1654. You think, then, that there is no necessity for any one of the systems of sewerage for Parramatta? In my opinion the people of Parramatta as a body do not think they are in a position to pay for a system just now. There are one or two faddists there, perhaps, who want a system of sewerage, but that is all.
1655. Do you not receive a large amount of money from the Government for the removal of the sewage matter from the institutions? Yes; but we remove only the solid matter. The urine and slops, and the water from the washing of the various utensils, goes into the river. There is no nuisance in Parramatta except that which arises from the river. In the case of private residences the slops are mostly thrown on to the gardens and yards.

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1656. Nearly every witness has informed us that it is absolutely necessary that something should be done in the direction of sewerage? I have no objection to sewerage; but I object to a sewage farm, especially if we have to pay 1s. or 1s. 3d. in the £ for it. There is not only that to be considered, but there is the cost of connection of the different houses.
1657. Do you think the people would regard a rate of 8d. or 9d. as excessive? I do not think they would object to that. If you can guarantee that the rate would be less than 9d. I myself would not object to it.
1658. But you think 1s. too much? I am sure it is. Property is low. The amount from our rates is being reduced every year, giving us less money to work upon, and it will never do to think of putting another tax on to the people on account of sewerage at a time when there are so many unemployed.
1659. You have a local water supply? Yes; it is a very good one, and I was rather surprised to hear some of the remarks of the last witness. When the water was analysed the supply was low, but I have heard no reports against the water for the last twelve months. As a rule, the water is as good as is the Nepean water. Just now we are using the Nepean water, because our own supply is so low that we do not think it advisable to use it.
1660. What do you pay for the Nepean water? One shilling per 1,000 gallons. We paid the Board £2,000 on the last occasion on which our own supply ran short.
1661. In an ordinary season you derive a good revenue from your own water supply? Yes.
1662. Is the revenue applied to the general purposes of the corporation? It has been, but now only for water purposes.
1663. Is the water account kept separately? It used not to be. But when I was mayor I had it put into a separate account and instituted a sinking fund.
1664. *Mr. Lee.*] Has there been any expression of opinion among the aldermen as to the acceptance or rejection of this scheme? It seems to me that some of the aldermen do not know anything about the matter.
1665. But has the matter come before the council? The mayor brought it before the council about a fortnight ago. The council would not express an opinion about it. It was left to the mayor to do just what he liked in regard to the matter.
1666. You have a considerable debt in the borough of Parramatta? Yes.
1667. Do you think Parramatta is in a position to take upon her shoulders a further debt of some £60,000? I should be very sorry to put it on to the place. I announced myself at my last election as opposed to a sewerage system. My opponent was in favour of it, and I beat him hands down.
1668. You know the rates at present chargeable in Parramatta for the various services? Yes.
1669. And you say the revenue derivable is decreasing every year? Yes.
1670. But the rate is not decreasing? No.
1671. Showing that property has not the same capital value? Quite so.
1672. Is the population increasing inside the borough of Parramatta? No, I am sorry to say it is not.
1673. You know that if the sewerage system is adopted the borough of Parramatta will have to take it over no matter what it costs, and that in the event of any default on the part of the borough in the payment of the amount chargeable annually, it may be made a first charge upon the whole of your revenue? I did not know that.
1674. How is the debt of your borough at present held? By debentures, which all run out in about six years' time.
1675. If your borough hypothecates its credit by an additional amount of £60,000, do you think you will be able to raise money enough to renew the debentures at the end of the six years? I should not think we could.
1676. Would your securities for that amount of money be as good after you had taken over an additional debt of £60,000? No.
1677. The revenues of your borough were pledged for the payment of the principal and interest of the existing debt? Yes.
1678. And if you further pledge that revenue to the extent I have named, do you not think that would mean a depreciation of security? Yes. I myself am opposed to this adding of £60,000 to the debt of the borough.
1679. Do you anticipate any fair increase in the population of the place? No, I do not.
1680. Consequently you see no prospect of a large increase in revenue? No.
1681. You see no reason for a large increase of your present revenue? No; I see a prospect of the revenue decreasing. In fact I think it would be a great mistake at the present period of depression to expend £60,000 upon sewerage works.
1682. Goulburn has a larger population than has Parramatta? Yes.
1683. Bathurst has a population equal to it? Yes.
1684. Are you aware that none of these country towns have such a complete system of sewerage as is proposed at Parramatta? I am.
1685. Yet these towns, in the absence of any special cause of nuisance, are held to be healthy places of residence? And so is Parramatta—I have lived there eighteen years.
1686. Consequently, if the special nuisance of which you have complained were removed from Parramatta, there is no particular reason why Parramatta should have put upon it a sewerage system when other towns of larger dimensions have no such system? No.
1687. The nuisance which exists in Parramatta is contributed to almost entirely by the Government institutions? There is no doubt about it.
1688. Are you, as a resident of Parramatta, prepared to accept this elaborate system of sewerage for the whole town simply for the purpose of disposing of the sewage matter from Government institutions? No.
1689. You hold that, if the State creates a nuisance of this kind, it should deal with it at its own expense? Yes.
1690. And if the State does deal with the nuisance which it has created there will be no necessity to sewer the town of Parramatta? No; that is my firm opinion. Let the Government get rid of the nuisance which is created by the 4,000 inmates of their institutions, and there will not then be in Parramatta a nuisance to affect anyone.
1691. You remember that many years ago, when the population of Parramatta was considerable, there was no nuisance whatever? Quite so.
1692. The whole trouble has been brought about since the Government undertook to bring the sewage matter direct from the gaol and other institutions, and put it into the river? Yes. 1693.

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1693. From that time there has been a demand for relief of some kind? Yes, and the Government, in my opinion, to relieve themselves of the worry, contemplate placing a debt of £60,000 on the town.
1694. You know that these Government institutions are situated at the north end of Parramatta? Yes.
1695. You are not including in the institutions the Government benevolent asylums? Yes.
1696. You know that it is proposed to remove them? Yes, and a good job too.
1697. You have no desire to see them continued in Parramatta? No.
1698. If it were possible for the Government to bring down a scheme by which they could take the whole of the sewage from the institutions I have mentioned down to a point just below the old Benevolent Asylum, and there destroy it, you think that that would be all that would be necessary? Yes.
1699. Once that is done you think the trouble in Parramatta, so far as sewage is concerned, would be over? Yes, for many years. You have also to bear in mind that if we have a system of sewerage, our water supply will be knocked out in one act, on account of the water required for the flushing of closets and that sort of thing. The supply would not last a quarter of the time it lasts now.
1700. Your water supply is not sufficient for domestic requirements of Parramatta at the present time? Well, we have not had any rain for twelve months, and last week we had to take the Nepean water.
1701. That goes to prove that the supply is not sufficient? Not if we have a continuation of dry weather, otherwise it is ample.
1702. You have to pay for the Nepean water? Yes.
1703. And out of your own supply you make a fair profit? Yes; we could pay £500 a year, at least, off our debt with the revenue.
1704. You have to use the Nepean supply as an auxiliary supply? Yes; we have used it twice.
1705. If you were of opinion that the sanitary condition of Parramatta was so bad that a sewerage system was necessary, you would not object to the system merely because it would interfere with the local water supply? No.
1706. What you say is that the sewerage system is not required in order to remove from the river the nuisance created by the Government institutions? Quite so. A third of the population of Parramatta are lunatics, paupers, and criminals, and we are receiving them every day of the week from other Colonies.
1707. You say that the borough is heavily burdened with debt at the present time? Yes.
1708. If the town of Parramatta can do without a complete system of sewerage for another fifteen or twenty years, it must follow naturally that you will then be in a better position financially to undertake it than you are in at the present time? Yes.
1709. At present it is problematical whether if 1s. rate were struck it would realise enough to pay the interest and working expenses of the proposed scheme, and it may so happen that the system will prove more expensive than has been estimated? Yes; that is one of my objections to the proposal.
1710. *Mr. Fegan.*] You say you wish to get rid of the occupants of the asylums? Yes.
1711. In regard to the water supply and its quality, are you prepared to pit your opinion against that of the Government Analyst, and to say that it is a good supply? I say that it is a splendid supply; the water has been splendid during the last twelve months.
1712. If the old men are removed from the asylums, how will you make your water supply pay? We shall still have the gaol and lunatic asylums. Besides that I would rather see the paupers out of the place.
1713. If the paupers are removed will you not be in a far worse position as a municipality than you are in now? No.
1714. Is it not a fact that from the Government asylums you receive a sum of £1,700 a year? We are supplying them cheaply. We are charging them 10s. a head, whereas the Board of Water Supply and Sewerage are charging the Government 37s. 6d. per head.
1715. When were you mayor of the municipality? The year before last.
1716. As presiding officer of the council you with others then agreed that the Secretary for Public Works should be asked for a sewerage scheme? I remember something of the kind.
1717. How many members of the council were against the resolution? I could not tell you. I know that I was against it. I have always been against it.
1718. But you carried out the wishes of your council in the matter, although you did not believe in their decision? Yes; I could not do otherwise.
1719. Did not the council at that time take the financial aspect of the question into consideration? If I remember rightly we were given to understand that the rate would be about 7d. in the £, but it subsequently transpired that it would be more likely to be 1s. or 1s. 3d.
1720. Did not the council consider the financial aspect of the case before asking you to have the letter written to the Under Secretary for Public Works? Yes; but that step was taken on the understanding that the rate would be only 7d. in the £.
1721. Have you anything to prove that that was the case? No.
1722. Did you ever hear of any council attempting to lay down hard and fast lines with the Secretary for Public Works as to what the cost of a scheme of water supply or sewerage should be? No; but I think it would be a very good thing for them to do so.
1723. But when would you be likely to get a scheme of water supply or sewerage? It is quite likely that you might not get the scheme. But some councils have had to go to double the expense to which they expected they would have to go in order to get one.
1724. Is not public opinion in Parramatta in favour of a sewerage scheme? No.
1725. Have you any proof to the contrary? I can only speak from what people who have come to see me have said.
1726. They did not see you officially? No.
1727. No public meetings have been held in condemnation of the scheme? No; but I do not think it would be a bad idea to hold one.
1728. Surely if the people are opposed to the scheme they would take some action to show their opposition? In some cases they might.
1729. In connection with different works undertaken by your council you generally have public meetings have you not? No.
1730. Your council has addressed a letter to the Under Secretary for Public Works in favour of a scheme, and no public meeting has been held in condemnation of that action? No.

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1731. Therefore we must assume that the people of Parramatta desire that the scheme should be carried out? Some persons were speaking to me the other day about getting up an indignation meeting against the scheme.
1732. But such a meeting has not yet been held? No.
1733. Have the council gone into these various schemes? Yes.
1734. Which of them do you yourself prefer? I do not prefer any. I have a great objection to a sewage farm.
1735. If the Government destroyed the sewage from their institutions, what would the people of Parramatta do with their own sewage? There would be very little sewage going into the river.
1736. But will they not want a system of sewerage? Not at present. Parramatta is not cramped up as are some of the suburbs of Sydney. There are comparatively big allotments, and the slop-water can be disposed of by being thrown on the surface.
1737. But is not a nuisance likely to arise from the want of supervision of operations of that kind;—will it not ultimately cause a nuisance? It might if we were crowded out with residences; but that is not the case. The night-soil is never buried upon a private allotment unless with permission, and unless the allotment is of considerable size.
1738. Did you succeed in wiping off any of the debt of your municipality during your mayoralty? Yes; £1,700, which was paid out of the water account, and we have spent £12,000 in reticulating the water over the borough. If our water supply did not run out we could pay from £500 to £1,000 a year off our debt. You must not understand me to be opposing any sewerage system whatever. I am in favour of a system of sewerage; but I do not think we ought to increase the indebtedness of the municipality at the present time.
1739. You say that you do not think that a system of sewerage is necessary at the present time, so far as 8,000 of the population of Parramatta are concerned, and yet you think that for the 4,000 inmates of Government institutions a system of sewerage is necessary? You must remember that the 4,000 are all within a comparatively small space, whereas the 8,000 are scattered over a large area. Moreover, the sewage from the 8,000 does not go into the river, whereas the sewage from the 4,000 does, and is all concentrated at one spot.
1740. *Chairman.*] You have no doubt whatever but that the nuisance at Parramatta is confined within the banks of the Parramatta River? I am sure that 99 per cent. of it is.
1741. Therefore if we deal with the polluting causes, the brewery and the other places, you think there will be no need for a system of sewerage at present? Just so; I do not think the people are inclined to incur the expense at the present time.

FRIDAY, 12 *MARCH*, 1897.

Present:—

THOMAS THOMSON EWING, Esq. (Chairman).

The Hon. Frederick Thomas Humphery.	Charles Alfred Lee, Esq
The Hon. James Hoskins.	John Lionel Fegan, Esq.
The Hon. Charles James Roberts, C.M.G.	Thomas Henry Hassall, Esq.
The Hon. Daniel O'Connor.	George Black, Esq.
Henry Clarke, Esq.	Francis Augustus Wright, Esq.

Frank Farnell, Esq.

The Committee further considered the Proposed Sewerage Works for Parramatta.

Joseph Davis, Engineer for Sewerage Construction, Department of Public Works, sworn, and further examined:—

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1742. *Chairman.*] What are the salient objections to the Liernur system? It does not deal with the sewage as a whole, and that is a very decided objection to it. It deals only with the excrement.
1743. It does not deal with the slop-water at all? No; that has to be dealt with by separate sewers.
1744. Then it may be regarded as a competitor with the pan system, and not with the general system of sewerage? Yes; the most that can be said for it is that it is a ready mode of removing excrement.
1745. *Mr. Hoskins.*] The system, I believe, is applied to separate buildings? Yes; the excrement is drawn up into a depôt, where it is treated by desiccation, as a rule, and it is afterwards sold as manure. It is not regarded by those who are best versed in sanitary matters as a satisfactory system; it is regarded as a failure.
1746. *Chairman.*] You have no doubt whatever about that? None whatever.
1747. *Mr. Humphery.*] It was used at Amsterdam, and it has been discontinued there, has it not? Yes; I believe it has been, to a great extent. The appliances got out of order so readily, I believe, that the system was discontinued.
1748. *Chairman.*] Since the pollution of the Parramatta River comes primarily from slop-water, the system would not deal with that aspect of the case, and that is very important? No; it would not deal with the Parramatta nuisance in any way whatever, because that nuisance does not arise from excrement, but from slop-water.
1749. Therefore the system ceases to be pertinent to the inquiry? Yes.
1750. *Mr. Humphery.*] How long ago is it since the experiment was made in Amsterdam with the Liernur system? It must have been made twenty years ago.
1751. You know of no other town where the system is, or has been, in operation? I do not know of any other place.
1752. *Mr. Hoskins.*] Is it not in use in Berlin? No; a system of water carriage is there, the same as in Sydney, with the exception that the sewage is treated on farms on the broad irrigation system.

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1753. *Chairman.*] You were asked to prepare a statement for the Committee, showing the revenue from the proposed scheme? I have prepared a statement, showing the revenue and annual expenditure, supposing £60,000 were expended upon the scheme. The statement is as follows:—

PARRAMATTA SEWERAGE.

Expenditure.

Annual instalment required to repay the sum £60,000, principal and interest, 3½ per cent., in 100 years	£2,170	0	0
Working expenses, maintenance, and administration	1,433	0	0
Total expenditure	£3,603	0	0

Revenue.

Storm-water channel, 6d. in the £, derivable from £10,034		252	0	0
Private property served by sewerage scheme, £52,831, at 10d.		2,201	5	10
Railway stations		25	0	0
Public buildings and land, £3,200, at 10d.		133	6	8
Government institutions—	Persons.			
Hospital for Insane, Gaol, Girls' Industrial School, Cottage Homes	1,580			
Rydalmere Asylum	527			
Total	2,107, at 10s.	1,053	10	0
Total revenue		£3,665	2	6

The statement shows that if a rate of 10d. in the £ were levied the revenue would exceed the expenditure by about £62.

1754. *Mr. Humphery.*] Are the house drains in Parramatta connected with the storm-water sewers at the present time? Yes.

1755. How much revenue do you expect to realise from the storm-water rates? £252.

1756. *Chairman.*] What is the difference between the level of the river at the sewage farm and at the first dam near Marsden-street? The top of that dam is 10·65 above datum—datum being high water, Sydney Harbour.

1757. Can you give us a comparison between high water at the mouth of Duck River and high water at the dam;—what would be the difference in the level? The difference between the level of the top of the dam, and the bed of the river at the floodgates near Harris-street, would be a matter of 10 feet.

1758. If the water were lifted 2 feet at the sewage farm it would run back? Yes.

1759. Where is the greatest nuisance in the Parramatta River? At the floodgates.

1760. And above that? To some extent.

1761. Is there any below it? Yes, there is a little; but the nuisance on the lower side of the floodgates is the principal one.

1762. What is the carrying capacity of the river there? Supposing the river to be running 6 feet deep, the carrying capacity would be 1,591,750 gallons. In flood-time there has been as much as 9,745,000 gallons per minute discharged by the river. The first discharge I gave is equal to a velocity of about 4 feet per second, or about 2·6 miles an hour.

1763. Do you get that velocity at any fixed period of tide? No; you get no velocity of any consequence at all as far as the tide is concerned. It recedes so very gradually that the velocity is very small indeed.

1764. Do you think the velocity would be 1 mile an hour? I do not think it is. It may run at the rate of a mile an hour when the tide is confined to a narrow channel in the centre of the river, but speaking generally I do not think the current would be measurable.

1765. And in point of fact that is the reason of the nuisance? Yes.

1766. To what extent does the salt water rise against the dams at Marsden-street above the bed of the river? On the lower side, at an extremely high spring-tide, it might come up the toe of the dam a couple of feet.

1767. Is there only a tide of 2 feet at Parramatta? No; the tide recedes from below the flood-gates.

1768. There is a fall of 3 feet from the flood-gates to the toe of the dam? Yes, or thereabouts.

1769. Therefore the dam obstructs a height of 2 feet of water which would reach up the bed of the river past Parramatta? Yes.

1770. If the dam were removed there would be that quantity of water more each tide to go up and come down? Yes, at exceptional tides; but I do not say how far it would go up. I apprehend not very far. The bed of the river is situated up above the dam, so that there is no means of saying how it rises.

1771. If the trouble arises from the want of velocity it is clear that the dam must have some effect upon it, inasmuch as it allows a less quantity of water to go up than would naturally do so? It has some effect; but I am of opinion still that inasmuch as the water-supply dam as a general rule prevents any stormwater from flowing down the river for a matter of, perhaps, five or six years, it has more to do with the present condition of the river than has the lower dam at Marsden-street of which you are speaking.

1772. With regard to the fresh water coming down, how much does the water-supply dam hold? I do not know. I know that when full it holds eighteen months' supply for Parramatta.

1773. If these two dams were removed do you think the Parramatta River would have a better opportunity of clearing itself? It would; but I do not think it would be sufficient, because of the quantity of sewage deposited in so short a length of river.

1774. *Mr. Lee.*] Would it be possible to make a connection between Granville and the proposed pumping station? That is the place where the sewage of Granville must be dealt with eventually. It is the proper place at which to deal with it.

1775. There are no engineering difficulties? No.

1776. You can get gravitation? Yes, certainly, for the major portion of the borough.

1777. Would the connection be made directly with the pumping-station or with the farm? With the farm, I think, by an outfall sewer probably, running down the bank of Duck River.

1778. In the event of the scheme before the Committee being carried out, and Granville being connected with

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with it, how would the expense be apportioned? I apprehend that the scheme, if carried out, would be transferred to the Water and Sewerage Board, which would see to the collection of the rates just as they do in other portions of the metropolitan area.

1778½. Is there not an understanding that this particular scheme is to be transferred to the Parramatta council? There is no understanding with the council such as you mention; but there is an understanding that water supply and sewerage will be in the same hands. The only reason I can see for the Parramatta council having charge of the sewerage works is that they have charge of the water supply. It seems doubtful, however, how long they will keep charge of their water supply. At the present time they have no water, and they have to get water from Prospect.

1779. You think then that the scheme will be taken over by the Board, and that an ordinary rate will be struck to cover the interest, as is done in the case of the western suburbs? Yes. I do not see that the Parramatta council would have any more to say in the matter than have other suburban areas. If the works were necessary and could be carried out for a reasonable sum of money the Sewerage Board would have conferred on them all the power necessary to administer the scheme and collect the rates.

1780. *Mr. Hoskins.*] They would enforce payment of the rates? Yes; there would be no difficulty about that. The difficulty the Department experiences is more with the councils which could pay, but which, for reasons of their own, do not.

1781. *Mr. Lee.*] The Metropolitan Water and Sewerage Board would strike a rate to cover the cost, whatever it might be? Yes.

1782. But the Board have no power to take the water supply from Parramatta, have they? No; if the Board were to do that they would have to pay a great deal of money for it; but if the council come to the Board, and ask the Board to take over the supply, then quite a different complexion is put upon the matter.

1783. Supposing the Parramatta council are not willing that the Metropolitan Water and Sewerage Board should have control of the sewerage system, would it be carried out? If it were necessary. Parramatta is in the county of Cumberland, and the Minister has power to carry out any necessary sewerage works there.

1784. Would he carry out such a work in opposition to the wishes of the local council? I do not think he would; but, as I understand the matter, the council is not against the scheme.

1785. They desire to have control over it, do they not? Yes; and they might do so, so long as they retain control over the water supply, but not otherwise.

1786. The pumping machinery, for which you have provided, would not require increasing from the mere fact of Granville coming in? No.

1787. Could any other of the neighbouring boroughs be connected with the scheme? I have not looked into the matter very carefully, but I should say that Rydalmere could be. The only objection would be that we should have to put a siphon in the bed of the river, but that is not an insuperable difficulty. It has to be done sometimes, although it is not desirable.

1788. You have allowed for revenue from Rydalmere? From the asylum, but not from the borough.

1789. Have you given any attention to the question of dealing with the sewage matter from the Government institutions alone? I have considered that aspect of the case, but it always appeared to me to be such an expensive method of getting over the difficulty that it has not been entertained. It is expensive for this reason—that the asylums are scattered, and it would never do to deal with the sewage from these institutions at half a dozen different places. That would make it far too costly. Supposing we were confined to dealing with the sewage from the asylums alone, then it would be necessary to collect the sewage from them and bring it down to one point. You would require to have intercepting sewers to gravitate the sewage to a point in the vicinity of (say) Clay Cliff Creek, where you could deal with it.

1790. Take the lunatic asylum, the gaol, and the girls' industrial school—those are institutions which contribute largely to the nuisance in the Parramatta River at the present time? They contribute a large portion of it.

1791. They are pretty close together? Yes.

1792. There is some sort of system enabling the fluid matter from these institutions to find its way into the river, the solids being treated in another way? Yes.

1793. What would be the expense of a system which would collect all the sewage matter from these institutions at a given point adjacent to the buildings? If you left out of the question the other Government institutions these three institutions could be dealt with somewhere at the foot of Grose-street.

1794. I suppose it would be easy to provide a scheme for the destruction of the sewage upon the same principle as that adopted in No. 1 scheme? Yes, it could be done.

1795. Then the expense, other than the conveyance of material, would be confined to building wells, constructing tanks, machinery and pumps, and destructors, as enumerated in No. 1 scheme? Yes; but the work would be less elaborate than that.

1796. If you take those items out of No. 1 scheme you will find that they amount to £11,200. I suppose that for these institutions the cost would not be more than one-half of that? For the three asylums you have named the expenditure would probably not be more than 50 per cent. of the amount.

1797. In other words it would be about £5,500? Yes.

1798. It has been held by Parramatta residents that if the nuisance contributed by the asylums already enumerated were removed, the town, as a whole, would not require a sewerage system for many years to come;—consequently we should like to know whether it is possible to intercept the sewage matter from these institutions and deal with it separately? I agree that supposing the institutions were not there, and given the fact that the storm-water channels were constructed, Parramatta could do very well without a sewerage scheme, but I also hold that the sewage of Parramatta can be dealt with very much more economically by taking the institutions and the town itself together than it could possibly be by separating them. I think that if the institutions were dealt with apart from the town the cost to the Government would be considerably more than if the work were carried out as effectually as it is proposed to carry it out in this scheme.

1799. Do you know whether Parramatta itself contributes in any degree to the nuisance in the river? It does.

1800. In the shape of sewage? Yes; slop-water. There is a considerable quantity of soap-suds and other polluted water flowing down the storm-water channel at Clay Cliff Creek and at Brickfield Creek.

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The whole of the slops from those areas are discharged into the bed of the Parramatta River. Therefore it must necessarily have an effect.
1801. You know that prior to the expenditure to deal with the sewage of the asylums, the stormwater of Parramatta flowed into the river? Yes.
1802. You know that that practice was continued for a great many years with a large population, and that there was no nuisance? The nuisance has existed for pretty well twenty years, and has been gradually increasing.
1803. Whatever quantity of slop-water may have been discharged into the river prior to the interference with the tidal flow, it was conveyed away and did not become a nuisance? It has always been a nuisance, but the nuisance has arisen partly from the town itself and partly from the institution. Now that the creeks are lined with concrete I expect that the nuisance in the river attributable to the town itself would be greater than it was some years ago before the channels were constructed.
1804. For the reason that there is not the same natural outlet as formerly? For the reason that the whole of the slops are now conveyed into the river, whereas previously a certain quantity was left in the bed of the creek, and evaporated, the nuisance being more distributed.
1805. But the water would be conveyed into the river by the same sources which exist to-day? No; because the creeks as they then existed impeded the flow of the slop-water to such an extent that a large proportion of it was evaporated on its way to the river. Now you may say that anything which is discharged into the channels reaches the river, and it also reaches the river in the shape in which it was discharged into the channel.
1806. Do you hold that it is largely due to increase of population that a certain amount of sewage has accumulated in the stream about the town? Partly from that, and partly from the fact that the creeks are now lined.
1807. Were you in the Department twenty years ago? No; but I have seen papers going back as far as that. Indeed it was even before that that the training walls were put in to prevent the nuisance; the walls have been constructed for nearly thirty years.
1808. Was it not the fact that the nuisance was accentuated from the very hour that the walls were erected? I believe they did no good.
1809. On the contrary did they not create an abominable nuisance? I believe there was a greater nuisance after they were built.
1810. If it should be found that Parramatta is not in a position to accept a large sewerage scheme of this kind, and the fact remains that the nuisance must be removed, would it not be a matter for the consideration of the Department whether the sewage from the Government institutions should not be separately dealt with? It would be just as fair to suppose that the town should deal with its nuisance as that the Government should deal with its nuisance.
1811. But why should the town be called upon to accept the expense of this sewerage scheme when the chief contributors to the nuisance are the Government asylums;—supposing the people do not require the scheme, and they could do without it for some years to come? I hold, and I think it is the view of the Department, that the town should be looked at as a whole—that is, as comprising the Government institutions. The town, no doubt, derives considerable benefit from the fact that the institutions are there.
1812. You mean from the expenditure of public money? Yes. While it may be convenient for the Government to have the institutions there the common-sense view to take is that the town also derives some benefit.
1813. But it derives no benefit from a sanitary point of view from the existence of the institutions? It derives no benefit from that point of view certainly. While the three institutions of which you have spoken are contributories to the nuisance I would not say that they are the chief cause.
1814. *Mr. Humphery.*] What is the population of Parramatta for which this sewerage scheme is intended? 10,000; but outside the area dealt with by the scheme there may be 2,000 persons more.
1815. Of the 10,000 persons you have named 3,000 would be inmates of the Government asylums? Yes.
1816. So that 7,000 of the town population outside of the Government institutions will be benefited by this scheme? Yes.
1817. At the present time does all the surface drainage of Parramatta find its way by different drains into the river, exclusive of that from the Government asylums? Yes.
1818. Therefore the proportion of pollution contributed by Parramatta would be two-thirds by the townspeople outside of the asylums, and one-third by the persons in them? Yes, except that in regard to the asylums you have to bear in mind that the pollution would be more concentrated.
1819. But you say that the pollution of the town is conveyed directly into the river by storm-water channels? Yes.
1820. So that after all the proportion would be two-thirds to one-third? About that.
1821. In reply to Mr. Lee you said that it would cost £11,000 to provide some means of treating the sewage at Clay Cliff Creek, as against £5,500 for treating the sewage of the Government institutions which were mentioned? Yes; but I could not speak positively as to that, because I have not gone into the figures.
1822. If the Government institutions contribute one-third to the pollution should not the annual cost of the scheme contributed by the Government be proportionate—that is one-third of the whole cost? That is a fair view of the case, except that the immediate reason for a sewerage scheme at all is that the Government institutions are there. The benefit derived would be in the proportion you mentioned.
1823. Are you proposing that the institutions shall contribute under this scheme one-third of the annual cost? It is proposed that the Government institutions shall contribute as nearly as possible one-third, the total annual expenditure being £3,603.
1824. What proportion do you propose shall be contributed by the Government? £1,211; from the railway station £25, from the public buildings £133 6s. 8d., and from Government institutions £1,053 10s.
1825. If you take the Government institutions purely and simply the contributions would be about £1,000—not quite one-third? Yes.
1826. Have you satisfied yourself that the water supply of Parramatta would provide sufficient flushing for the sewers in the event of the scheme being carried out? I do not think that the water supply of Parramatta can continue in its present state much longer, and it would not be applicable at the time this scheme was carried out.

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1827. Therefore it would be necessary for the borough to increase its expenditure considerably in order to provide the water necessary to give effect to this sewerage scheme? Unless they got the water from Prospect, which is the proper thing to do.
1828. Suppose the scheme were taken over by the Metropolitan Water and Sewerage Board, in addition to the rate of 10d. would it not be necessary to make a charge for the extra water supply? Yes; but the Parramatta people would pay less for the water from the Board than they pay the council.
1829. But you deprive the council of the revenue which it derives from the water? Yes.
1830. Therefore does it not follow that there would be more expenditure than you anticipate, inasmuch as the council would have to provide water through the Metropolitan Water and Sewerage Board in addition to the present water supply from North Rocks? Well they will have to get an additional supply of water from somewhere.
1831. Therefore the rate will be more than 10d.? Looking at it in that way.
1232. Will there not be a considerable addition to the annual cost? The council would either have to purchase water or increase the quantity impounded at Hunt's Creek. There is at the present time no adequate supply.
1833. Have you made an estimate as to the probable quantity of water which would be necessary in connection with this sewerage system? No; I have not.
1834. Can you say what quantity per head would be a fair allowance? I have not made any calculation, but probably 10 gallons per day per head.
1835. About 100,000 gallons per diem in addition to the present water supply? Yes.
1836. Inasmuch as the present supply is only sufficient for present daily use? Yes.
1837. *Mr. Lee.*] You do not wish to convey the idea that the 7,000 persons living on a number of square miles of country contribute in proportion the same amount of pollution to the Parramatta River as do the lesser number of inmates in the asylums? No. What I say is, that the sewage would be more concentrated in the case of the asylums.
1838. Therefore it is not possible, from the way the persons outside of the asylums are now residing in Parramatta, for them to contribute two-thirds of the present pollution of the river? I do not think so.
1839. Is it not a fact that with the residents scattered over a number of square miles, throwing their slop-water on to their back yards and vacant land, a large proportion would be absorbed in the process in precisely the same way in which you propose to deal with the sewage on the sewage farm, and that not more than one-third of it would find its way by the storm-water channels into the river? That is a reasonable assumption. I think it is likely that it is the case.
1840. As against that the inmates of the asylums are very much concentrated, and all their sewage matter must be disposed of quickly and at once;—it must be conveyed into the outfall channel, and is therefore taken directly into the river in a concentrated form, becoming a greater nuisance for that very reason? Yes; but you must bear in mind that under this scheme we propose to give the same service to the townspeople that we give to the Government institutions. There is another aspect of the case to be considered,—that is, as to whether the people of Parramatta prefer to pay a rate of 9d. in the £ or additional doctors' bills.
1841. Supposing this scheme were rejected, what would be the prospect of getting rid of the nuisance which exists in the Parramatta River? It could not be effectually dealt with otherwise, except by some scheme which would deal partially with some of the Government institutions as you were suggesting. But even supposing we called upon the Government to deal with its own nuisance the town nuisance would still be left.
1842. Suppose it could be shown that if the Government nuisance were remedied the borough would not require a sewerage system of this character,—would not that appear to be direct evidence that the Government should undertake their own work, and not call upon the people to undertake it for them? That is true, but you leave the town of Parramatta in a worse position than that in which we are going to put it; because the town, under such circumstances as you describe, will have to pay for the storm-water channels, and they will probably cost 7d. in the £. In addition to that, they will have to continue emptying their pans, which would cost, (say) 6s. 8d. per head. That is a rate as far as the Government institutions are concerned, and it would probably be the rate so far as the town is concerned. If you take these two items together you will find that the town would be left to pay more for its sewerage than it would under the proposed scheme.
1843. Supposing it is proved that the Parramatta council cannot accept this scheme on account of its expensive nature? But the council must deal with the sewage of the place in one form or another. If they have storm-water channels they will have to pay for them, and at the same time they will have to pay for the emptying of the pans.
1844. Why should Parramatta especially be compelled to deal with its sewage in this way, assuming that the Government nuisance is prevented? It need not have had the expense of the storm-water channels, but at the request of the town these were carried out, and no doubt the Government will require to be recouped. Then, again, the townspeople must have their pans emptied in the absence of any system of sewerage, and that will have to be paid for.
1845. Goulburn, Bathurst, and other towns with a larger population than has Parramatta, have no system of sewerage? But they have to pay for the pans.
1846. But has not that system been found sufficient for all purposes? It gets over the difficulty.
1847. If it can be done in these towns would it not answer in Parramatta for some years to come? In the case of Parramatta £14,000 has been expended upon storm-water channels, and the town is expected to pay for it.
1848. But were the storm-water channels put down as part of this system of sewerage? They were put down at the request of the council of Parramatta. And what we proposed to do now was to have a general squaring up of accounts, it being a good arrangement for the Government institutions, for the Parramatta council, and also for the State exchequer.
1849. When the £14,000 was expended was it upon the understanding that the Government should be repaid? It was upon the understanding that it would form part of the sewerage scheme.
1850. In what years was this money expended? It was expended over five years.
1851. The Government have not received any interest? None whatever.
1852. And if the sewerage scheme were not entertained for another twenty years the Parramatta people would

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would still have the benefit of this expenditure? If the Committee decided to throw out this scheme the next step would be to ask the Parramatta people to pay for the storm-water channel.

1853. *Mr. Fegan.*] How many persons in Parramatta are benefited by the storm-water sewers which the Government have constructed? The whole of the people of Parramatta, excepting, perhaps, a few on the bank of the river, in the vicinity of Phillip-street and George-street.

1854. This scheme has not been foisted upon the people of Parramatta; they have asked for it? Repeatedly.

1855. It is at their request that the Works Department have prepared this scheme and submitted it to the Committee? Certainly; at their urgent request.

1856. Knowing that the £14,000 already expended would form part and parcel of the scheme? Yes; there has never been any exception taken to that.

1857. In some cases the residents are allowed to bury excreta in back gardens and yards. Surely that system is not looked upon with favour? I should say not.

1858. I should say that under that system a nuisance might easily be created which might end in an epidemic? It certainly cannot be beneficial to the public health.

1859. The case stands in this way: The Department of Public Works has no interest in putting this scheme forward, except at the request of the residents of Parramatta? That is so. The town has sent deputation after deputation to the Minister on the subject, and has expressed the strongest possible views on this question.

1860. *Mr. Clarke.*] Do you think that most of the nuisance arises from the Government institutions? I think that a portion of it arises from the fact that sewage from the Government institutions is discharged into the river in a concentrated form by means of pipe-sewers.

1861. Do you think the nuisance of the Government institutions is greater than is that caused by the town in proportion to numbers? Yes; but I should not like to say to what extent. As far as the nuisance in the river is concerned, the Government would contribute to a greater proportion, taking the number of inmates in the asylums, as compared with the number of persons in the town.

1862. I suppose the inmates of the Government institutions, being mostly adults, forms one reason why they contribute more of the nuisance than do the general public? There may be a little in that; but the chief reason is that the sewage goes directly into the river in a concentrated form. It is not distributed over a long period or over a great distance.

1863. *Mr. Roberts.*] With reference to the expenditure of £14,000 upon storm-water channels, I think you said that the municipal council agreed to repay it to the Government? There has never been a written agreement, but there has been a tacit understanding. This expenditure has been undertaken from time to time at the request of the council, the council knowing full well that it would eventually form part of the scheme. The course of the Government is perfectly clear. It will simply transfer these channels to the Water and Sewerage Board, and they will immediately collect rates. We have not to ask the Parramatta council one word about it. We have simply to transfer the channels to the Board, and the expenditure would then become part of the debt of the Board.

1864. *Mr. Hoskins.*] Have any of the works been transferred? Not the whole of them. One little bit was transferred, but no action was taken. There was some demur, and the matter was left in abeyance.

1865. *Mr. Black.*] As to the matter of concentration, the objection you have to concentration is not on account of the small area over which the sewage is gathered? No. When I used the word concentration I used it in this sense: that, taking the gaol, the asylums, and the girls' industrial school—a matter of 1,500 persons—you are using one pipe, and that pipe discharges the sewage from those institutions at one point on the river.

1866. Your objection arises not from the area of collection but from the outlet? Yes.

1867. How many outlets are there into the river from the Government institutions at Parramatta? There is the one I have already named at the flood-gates, from the three institutions; there is another at the foot of the street, between Smith-street and Harris-street, from the Macquarie-street asylum; then there are one or two going into the river from the George-street asylum; and there is also another from the Rydalmere asylum, near the railway bridge.

1868. How many outlets are there for the sewage from the townspeople of Parramatta outside of the asylums? The sewage which finds its way into the river from the people of Parramatta outside of the asylums is discharged first of all into a drain from Vallack's brewery, near the dam at Marsden-street; then there is another at Brickfield Creek, and another at the street midway between Smith-street and Harris-street; there is another at Clay Cliff Creek; and there are several others I cannot mention.

1869. How many more would there be? There might be half a dozen smaller ones, but I have given you the principal ones.

1870. The objection by the people of Parramatta, and by certain semi-scientific authorities, to the pollution of the river by the Government institutions is because of the concentration of sewage at the point of outlet;—is that so? Yes.

1871. If there are six outlets for the sewage of the 3,000 persons housed in Government institutions, and eleven outlets for the sewage of the other 7,000 inhabitants of Parramatta, who are not housed in Government institutions, would it not appear, as a matter of fact, that the concentration and pollution is more intense on the part of the inhabitants outside of the institutions than on the part of the inhabitants within them? Looking at the matter in that way it would be so. But there are other things to be taken into consideration. There are a certain number of people who, from their positions on the water-shed, cannot contribute to the pollution.

1872. How many persons are there which the water-shed would prevent from draining by the eleven outlets you have named into the Parramatta River? Some thousands.

1873. What proportion of the sewage of the 7,000 does not drain into the river at some point above where the nuisance is created? In connection with what you are asking, you must bear two things in mind. First, there is the way in which the sewage is discharged into the river; then secondly, the quantity which is discharged into the river. As to the way in which the sewage is discharged into the river, if you take the three institutions in the vicinity of the gaol, you find the 1,500 persons there discharging their sewage at the flood-gates. If you take the people who live on the Clay Cliff Creek drainage area, they discharge their sewage at the mouth of Clay Cliff Creek, but inasmuch as the population is scattered over the whole area, and has in many cases no means of conveying the sewage direct into the channel, a good deal

J. Davis. 12 Mar., 1897.

deal of it necessarily escapes by means of evaporation. If you take the flow in Clay Cliff Creek in dry weather, and the discharge at the flood-gates from the three institutions I have mentioned, you will find that the quantity is probably more than four times as much in the case of the institutions than in the case of Clay Cliff Creek, although there is a greater number of persons on the Clay Cliff Creek area than in the institutions.

1874. You appear to consider that the claim of the Parramatta people to a new system of sewerage depends upon the pollution of the river? That is the immediate reason for the scheme.

1875. Do you attribute the chief cause of the pollution to the Government institutions? I do not know that I should be right in saying the chief portion, but the Government institutions would be responsible for a great portion of it.

1876. Do you not think it possible that the demand of the inhabitants for a better system of sewerage may arise from the distribution of sewage and its consequent evaporation over the land, which, as you say, lessens the flow of sewage into the river from the inhabitants of Parramatta outside of the Government institutions? The fact that the people have practically a large sewage farm spreading over the whole borough is not very conducive to health. What we propose to do is to take it away from them, and to deal with the sewage scientifically upon a proper farm.

1877. Then you agree with me? In that respect, certainly.

1878. You agree that it is not only a question of the pollution of the river but that it is also a question of pollution from sewage in the vicinity of houses, which may be more objectionable under some circumstances than river pollution? Exactly, although not so potent to the senses.

1879. Do you think that if the Government institutions were removed from Parramatta, and if the people were allowed to stew in their own sewage, they would be satisfied with their sewerage system? I do not think it would be so for any length of time. I do not think it is a desirable thing at all. The least costly way to the people of Parramatta is to carry out a scheme such as that before the Committee.

1880. *Mr. Humphery.*] Is it your opinion, that the best and most economical system of sewerage for Parramatta is that proposed in No. 2 scheme? I think so, most decidedly.

1881. Is there any better scheme for dealing with the sewage in the case of a town situated like Parramatta, which is known to engineers at the present time? No.

1882. *Chairman.*] If the river were clean would there be any need for a sewerage system? There would be no immediate need for it, but it would be desirable.

1883. Would it be more desirable in Parramatta than in any other town of 10,000 inhabitants? Possibly not more desirable.

1884. You know that there is a considerable number of places situated similarly to Parramatta, where it has been thought preferable to flush the river than to go to any considerable expense in the creation of a sewage farm? There have been cases certainly where rivers have been flushed. The rivers have been very sluggish, and there has not been sufficient flow to carry away the sewage discharged into them from factories in the towns. In some cases they have pumped water, and have by that means flushed the rivers so situated.

1885. *Mr. Humphery.*] If it should come to a question between the scheme you recommend and the Clay Cliff Creek scheme, have you any doubt whatever as to the thoroughly satisfactory way in which the sewage could be dealt with at Clay Cliff Creek? No. It is only upon the question of cost that I prefer the other. The farm seems to be the most natural way. It is better than converting 4,000 tons of liquid sludge into about 700 tons of sludge cake. Instead of doing that, you put the sewage on to land of a sufficient area to permit of the land itself burning the whole thing up.

1886. And wherever you can deposit sewage on a farm and allow the effluent to run into a river, you prefer that system to any other? Certainly. If you cannot discharge sewage into the sea put it on to the land, and if you cannot get enough land to treat it by broad irrigation then the next best thing to do is to put it on to large filter-beds, and treat it by a system of intermittent downward filtration.

1887. In the case of broad irrigation you must not deal with the sewage of more than 120 persons to the acre? No.

1888. Formerly it was thought by filtration, such as you propose at Duck River, you could treat the sewage of about 2,000 persons to the acre? Yes.

1889. But it has since been ascertained that it would not be safe to treat the sewage of more than one-half of that number of persons to the acre? Just so.

1890. In your estimate of 14 acres you have really provided then for the sewage of 14,000 persons? Yes.

1891. *Mr. O'Connor.*] I should like to hear your opinion as to the healthiness or otherwise of sewage farms;—do you think, for instance, that they are deleterious to the health of residents in their immediate vicinity? Experience has shown that that is not the case.

WEDNESDAY, 17 MARCH, 1897.

Present:—

THOMAS THOMSON EWING, Esq. (Chairman).

The Hon. Frederick Thomas Humphery.	Charles Alfred Lee, Esq.
The Hon. James Hoskins.	John Lionel Fegan, Esq.
The Hon. Charles James Roberts, C.M.G.	Thomas Henry Hassall, Esq.
The Hon. Daniel O'Connor.	George Black, Esq.
Henry Clarke, Esq.	Frank Farnell, Esq.

The Committee further considered the proposed Sewerage Works for Parramatta.

John Moore Smail, Engineer-in-Chief, Metropolitan Board of Water Supply and Sewerage, sworn, and examined:—

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1892. *Chairman.*] Have you had an opportunity recently to visit Parramatta? Yes. I have prepared a statement, which, with your permission, I will read:—

At your request I visited the proposed site of the sewage farm at the confluence of the Parramatta and Duck Rivers in connection with the scheme for sewering the town of Parramatta.

With

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With regard to the different proposals, viz. :—1. Precipitation and filtration of sewage at Clay Cliff Creek and discharge into Parramatta River at that point. 2. Disposal of sewage on prepared filtering areas at site resumed for a sewage farm. Each of these proposals are dealt with in two different systems, viz., "partially separate" and what is known as the "absolutely separate." As the second was the proposal before the Committee on a former occasion I would like to refer to it first.

In my former examination I stated, in reply to Question 1605: "Do you think the site at Parramatta a suitable one for a sewage farm?" To which I replied, "Taken on the whole, and considering what it will be in the future, I consider it a very suitable position." At that time it was proposed to utilise the whole of the area above and below high-water mark.

The present proposal is to utilise only 31 acres out of the 62 acres total area, and the number of persons is given at 322 per acre, and the method of treatment is intermittent downward filtration through material dredged from the harbour.

If the area at the "farm" is laid out in tanks for filtration it is obvious that no return can be obtained by cultivation, and the whole cost of ploughing to keep the ground free and to allow it to become oxidised will be a charge on the revenue.

Another feature presents itself in connection with the proposed mode of treatment, viz., that it is necessary to intercept the heavier portions of the sludge before it is allowed to pass on to the filtering-beds, otherwise the pores of the sand will become clogged and be inoperative. Some provision will therefore be necessary to precipitate the sludge, either by gravity or by a mixture of lime or some other economical precipitant. I think lime would be the best material, as its application to land accelerates nitrification.

The provision of tanks for precipitation would not materially increase the cost. I might state that at the Botany farm, where the disposal is carried out by filtration-tanks and irrigation-plots, that even after the grosser particles are mechanically deposited in the sludge-basins of inlet-house, the filtering-tanks become coated with fine sludge which has to be ploughed in after drying before the tank can be used for a fresh dose. This treatment accounts in a great measure for the filtering capacity of the farm, which has and is capable of dealing with the sewage of 1,000 persons to the acre. As the material with which it is proposed to form the farm will be composed of dredgings from the river, I think it can be considered as analogous to the material dredged from Cook's River and used in connection with the river improvement works at back of facine banks, and to test the filtering capacity of same tests were made with sewage from the main carrier with soil from the facine bank and from the farm, both being average samples; it was found that the soil from the banks was 50 per cent. slower in filtering or passing through an equal quantity as compared with the farm soil; it must be stated however that the filtrate in the case of the river silt was clearer than the farm sand. I would consider this in favour of the former; as the more suspended the process of filtering is so is the quality of the effluent.

Taking the foregoing, which can only be considered as an approximation, it is evident that the area which must be provided in the case of the Parramatta disposal works must be double the area of the Botany Farm for an equal quantity; in other words if an acre of filtering area in the Botany Farm is equal to 1,000 persons, that at Parramatta is only equal to 500 persons to the acre. The scheme submitted only provides for 322 persons, so it is within the mark. I have no doubt that if the filtering area—for it is a misnomer to call it a farm—is judiciously arranged and managed it will be quite equal to disposing of the sewage calculated upon.

The effluent from the filtration areas would pass into Parramatta River, as it does into Cook's River and Botany Bay, without in any way endangering public health.

With regard to the possibility of smells from the area it cannot be denied that smell will exist with sewage even in its fresh state, and it depends upon the management at the place of disposal whether the odour will develop into a nuisance which can be detected at places remote from the site. The existence of a smell does not imply that it is inimical to the health of residents in the vicinity of the place. The latest information to hand indicates the trend of scientific opinion that disposal of sewage over suitable land is the best means of purification, both in England and on the Continent. In connection with the Berlin Sewage Farm—which is perhaps the largest in the world—the report states, among other things, that the possibility of pathogenic germs doing further harm, after systematic treatment on land, is an exceeding remote one—the bacteriacidal action of sunlight has the most destructive effect on same. Several large towns on the Continent, viz., Dortmund and Wiesbaden, having populations of 90,000 and 70,000 respectively, after a trial of chemical treatment, abandoned the system for one of land treatment; and at Vienna, with a population of 1,315,000, the Board of Agriculture expressed itself strongly in favour of land treatment.

If the disposal of the sewage is determined upon land treatment, it is essential that the disposal and management of a filtration area should be in the hands of a competent person, otherwise a system which should give good results will fall into disrepute, and become a positive nuisance. I have not touched upon the financial question, but it is obvious that the Department is handicapped with a heavy first charge, for the cost of the land and the cost of preparation of the site to receive sewage will accentuate the difficulty.

The other system of disposal is by precipitation and filtration over specially prepared filters, polarite forming a section of the filter. As ferozine is not used as a precipitant, it might be generally stated as an adaptation of the International process.

There is no doubt that, from the reports as to the many systems of sewage treatment in vogue, this system holds its own as a purifier of sewage. As far as I have had an opportunity of studying the details, it appears to me that all the necessary appliances and tanks usual in this particular mode of treatment have been provided. I have no doubt that the sewage could be treated at this place without creating a nuisance. While on this matter, I might state that an experiment was made at the sewage farm, Botany, with purification of sewage by passing same through a coke filter. The experiment was carried out as near as possible on the same lines as by Mr. Dibdin for the London County Council. The sewage was taken from the main carrier, from which all the grosser particles had been precipitated, and run through a trough filled with coke to further strain into a filter $\frac{1}{200}$th part of an acre and 4 feet deep. The top part of the filter was gravel, merely to prevent coke floating.

Previous to being filled the filter was allowed to rest for four hours; it was then slowly filled, four hours being absorbed in the operation; it was allowed to remain twelve hours in the filter, and four hours was taken to empty it—the one changing occupied twenty-four hours. The effluent was forwarded to Mr. Hamlet, Government Analyst, who reported as follows:—The liquid was black and turbid, contains offensive gases; free ammonia, 70 parts per million; quite unfit to pass away in its present condition.

Another test was made with a filter suggested by Mr. Hamlet, composed of coarse gravel, garden-soil, coke, breeze. The effluent after being treated as above gave the following results by Mr. Hamlet:

The liquid was clear with some suspended organic matter, not offensive; free ammonia, 45 parts per million; albuminoid ammonia, four parts per million may be allowed to flow away into tidal rivers without causing nuisance. As it is not necessary to aim at such a high standard of purity of effluent as insisted upon by the Rivers Pollution Commission in England, I think a filter composed of the foregoing materials would sufficiently purify the sewage to permit of it being discharged into the river.

Polarite is a patent article, and can only be purchased from the patentees, but the materials referred to can be obtained locally.

The estimated cost of the two schemes are approximately the same. This is accounted for by the fact that scheme No. 1 is debited with the capital already spent on the proposed site of farm or filtering tanks; eliminating this amount the cost of scheme No. 1 would be £59,437 — £6,931 = £52,506, or £6,803 less than scheme No. 2.

If the capital already spent on the farm is to be added to any scheme selected, it would, as before-mentioned, make Nos. 1 and 2 approximately the same, and under the circumstances I would prefer disposing the sewage on land at the furthest point from the centre of population, viz., at the proposed site of the farm or filtering tanks. If the cost of preparing the filtering areas at Duck River be charged against the work it will increase the cost of scheme No. 2, and make scheme No. 1 the cheaper, and as the sewage can be efficiently purified with either systems it simply becomes one of cost, and in this case scheme No. 1 seems preferable.

I have not referred to the separate systems, as I think the small difference in cost would not justify reverting to this system, irrespective of the difficulties which would attend the carrying out of the system. It is well known to sanitary engineers that the first shedding in rainy weather is nearly as foul as the ordinary sewage flowing into the sewers, and for this reason that a certain proportion of rain is provided for in a partially separate system which is as distinct from the combined as it is from the separate system, and I quite agree with the preference given for this system.

There is no doubt that if a system is carried out, the authority which controls the one should also control the water supply, as the latter is a necessary adjunct to the former. I question very much if the existing water supply, when there is water in the dam, would be sufficient to meet the domestic and sanitary demands without encroaching on their impounded reserve. The additional quantity for present population might be taken at approximately 40,000 gallons per diem.

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1893. You consider 40,000 gallons necessary to a proper system of sewerage for Parramatta? Yes.
1894. What would it cost? 1s. per 1,000 gallons, or £2 a day.
1895. Therefore, it is necessary to expend £720 a year upon water to effectively work the sewerage of Parramatta under present conditions? Yes.
1896. That is to say, that if Parramatta continues to use the water in the dam at Hunt's Creek, it appears probable that it will require to obtain £700 from somewhere to pay for the necessary additional water? Yes; of course if the impounding reserve gives out. Four gallons a day is a fair average. Each flush is only 2 gallons, and I am reckoning double that.
1897. You state that 40,000 gallons a day is the minimum quantity? Yes.
1898. Suppose that Mr. Davis states that the quantity is rather more than twice that? I do not think that practice would bear that out. It would be necessary to flush the sewers occasionally; but I am not providing for that, because we rarely use fresh water for flushing. The sewage is so diluted that we use the water in it to do the necessary flushing.
1899. That brings us to the question of the abandonment of the Parramatta water supply, out of which the borough professes to earn £1,700 a year, and to the taking of a certain supply of water from the Metropolitan Board of Water Supply and Sewerage? Yes.
1900. It would appear that for the water that would be required under a water-borne system a rate of approximately 3d. extra would have to be imposed? I presume so. I have not calculated it, but I think that the rate would come to between 2d. and 3d.
1901. You are not inclined to alter your estimate of 4 gallons? No; I am certain that it is a fair thing. Perhaps Mr. Davis in his estimate may have taken 10 gallons to a house.
1902. Therefore the estimate before the Committee on account of the scarcity of the water in Hunt's Creek, there not being sufficient to supply the ordinary wants of Parramatta, would require to be increased annually to the extent of some £700? Yes.
1903. In your opinion, should the sewerage and water supply system be in the same hands? Certainly.
1904. Do you feel inclined to express an opinion concerning the Parramatta water supply? I have always had one opinion, and that is that it must eventually give out. I think the watershed is not free from pollution, and the very fact that Parramatta has in an average dry season had to come to the Board for water shows the defective nature of the supply.
1905. Would the dam stand a few more feet on it? That is purely an engineering question, and I should not like to so express an opinion unless I had a section of the dam.
1906. You do not know whether a sufficient quantity of water could be impounded at Hunt's Creek to supply the wants of Parramatta? No; I am not in a position to say at present.
1907. As to the quality of the water, you think that had better be left to Mr. Hamlet? Yes; Mr. Hamlet's report would be more valuable than anything I could say at present.
1908. If the Metropolitan Board of Water Supply and Sewerage had charge of the proposed scheme could it levy a rate irrespective of the municipal boundary of Parramatta? Yes.
1909. Suppose, for instance, they desired to include the lunatic asylum? Then they could do so. The Metropolitan Board is limited only by the boundaries of the County of Cumberland.
1910. It has full power both inside and outside the municipality? Yes; subject to the boundary I have mentioned.
1911. If the Parramatta council had control of the scheme it would be limited to rates within the boundaries of the municipality? Yes.
1912. Any contribution outside would be a concession on the part of the persons making it? Yes; unless persons outside the boundary entered into an agreement.
1913. You think that the water supply and sewerage systems are so interdependent that they should be under one Board? Yes.
1914. Will you state your reasons for that? Yes. In the first place, we depend upon water for the carrying away of the sewage; that is supplied by the water-mains; so you can see the line of demarcation at once. The sanitary authorities—the authorities who laid the sewers—provide everything up to the pan, and the vehicle to carry the fæcal matter away has to be supplied by another authority. Suppose there was a stoppage in the main—or suppose that by some neglect on the part of the water authority there was no water supply for the pans—the sanitary authority might be creating a nuisance which would be beyond its control; whereas if the one authority has the control of the two systems it would naturally see that one was contingent upon the other. That is the main reason. Then, again, the question of health comes in.
1915. Upon the question as to whether the Water Supply and Sewerage Board or the local council ought to control the two services, which authority, in your opinion, should do so? I think it was contemplated by Parliament, when it brought the Board of Water Supply and Sewerage into existence, that the Board should control the whole of the water supply and sewerage of the County of Cumberland.
1916. Leaving aside what was contemplated by Parliament, which, in your opinion, should control the water supply and sewerage of such a place as Parramatta? I should think it should come under the Board of Water Supply and Sewerage. The administration would be cheaper; and the system would be charged only the proportionate amount of its expense.
1917. How, in your opinion, would the ordinary municipal authorities deal with the sewage farm? Of course we have had no experience of municipal councils dealing with sewage farms in this Colony; but from my reading, and from what I have heard from persons who have come from England where the sewage farms are handed over to municipal authorities, the farms under those conditions are generally voted a nuisance.
1918. Have you learnt anything since you yourself started sewage farming? Yes.
1919. And you think that any municipal authority would have to go through the same experience? Yes. We have had visitors from all parts of the Colonies, students from the Technical and Agricultural Colleges, coming and going on the sewage farm, and returning to their several localities and working upon the same system.
1920. You have some doubt as to the wisdom of putting the Parramatta council through the same experience which you have had? Yes. I would point out, however, that in this particular case it is proposed that either place—that is, at Clay Cliff Creek or Duck River—would deal with the sewage in the shape of filtration, and not as we are doing on the farm at Botany.

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1921. I think you stated the area which you thought to be sufficient for filter-beds at Parramatta to be some 31 acres? Yes; I think that is well within the mark.
1922. Would 14 acres be ample? No, it would not, because you have to deal with a population of 10,000. Fourteen acres would provide for only 7,000. I think that with such material as is dredged from the bottom of the harbour it is highly probable that 20 acres would be required; but if the conditions were altered by placing on the top of the silt, sand similar to that at Webb's Grant matters would be somewhat altered.
1923. Have you had an opportunity of seeing the storm-water sewers at Parramatta? Yes.
1924. In your opinion, will they be necessary in the future? There is no doubt about the storm-water sewers being necessary.
1925. What is your opinion of the sewers at present in existence;—are they unnecessarily costly? I think that if a concrete invert had been put down sufficient to carry away the foul liquid, then, from the nature of the ground, which is very suitable for the purpose, you might have had banks of ordinary soil with couch grass sodding.
1926. The expensive work in connection with the sewers is the concrete contained in them? Yes.
1927. Did you note sufficiently the size of the sewers to be able to inform the Committee how much unnecessary concrete there would be in each running yard? No; I have not gone into that question.
1928. All the concrete, once you leave the small curve at the bottom of the drain, is unnecessary? Perhaps I had better explain: the object of these storm-water sewers was temporarily to carry off the slops which were flowing down the creeks, and getting into pot-holes where they decompose and give off offensive odours. If a concrete invert sufficient to carry off this liquid were put in it would meet the case. As to the slopes, I do not think you could adopt any better method of preventing erosion than by planting them with couch grass. I have tried it in the country again and again.
1929. Therefore it appears probable that these storm-water channels could be built for one half the money? I should not like to express an opinion as regards the cost, because I have not gone into that question; but, as a matter of design, it seems to me that it is preferable to do what I say in this particular case. Of course there are cases where it is absolutely necessary to put in concrete.
1930. The nuisance at Parramatta is primarily river pollution? Yes.
1931. The whole agitation in connection with sewerage works at Parramatta has arisen from the fact that the river is frequently very offensive? Yes; that was the inception of the whole movement, to obtain a sewerage system for Parramatta. It started sixteen or seventeen years ago.
1932. If it were possible to clear away the pollution within the banks of the river, would there be any more need for a sewerage system for Parramatta than for any other town of from 7,000 to 10,000 inhabitants? No, I should think not. I have heard no complaint about Parramatta except on account of the river. It is the primary cause of the whole thing. Of course all towns are benefited by having a sewerage system.
1933. You are aware that the Meat Preserving Company, whose works are just below the junction of the Duck River with the Parramatta River, after some system of purification, discharge their soup into the river? I think it is quite possible to purify the soup.
1934. Do you know for a fact that they do purify it? I do not know that.
1935. You can only say from hearsay whether these particular works do pollute the Parramatta River? I can only say from inference that if it be a nuisance mixed with fresh water it is much more likely to be a nuisance when it is mixed with salt water.
1936. As to the pollution of the river by the soup, we are given to understand that at times the evidences of its discharge can be found up as far as the fresh-water dam? With wind and tide in the same direction, I see no reason to doubt that statement.
1937. As to the various causes of pollution: At the Government asylum, near the old Queen's wharf, there is a slop-water discharge. There is then a discharge for slops and urine from the benevolent asylum. Then a little above the Queen's wharf the first municipal drain going up the river comes in, draining rather a limited area; then, opposite Harris-street, there is another drain into the river. Coming down to Charles-street, there is a rather large drain-pipe into the river—it drains the Macquarie-street asylum and the public school. A little further up the river, just above the flood-gates, there is another drain, which appears to carry a considerable quantity of objectionable matter, and to drain a considerable area of the town. Between that point and Church-street there are two or three other small discharges. At Church-street, on either side of the bridge, there are drains emptying into the river, one of them appearing to drain a considerable area. Then there is a drain or sewer, which has been built to carry the sewage from King's School, the lunatic asylum, and the gaol, which passes down the bed of the river, and discharges just below the flood-gates. This sewer appears to be leaking rather badly over a considerable distance in various places; it stands out, like a rib, in the bed of the river, and intercepts the sewage coming in from the southern side, which remains there and decomposes, until the tide rises. There is also, from the northern side of the river, a storm-water discharge, which is at present not quite completed;—these, in conjunction with such surface water as enters the river, are the main sources of pollution? Yes.
1938. Do you want to add anything to that description? I ought to explain that the drainage from the lunatic asylum and King's School is the same kind of drainage as you have from the lunatic asylum; it is urine.
1939. Slops and urine? Yes.
1940. In almost all these cases the sewers or drains carry slop-water, urine, and other objectionable matter? Yes.
1941. Are there any other sources of pollution? Yes; the bottom of the river is exposed to the action of the sun at certain times of the day, and the organic matter that is deposited there by the slow receding of the tide leads, to a very large extent, to such nuisance as arises from smell in the river.
1942. The river has been foul for a great number of years from causes which are in existence to-day? Yes; the thing has been going on for seventeen years, to my own knowledge.
1943. Suppose it were possible to discharge the sewage of Parramatta where the volume of water was sufficiently large to dilute it—say below the flood-gates—would there be any serious disadvantage to the Parramatta River? As compared with the present system of discharge into the comparatively dry bed of the river, and through leaky joints, and so on, if the sewage could be concentrated at a point where there would be deep water and a chance of dilution, no doubt the state of the river would be considerably improved.

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1944. *Mr. Hoskins.*] What is the rise and fall of the tide at the junction of the Duck River with the Parramatta River? At ordinary tides, about 4 feet; at spring tides, 5 feet.
1945. Would there be a sufficient rush of water to carry the sewage away down opposite Tarban Creek? Yes; the object of putting up the flood-gates was to create a current. I believe that if the flood-gates could be opened so as to give the full benefit of the head conserved behind them they ought to carry everthing altogether clear of Duck River.
1946. *Chairman.*] Would it be a serious matter to intercept the sewers we have particularised on the southern side of the river, bringing them down below the flood-gates and joining them on to the sewer at present in the middle of the stream? I do not think so, comparatively speaking.
1947. Have you seen the flood-gates? Yes.
1948. Do you know what depth of water there is on the southern side of the flood-gates when an ordinary tide is in? About 4 feet.
1949. And at the upper end? Taking the slope of the river it would not be more than 18 inches.
1950. Therefore, if the gates were properly constructed, you would have a body of water available for use between the gates and the fresh water dam? Yes.
1951. If it were possible to open the flood-gates instantaneously what would be the effect of the rush of water? You would obtain a velocity which would carry the matter past the farm site out into the wide river.
1952. Have the gates ever been worked? I could not say, I have no knowledge of it.
1953. Have they been worked recently? Not to my knowledge.
1954. Do they look as if they had been doing any service? I should not think so from looking at them. It was simply impossible to open them with the levers when the tide was full. There was a sluice to let the man work them after a certain point had been reached.
1955. If it were possible to so manage the sewage that it would discharge below the flood-gates, and to work the gates properly, it would be possible to send out such a body of water as would, in all probability, remove any objectionable material a considerable distance down the river? It would be removed from the upper portion of the river, where it is a source of nuisance, to deep-water, where it would be less objectionable.
1956. Do you think it probable, that with such a scheme properly managed, it might be possible to keep that portion of the river fairly clear? I think it is worth trying.
1957. You will have the whole of the appliances there ready? Yes.
1958. What would it cost to work the gates? I could not say.
1959. A few hundreds of pounds? I daresay, taking it altogether. You would have to make hydraulic appliances.
1960. There is one other question I want to ask you. The Parramatta River receives on one side the tributaries of Haslem's Creek, which drains Rookwood and Auburn; the Homebush Creek, which drains a portion of Strathfield; and the Duck River and A'Beckett's Creek, which drains the western side of Auburn, and a portion of Parramatta. On the other side of the river further down there is Ryde, and above that Rydalmere, and other places. Upon the area I have described is there a considerable population? I should not call it considerable, but it is a good population.
1961. Is it a population that will presently require sewerage operations? There is no doubt of it. As regards Auburn and Granville something will have to be done there in the near future, because there is a concentration of small households, and the whole of the sewage goes into the Duck River and A'Beckett's Creek.
1962. It appears from a cursory view that the whole of the sewage from these places should be treated at one and the same place? That seems to be the natural thing to do.
1963. Before having a sewage farm to deal with any one municipality within that area, you think it would be well to discover a site which would best deal with the sewage of the entire area? I think it would be very advisable to take the thing as a whole.
1964. It becomes a question as to whether the proposed farm is so situated that it is most accessible to those places, the sewage of which will eventually require to be treated at it? That, of course, is an important question. There is no doubt about the places to which you refer requiring sewerage systems.
1965. You advocate the placing of the sewerage and water supply of Parramatta under the Metropolitan Water and Sewerage Board? What I said was, it would be better to have the two systems under one authority, and I think the Metropolitan Water and Sewerage Board would be the proper authority.
1966. Does the Metropolitan Water and Sewerage Board enforce the payment of the water and sewerage rates? Yes.
1967. Do they administer the law properly in that respect? I believe so.
1968. I understand you prefer No. 1 scheme to the sewage farm? No. I said it was only a matter of cost. There is a certain amount which is chargeable to both schemes. Whichever scheme is adopted the amount will have to be paid. Suppose you were to adopt the Clay Cliff outfall, with filtration and precipitation, and were not to charge the amount due on account of the farm to that scheme, then I say that it would be the cheapest. The nuisance no doubt could be got rid of just as well by No. 1 scheme as by No. 2.
1969. Dr. Ashburton Thompson prefers the precipitation and filtration scheme;—have you a preference for any particular scheme? Wherever you can get suitable land that of course is the proper way to dispose of the sewage, but you do not want to have to make the land for it.
1970. The idea of making any profit out of a sewage farm has been entirely exploded? Yes.
1971. It is simply a question of disposing of the sewage? Quite so. But we have to keep a certain number of men to work the farm at Botany, and therefore crops are grown to help to pay their wages.
1972. Seeing that the disposal of sewage must be a source of expense and that nothing can be made out of it, and having regard to the number of men which must be employed on the sewage farm, would not No. 1 scheme would be less expensive? I think the expense would be about equal in the two cases. I do not think there would be much difference in the cost of working.
1973. I am entitled to infer that a good deal of the nuisance which has arisen is through the failure of the flood-gates to flush the river? There is no doubt about that.
1974. If the people of Parramatta derived their water from Prospect would there not be more water in the Parramatta River available for flushing than there is at the present time? Yes; assuming there were no dam there.

1975.

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1975. Did you notice whether a considerable portion of the sewage of the river was sewage from the inhabitants of the town as well as sewage from the Government institutions? Judging from what I saw I should say honours are pretty well divided.
1976. There is a large discharge from Vallack's brewery, is there not? Yes.
1977. *Mr. Lee.*] Suppose this scheme were carried out at Parramatta and were handed over to the Metropolitan Water and Sewerage Board, under the Act what would be the Board's first procedure? We should have to gazette all the sewers and strike a rate. The Government would debit our capital account with the cost of the work.
1978. And you would strike a rate to cover the interest on the money and the working expenses? Yes.
1979. And the sinking fund, I presume? There is no sinking fund provided for in the Act.
1980. But are you not compelled to strike a rate which will include a renewal fund? No; we are asking for a renewal fund under the amending Act.
1981. You have power to enforce rates by levy and distress? Yes.
1982. Supposing you found the first rate struck was insufficient, would you have the power to increase it? Yes.
1983. Is there a limit? Yes; 5 per cent.
1984. If a rate of 1s. in the £ were found insufficient what would be the fair position? We should have to ask Parliament to pass an amending Bill enabling us to strike a rate sufficient to pay working expenses and interest.
1985. You think the Metropolitan Water Supply and Sewerage Board should have the entire management of both water and sewage for Parramatta? Yes. I would not advise the Board to take over the sewage without the water.
1986. Supposing that were the case all the house connections would be done by your licensed workmen? Yes.
1987. Can you give the Committee any idea what it costs to connect a house with the reticulation? It depends, of course, on the soil. An ordinary house such as you see in Parramatta would be as low as £7. Sometimes the price goes up to £15—that would be in rock. That would include the whole of the plumbing work on to the closet, and also the cistern and ventilating pipe.
1988. Would it include the drains and traps? Yes; we have had the whole thing done for £6.
1989. Does not the price sometimes go as high as £25? It might do so in exceptional cases. There is one thing I should like to point out, and that is that the payment is extended over a period of three years, which is a great advantage to persons in comparatively poor circumstances.
1990. I suppose connection with the sewers is compulsory in all cases? Yes.
1991. It matters not whether the house is tenanted or not? We do not enforce it until the house is tenanted.
1992. As the law stands at present the rate must stand for all time;—the borough will never be able to relieve itself? It will be out of the hands of the borough altogether. The individual ratepayer will have to make payment.
1993. But without provision for a redemption fund, and without a prospect of the rate becoming less? There is no doubt about it. But as the town improves, and as the value of property improves and assessments increase, the rate would decrease. That is where the benefit would come in.
1994. Would the Board have power to define the area within which it could collect the rate, or would the rate be applicable to the whole borough? We can rate only within 150 feet of any sewer.
1995. The power would be confined to the reticulated portion of the town? Yes.
1996. *Mr. Fegan.*] I understood you to say that you preferred scheme No. 1? It is a question of cost. I said I would do so if the amount of the farm were not debited to it; but if the expenses were equal in both cases I should prefer to get the smell away as far as possible. There is bound to be a certain smell in either case.
1997. So far as health is concerned, you think that one scheme is as good as the other? Yes, as far as disposing of the effluent is concerned.
1998. You believe it is unnecessary to have a sewage farm? It is not absolutely necessary, but you must have something.
1999. It is proposed that the workmen employed in the meat works shall reside in the vicinity of the farm;—you are aware of that? Yes.
2000. Do you think the proximity of the farm would be dangerous to their health, so far as sentiment is concerned? Of course the whole thing is a matter of sentiment. At Berlin there is the largest sewage farm in the world. Although they had typhoid fever near the farm yet not one person living on the farm itself developed a case.
2001. Was there not some difference among experts in that case? Of course doctors like everyone else sometimes disagree, but I do not think any real case of typhoid fever has been traced to a sewage farm.
2002. Do you think the farm will deter persons from settling at Granville and in that end of Parramatta? I do not like to express an opinion as far as Parramatta is concerned, but as regards Granville I do not see where the objection comes in at all. You might as well say that people would not settle at Rockdale on account of the proximity of that place to the sewage farm. Seven years ago there were very few houses near the farm, now the hillside is studded with them all round.
2003. But the land will not be taken up as readily as if there were no sewage farm? Of course sentiment will come in. People will not go near the proposed sewage farm from choice any more than they will go near the proposed outfall works from choice. I do not think that the persons who do not object to the smell of soup in the meat works will be likely to object to any smell which may arise from the sewage farm.
2004. *Mr. Humphery.*] Touching the treatment of sewage at Clay Cliff Creek, which of course will be included in No. 1 scheme, are you aware that the cost will be £800 greater than will the treatment of sewage at Duck River;—are you assuming that the annual cost under both schemes would be the same? Yes; I am assuming that.
2005. If you were informed that the cost of precipitants would be £300 besides the additional labour, would that alter the view you express that of the two schemes No. 1 should be preferred to No. 2? I should say that under those conditions the sewage farm would be the cheaper. But I doubt very much whether £500 would be spent in precipitants for the sewage of 10,000 persons.
2006. What quantity of lime will be necessary for the treatment of the sewage of 10,000 persons by the means proposed under No. 1 scheme? I should not like to express an opinion straight off.

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2007. If Mr. Davis is of opinion that the cost of the line will reach £500 a year, then your opinion will be in the direction of No. 2 scheme rather than in the direction of No. 1? Yes, no doubt.
2008. Have you formed an opinion as to the efficiency of No. 1 scheme—that is, the treatment of the whole sewage upon a comparatively small area of land? My opinion is that the "International" is the best of the whole of the patents we have.
2009. Is it your opinion that, in addition to the use of lime, it would be necessary to use polarite in the event of No. 1 scheme being adopted? Yes, or some other purifying medium; because you must concentrate the oxygen. In other words, you are doing with chemicals what nature will do for you on the farm. Polarite is a magnetic carbon which goes through a patent process which retains the oxygen. It purifies the sewage after it has passed through sand and gravel.
2010. The object is to prevent anything but a perfect and really innocuous effluent reaching the river? Yes, and also the reduction of ammonia.
2011. In connection with the present condition of Parramatta, are you prepared to say that it would be possible to deal with the difficulty which now presents itself without the adoption of either No. 1 or No. 2 schemes? Of course, as an engineer I must say this: that it is always best to have a sewerage system in a town; but if the town cannot pay for it then the next best thing is to see what you can do to best mitigate the nuisance.
2012. The mitigation of the nuisance is, that the solids would be treated by the pan system, and that all the slops would go into the gutters and find their way into the river? Yes.
2013. When you say that the nuisance may be mitigated, you mean this: that it can be mitigated only by driving down a portion of the drainage from the higher portion of the river to the junction of Duck River by working the flood-gates? Yes.
2014. In all other respects the present insanitary condition of Parramatta River would continue? Just so.
2015. Where practicable, you think sewage should be carried on to a sewage farm or a filtration area, as proposed? Yes.
2016. Are you also of opinion that if suitable sand can be obtained to build up the proposed farm at Duck River it would be capable of treating the same portion of sewage as is the filtration area at Botany? There is no doubt about that—that is, if you get the same kind of sand; but you must have 2 or 3 feet of it.
2017. And you think it would be equal to the treatment of the sewage of 1,000 persons to the acre? Yes; it may sometimes go beyond that. In summer-time it would; in winter-time it would not.
2018. Everything would depend on the sand used in the formation of the filter-beds? Yes; and I assume, of course, that the works would be under the control of a skilled man.

THURSDAY, 18 *MARCH*, 1897.

Present:—

THOMAS THOMSON EWING, Esq. (Chairman).

The Hon. Frederick Thomas Humphery.	Charles Alfred Lee, Esq.
The Hon. James Hoskins.	John Lionel Fegan, Esq.
The Hon. Charles James Roberts, C.M.G.	Thomas Henry Hassall, Esq.
The Hon. Daniel O'Connor.	George Black, Esq.
Henry Clarke, Esq.	Frank Farnell, Esq.

The Committee further considered the proposed Sewerage Works for Parramatta.

Joseph Davis, Engineer for Sewerage Construction, Department of Public Works, sworn, and further examined:—

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2019. *Chairman.*] Have you any further information for the Committee? First of all, I have some letters for which Mr. Roberts asked when I was here before. They date back to 1885. They are with reference to the responsibility of the Parramatta council in connection with the storm-water sewers. I find that the following resolution was agreed to on the 16th December, 1886:—

> That, in order to the preservation of the public health, the construction of works for sewerage and drainage in the borough of Parramatta is become urgently necessary; and this council, therefore, request the Minister for Public Works to cause this borough to be brought under the operation of the Metropolitan Water and Sewerage Act of 1880, and undertake that this council will be responsible for the repayment of the expense incurred in the construction of such works, pursuant to the provisions of the said Act in that behalf.

I should explain that several years after that a sum of money was voted, and that sum has been expended.
2020. *Mr. Lee.*] That was for sewerage only? Yes.
2021. *Mr. Humphery.*] What was the result of the resolution? Several letters were written to the Minister, and there were one or two deputations, and finally in 1890 a sum of £16,000 was voted on the loan estimates; and it was at that time thought by Mr. Bennett, who had charge of the Sewerage Branch at the end of 1889 or in 1890, when the money was voted, that it would be sufficient to carry out the whole of the work. The officer who reported in 1882 or 1883 upon the Parramatta sewerage estimated that the forming of main drains, without considering reticulation, would cost that sum of money, and it was therefore voted. It was afterwards found, when the matter of sewerage was gone into, that it was totally inadequate, and at the request of members of the council from time to time, £16,000 was expended, first of all in the purchase of the land at the farm and the putting up of a bank around the land, and then in constructing storm-water channels. Those facts are borne out by the letters I produce.
2022. *Mr. Roberts.*] Are you able to say that the money was voted upon the clear understanding that it was to be repaid by the borough of Parramatta? Most decidedly. A deputation waited upon Mr. Wright, who was then Secretary for Works, and he promised that the matter should be taken into consideration, and that, as far as the Government institutions were concerned, they would be prepared to pay their proper portion of the expense, the council being accountable for the balance. That seems to have been the first time the matter was before the Minister, and it must have been in about 1883.
2023. Did Mr. Wright then write a minute on the subject? Yes; I have not got it with me, but I can obtain it for you.

2024.

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2024. *Mr. Lee.*] You spoke of £16,000 being the money voted for the sewerage, but you are charging Parramatta with £21,799? Yes; but there were subsequent votes to the £16,000.
2025. *Mr. Humphery.*] You are quite clear that what is known as the Duck River Farm was purchased with the knowledge of, and at the instance of, the council of Parramatta? I would not positively say so, but I have every reason to believe that it was done at the instance of the Member for the borough. I could not say that it was done with the knowledge of the council.
2026. Is there anything in the papers you have produced showing that the intention of the Government to purchase the farm was communicated to the Parramatta council? I am sorry to say that I have not been able to find the papers relating to the resumption.
2027. The papers have disappeared? Yes.
2028. *Mr. Lee.*] In 1886 this application for sewerage on the part of Parramatta seems to have started? That was the date of the resolution which was passed by the municipal council, but in 1883 a deputation waited upon the Secretary for Public Works at that time in reference to the matter.
2029. Did not that refer to the system of the storm-water sewers;—did it refer to the system of sewerage as now proposed? Yes.
2030. Had the council any knowledge of the cost of the sewerage system at that time? They were under the impression that it was going to cost £16,000.
2031. They gave their sanction to a scheme involving an expenditure of £16,000; but is there anything to show that they are willing to take over a scheme costing £60,000? There is a letter showing that they approved of No. 2 scheme, after it had been explained to them.
2032. The letter to which you refer purports to be written after the council heard Mr. Johnston's report, and it shows that they were willing to accept the proposed scheme, No. 2, provided an arrangement were made between the council and the Government, in accordance with the letter of the 11th June, 1895? Yes; it was written after I had visited Parramatta, and had explained the scheme to the council. The letter appears on page 2 of the printed evidence.
2033. The letter authorises the mayor to request the Minister to forward to the Public Works Committee, for consideration and report, the proposed sewerage scheme, such scheme to be carried out, providing that a satisfactory agreement can be made between the council and the Government in reference to the assessed value of the Government properties, and also on the understanding that when the works were completed they would be under the control of the council. In the first place, you will see that the terms of the letter of 1886 are departed from, because it is asked that the works be carried out under the Metropolitan Water and Sewerage Act; whereas the letter stipulates that they should be handed over to the council. As to the assessed value of Government properties, have the council approved of them? I do not think they have approved of them; but as far as I have been able to gather, they are favourable to them. I do not think they have absolutely approved of them. One of the objects in submitting this matter to the Committee was that the Committee itself might say what was fair and reasonable.
2034. I am afraid the Committee's recommendation will not be sufficient to bind the Parramatta council, inasmuch as it stipulated for certain things. The mayor of Parramatta is of opinion that, as regards the Government properties, the amount allowed is too low? I do not think he takes any exception to the 10s. a head. What he says is, that he wants the council to be guaranteed that there will be always 3,000 inmates.
2035. You have produced the only correspondence bearing on the matter? Yes; the correspondence is before the Committee.
2036. There is nothing more recent? No; the most recent thing would be the evidence the mayor gave before this Committee.
2037. *Chairman.*] We have had it explained to us that the pollution of the Parramatta River comes partly from soup from the boiling-down works, and partly from a discharge pipe from the lunatic asylum, the gaol, and King's School leaking; also from sewage from the town which finds its way directly into the river by various pipes, on the southern side principally; the pipe which carries from the gaol and other institutions acts as a sort of dam to keep back the sewage which comes in at low tide into the river-bed, and which lies there till the tide comes in;—do you agree that that is a fair description of the pollution? Yes; if I rightly understand your statement. The nuisance is discharged into the river and there is not sufficient flushing power in the river itself to carry it down.
2038. You know that the sewer in the bed of the river leaks seriously in many places? Yes.
2039. Have you taken into consideration the possibility of making the sewer effective by means of a scour? Yes.
2040. Would it be an expensive matter? I do not think so. But to begin with, it would be a most difficult thing to make the earthenware pipe watertight. I do not think it is possible when the pipe is under pressure. You could not break into the pipes without injuring them, seeing that they have been laid in cement and surrounded by concrete. My impression is, that if you want to make a watertight job you will have to abandon these pipes and bring pipes down either bank of the river.
2041. You do not think that without great expense it will be possible to make the pipes sewage tight? That is my opinion.
2042. It would be necessary, you say, to bring the pipe along the banks? You would have to lay an intercepting pipe on each bank—northern and southern.
2043. The main population is on the southern side? Yes.
2044. Therefore the sewage from the southern side would be greater in volume than from the northern, and its polluting power would be much greater? Yes; supposing you go down as far as the junction of the Clay Cliff Creek. If you go only down to the flood-gates, then I say no.
2045. The main part of the pollution of the Parramatta River comes from the asylums on the southern side, and also from the sewers that run down the bed of the river? Yes.
2046. Supposing it is proposed to remove the sewer out of the bed of the river and place it along the southern bank, and also to intercept the sewage which comes in between the flood-gates and the stone bridge, would that be an expensive matter? No.
2047. What length would the work be? About 50 chains.
2048. What will it cost? I should prefer to do the work effectually, and to bring the whole of the liquid sewage down to the flood-gates, and to put an intercepting pipe on each side. I estimate that that could be done for £2,000.

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2049. Give us the southern side first? That could cost approximately £1,000.
2050. At a distance of about 10 chains above the flood-gates you have a sewer coming down on the northern side;—would it not be better in that case to bring your sewer pipes down from that length and leave the western end of it alone? It might be.
2051. Then you take out of the bed of the river the sewer at present there, and the river will have a flushed bottom as far as you can have it? Yes; there would be no impediment. It would be of some advantage to the flow of water when there is water to flow down.
2052. As to the flood-gates, have they been recently worked? I could not say that they have been during the past few months. I believe the council have been working in the bed of the river, and have prevented it.
2053. Suppose we are informed that the power of the gates has never been sufficient to throw them open at once? It certainly has not.
2054. The river has never had the full flush running at once? No; that would be a physical impossibility without some other appliance.
2055. Could not arrangements be made for a rapid flush of half an hour? Yes.
2056. Do you think that would be enough to carry any objectionable matter down to the point where there is a good body of water? I am of opinion not. I believe it would not do so. I believe that the width of the river is such that even supposing you impounded all the water you could above the flood-gates, and put your appliances in for opening the gates the flush you would get would not effectually scour away the nuisance; it might to some extent mitigate it. Judging from calculations I have made the rush of the water would affect the river for about 30 chains down, and that would bring you opposite the George-street asylum. Before leaving that subject I would point out that supposing you did the flushing you speak of there is another difficulty to be overcome. At the present gates the nuisance which has been complained of especially is that in front of the wing-walls immediately behind the training-walls that are in front of the gates. That is where the principal nuisance has arisen. A north-east wind blows a lot of floating sewage into the corners there, and it festers and smells badly.
2057. Has there been any nuisance complained of below the George-street asylum? Yes.
2058. A serious one? Yes, I should say serious.
2059. If there were a scour twice a day are you of opinion that there would be a sufficient body of water to prevent any serious nuisance? I should say that there would not be any serious nuisance.
2060. Do you know for what purpose the land at Clay Cliff Creek was resumed? It was resumed for the old men's asylum.
2061. You do not know what was paid for it? No.
2062. The amount is not included in your estimate of cost? The Colonial Secretary informed the Works Department that they could have what they required of it. I wish to be distinctly understood as to the flushing of the river. I am opinion, with you, that if you can get the nuisance down below the George-street asylum, and abolish the George-street and Macquarie-street asylums, there would be nothing to complain of, but the difficulty to my mind is to get it there. I am of opinion that if you impound as much water as you can behind the flood-gates, and alter the gates so that they can be opened at once for the whole width of the channel, there would not be sufficient scouring capacity.
2063. Do you think that would affect the river for 30 chains down? Yes; the velocity at the flood-gates would be about 6 miles an hour. It would end at nothing 30 chains beyond that. The flood-gates would impound about 9,000,000 gallons.
2064. What would be the cost of so altering the gates that they could be opened and shut instantaneously? I should say it would cost £200 to alter them and put the necessary machinery there.
2065. You would require hydraulic appliances? Yes, that would be the cheaper method.
2066. Then for an expenditure of £1,200 you could have a thorough trial made of a proposal which might do a considerable amount of good, and which might deal with the whole question of river-flushing? Yes; but you would have to expend about £2,000 in order to make anything like a satisfactory scheme for river-flushing. It would be necessary to intercept the sewage coming in on the northern as well as on the southern side.
2067. Will the expenditure of that amount of money bring the sewage to a point on the river where there is a 6-knot current twice a day? Yes; and there would be the alteration of the flood-gates and having a man there to regulate them.
2068. *Mr. Humphery.*] Can you give any reason for the flood-gates not having been used up to the present time? At the time they were erected, to the best of my belief, they could not be opened. It was subsequently arranged that there should be some small doors put in the gates, and these were found not to be of much use for flushing, and larger ones were put in.
2069. After the erection of the flood-gates they were found to be defective? I have understood so, but I do not know it of my own knowledge.
2070. How many years ago were the gates erected? I think it is about twelve or thirteen years since.
2071. How long is it since the sewer was completed which discharges at the flood-gates? It would be about four or five years ago.
2072. Then if four or five years ago an expenditure of £200 had been incurred on the flood-gates, and an additional expenditure for getting all the sewage below the gates, then the complaint in respect of sewage would have been so minimised as to render the present scheme perhaps not immediately necessary? That is not my opinion. My opinion is, that what is now proposed by the Chairman will have very little effect, and I am supported in that view by Mr. Darley, Mr. Hickson, and Mr. Vernon. What has been suggested to day by the Chairman was suggested by Mr. Hickson and Mr. Vernon on 3rd January, 1895. I will read their report to the Committee:—

Department of Public Works, Government Architect's Branch, Sydney, 3 January, 1895.
DRAINAGE, GOVERNMENT INSTITUTIONS, PARRAMATTA.

In accordance with the personal request of the Under Secretary that some recommendation should be made to the Minister, upon which he might perhaps deal with the deputation which is arranged to wait upon him to-morrow on the subject, we have the honour to make the following report:—

The nuisance now complained of is the accumulation of sewage deposit immediately below and around the flood-gates and training-wall, and generally over the surface of the river-bed from such training-wall up to the dam above Lennox Bridge.

Since steady efforts have been made to deal with this evil by utilising the flood-gates, we understand the acuteness of the nuisance is very materially diminished.

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In dealing in a tentative way with the abatement of this nuisance, we must necessarily draw attention (as was done in previous reports) to the necessity of joint action between the Minister and the Borough Council of Parramatta, inasmuch as whatever further is done, it must be done with a view of providing means of disposal for the sewage both from the Government institutions and that portion of the town of Parramatta that now drains promiscuously on to the river-bank.

We herewith place before the Minister three alternative schemes for dealing with this matter, although at the same time we believe that no perfectly efficient scheme can be adopted other than such as has already been before the Public Works Committee, and involving a complete sewerage scheme for the district.

1st Scheme.

The 1st alternative consists in retaining the existing pipe down the centre of the bed of the river and also its present outlet, removing all the existing training and flank walls, rocky bed and flood gates, and constructing a new weir slightly below low-water-mark at the eastern extremity of the present training walls, to be fitted with three 2-feet pen-stocks.

The council of Parramatta should be required to connect all the sewerage now running into the river above the weir with the existing pipe, or, if found necessary, lay suitable pipes for intercepting the flow of sewage, and discharging it below the new weir.

The construction of this weir will have the effect of impounding a head of fresh water, extending from the weir in question up to the dam above Lennox Bridge, and will provide means of flushing the outfall at such times as may be necessary.

The approximate estimate of this work, including repairs to the present pipe, but not including the connections or new intercepting pipes, which would have to be paid for by the Parramatta Council, is £1,300.

2nd Scheme.

The 2nd scheme is one which follows on the recommendations laid down in the Report of August, 1891 (M.P. 91–3,856) by Mr. Darley and Mr. Vernon, wherein two pipes were recommended to be laid down at the foot of the right and left banks of the river respectively, the centre pipe being discarded. By this means an easier mode is gained of intercepting all town sewage on both banks of the river, and discharging at the weir, as in the 1st scheme.

The estimated cost, exclusive of connections, &c., as before, is £3,000.

3rd Scheme.

The 3rd scheme consists in laying pipes on either bank as before, the construction of a weir as in schemes Nos. 1 and 2, with the addition of a pumping and precipitating plant for dealing with the liquid sewage before it is discharged into the river.

This is roughly estimated to cost, exclusive of maintenance, £5,000.

In recommending the construction of the weir, which is common to the three schemes, we are of opinion that the main cause of the present complaints will, to a very great extent, disappear, as we find that the nuisance arises, not so much from the direct discharge of the sewage into the tidal waters, by which it is carried down the stream, but on account of the gathering ground on either flank of the training walls, which consists of rough rocky beds, covered at high-water and uncovered at low-water, and on which the sewage eddies and deposits itself; by the construction of the weir all this will of course disappear, as the foot of the weir itself will be in comparatively deep-water.

Of these three schemes we are of opinion No. 3 would be the most effective, but for the present No. 2, which provides for the weir and the collection, by means of intercepting pipes, of the liquid sewage from the part of the town and the Government institutions draining into the river, and discharging it into comparative deep water below the new weir, might be carried out.

If, at any future time, it was found that the adoption of this scheme created a nuisance on the banks of the river below the weir, then the larger scheme, No. 3, could be carried out in its entirety.

As there does not appear to be any immediate prospect of the comprehensive sewerage scheme being carried out, we recommend the adoption of No. 2 scheme, at a cost of £2,000, on condition that two-thirds of this sum be borne by the Government, and one-third by the residents of Parramatta. The Government could carry out the work and provide the necessary funds. The third portion to be debited to the sewerage account, and collected as rates, in conjunction with the Brickfield Creek storm-water sewer.

It must be distinctly understood that although provision is made in either scheme for carrying off the liquid sewage, no fæcal or other solid matter must, under any consideration, be discharged into the intercepting pipes.

In presenting this report, we venture to draw attention to that dated August 21, 1891 (before mentioned), prepared by Mr. Cecil Darley and Mr. Vernon, in which the opinion is expressed that any work undertaken that is not part of a permanent drainage scheme for the district, while it may have its temporary advantages, cannot, of course, be considered as permanently effectual.

ROB. HICKSON.
W. L. VERNON.

The Under Secretary for Public Works.

It will be found that those are the sentiments to which I have given utterance before the Committee.

2073. *Mr. Humphery.*] What action was taken on the report you have read? The council would not agree to pay the amount which Mr. Hickson and Mr. Vernon recommended. The only thing which was done was outside of the report, and that was to put in four new gates, two on the sides and two in the gates themselves.

2074. What expenditure was incurred for that work? £50.

2075. If the council had agreed to pay one-third of the expenditure, I presume the work would have been carried out? I presume so, but under the circumstances no action was taken.

2076. Are you of opinion that if the works estimated in the report of the 3rd January, 1895, to cost £2,000, had been carried out for the flushing of the river from the flood-gates down to Clay Cliff Creek, or to a point 30 feet below the gates, they would have been effective? I think they would have a beneficial effect. I do not say they would be effective.

2077. Do you condemn the proposal you have just read? I do not condemn it. I think it will have a good effect, but I do not think it will have a curative effect.

2078. Will you briefly say, in your opinion, what effect it will have? In my opinion if there be a man kept there constantly the accumulation of sewage will be carried down the river to a distance of (say) 30 chains.

2079. Are you of opinion that all the sewage which is collected at the flood-gates will be carried down far enough to be brought within tidal influence? I am of opinion that all sewage which comes within the influence of the flush will be; but there will be a certain portion of the sewage lying about the banks on either side of the flush which will not be affected.

2080. But there will be none on the banks above the flood-gates? I am speaking now of a point below the flood-gates.

2081. Will the collection of sewage you speak of be an appreciable nuisance, assuming that the flood-gates are properly worked? I could not say it would be appreciable if it has attention.

2082. What attention? I think a man would be required there all the time to look after it.

2083. The man who operates upon the flood-gates could also attend to any nuisance which might possibly be created below the gates from the causes which you have mentioned? Possibly.

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2084. Then the services of one man would be ample in connection with the report made in 1895? Yes.
2085. *Mr. Hoskins.*] The Parramatta council did not respond to the application of the Government that they should contribute to the cost of the works? No.
2086. I suppose they were invited to contribute? Yes.
2087. *Mr. Fegan.*] Can you tell us what the council will have to pay, or what the ratepayers will have to pay, in the way of a rate for the storm-water sewers? I would rather put the matter in this way:—If the scheme as proposed is not carried out, the position of matters will be this: Parramatta at the present time is paying for the emptying of the pans of the townspeople themselves £904 16s. 7d. per annum, and the Water and Sewerage Board, when the storm-water channels are transferred to them, will have to collect, in order to pay the interest on the money expended in the construction and administration of the sewers, £638 1s. 4d. per annum. That would make a total expenditure for pans and storm-water sewers for Parramatta, irrespective altogether of the Government institutions, and without charging anything for the farm upon which a matter of £7,000 has been expended, of £1,542 17s. 11d. But in making that statement it must be borne in mind that if the 7,000 persons who are to be served by the sewerage scheme were served by pans it would cost the townspeople for pans £2,300. You have to add to that the cost of the storm-water channels as before, £638, making the annual cost for the townspeople of Parramatta £3,071 for the pans and storm-water channels.
2088. In other words, it would be just as dear as the carrying out of this scheme? More so, because if the townspeople had the scheme, instead of paying £3,071 for an effective pan service and the storm-water channels, they would have to pay only £2,452; so that on that showing it would be infinitely better for the townspeople to have the scheme, because they would be £600 per annum to the good.
2089. So that the rejection of either of the schemes before the Committee does not mean the lessening of taxation to the people of Parramatta? Not if they are to have an effective pan system.
2090. *Chairman.*] What did the storm-water sewers cost? Between £13,000 and £14,000.
2091. The pan system is at present costing the people of Parramatta £904? Yes.
2092. What will the sewerage system cost the people of Parramatta? If No. 2 scheme is carried out, as modified by my previous evidence, it will cost £2,452.
2093. The difference between the pan system and your proposal is the extra cost that will require to be borne by the people of Parramatta? Yes.
2094. Therefore your scheme at present means an extra £1,500 for the people of Parramatta? Yes.
2095. That is the matter in dispute? There is something to add to that: they would not only have to pay what you say, but there would be the interest on the money expended upon the storm-water sewers.
2096. Have you seen the storm-water channels at Parramatta? Yes.
2097. They are designed to pass the storm-water discharge of very limited areas of country? Yes.
2098. Do you know the depth of them? They are about 6 feet, I suppose.
2099. What is the width? That varies.
2100. Take the one running parallel to Harris-street? That would be about 8 feet.
2101. What is the concrete? Sandstone concrete.
2102. What did that cost per running yard? It varied. The price at the time the Harris-street channel was constructed was higher than when the Brickfield Creek channel was constructed.
2103. *Mr. Lee.*] Do you happen to know if the rate which can be struck for sewerage under the Metropolitan Water and Sewerage Act is limited? Yes; it is limited to 1s.
2104. And under what conditions are these works to be handed over to Parramatta? My opinion is, that the works should not be handed over to the council but to the Board, in just the same way as are any other works in the county of Cumberland. Parramatta comes in in quite a secondary way. The borough councils of Ashfield, Petersham, and Burwood are not asked if they want works carried out. The question is, first, whether the works are necessary, and then whether the Board can recoup itself.
2105. It is proposed to hand over these works to the council as soon as they are completed, is it not? I do not think that is proposed.
2106. Was not that made a condition by the Parramatta council? We have never agreed to that.
2107. Then you contemplate bringing the works under the Metropolitan Water and Sewerage Board? Yes.
2108. That being the case, the Board will be tied down to a rate of 1s.? Yes.
2109. Supposing that maximum is not enough to pay the interest? They would have no power to strike anything more.
2110. How would the difference be made up? We do not propose to expend a sum of money which will require a rate of 1s. We are proposing a scheme which will require a rate of 10d. If 1s. is not enough, then I suppose there would be so much loss to the Board.
2111. Is it in contemplation to resume the waterworks in Parramatta, and to hand both the waterworks and the sewerage works over to the Metropolitan Water and Sewerage Board? No.
2112. Are you aware that it is supposed to be contrary to the interests of the Water and Sewerage Board to take over the sewerage works alone? I would scarcely ask them to do that. There would be difficulties from the very first.
2113. That being the case, when the works have been carried out by the Government, they must be handed over to the council, who will thereby make themselves responsible for payment of the interest on the outlay? I presume so.
2114. For that a general rate will have to be struck? The council will have to pay the rate, no matter from what source they obtain it.
2115. The annual instalment does not include a sinking fund? Oh yes, it does. It will include 3½ per cent. on the money spent, and the repayment of the capital cost in 100 years.
2116. *Mr. Fegan.*] At the present time there are several boroughs or municipalities in the area controlled by the Metropolitan Water and Sewerage Board which pay rates to the Board? Yes.
2117. Is it not a fact that in some cases they are paying only 7d. in the £ for the water? Yes.
2118. What are they paying for sewerage? 7d.
2119. If Parramatta is included in the metropolitan area, then the rates upon the whole of the remainder of that area might be so increased as to make up any deficit which might exist in respect of the Parramatta works? If you put the money spent at Parramatta into a general fund spent on sewerage, then whatever rate is levied on the other portions of the metropolitan area would be levied at Parramatta.

2120.

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2120. And if there be a deficit in respect of the sewerage works at Parramatta, could not the rate be increased over the whole of the metropolitan area to liquidate it? If the debts of the boroughs were consolidated.
2121. Does not the Act give the Board that power? Yes.
2122. The Board has only one water rate and one sewerage rate at the present time? That is all.
2123. And would not Parramatta be included in that rate if the works were put under the Board? I should think that would be the proper course.
2124. Therefore there could not be any deficit on the Parramatta works, because there would be the whole area open to taxation? Yes.
2125. *Chairman.*] The municipalities of Rookwood, Granville, and a portion of Homebush, Auburn, and perhaps Ryde and Hunter's Hill, are all approximately upon the same drainage basis; these will in all probability become pretty considerable municipalities as time goes on;—would it not be wise, before dealing with any portion of this drainage area, to take into consideration the whole of its requirements with a view to the discovery of a scheme which would suit the whole of them? Sewerage for many of the districts you named will probably be very remote. My opinion is that the proposed farm at Parramatta is in a right position for Rydalmere, Granville, Auburn, and Parramatta.
2126. You say nothing about Rookwood? That would have to be dealt with somewhere down in the vicinity of the meat works.
2127. Will you look into the matter and see whether you cannot group some of these municipalities under one scheme? Yes.

TUESDAY, 23 *MARCH*, 1897.

Present:—

THOMAS THOMSON EWING, Esq. (Chairman).

The Hon. Frederick Thomas Humphery.	Charles Alfred Lee, Esq.
The Hon. James Hoskins.	John Lionel Fegan, Esq.
The Hon. Charles James Roberts, C.M.G.	Thomas Henry Hassall, Esq.
The Hon. William Joseph Trickett.	George Black, Esq.
The Hon. Daniel O'Connor.	Francis Augustus Wright, Esq.
Henry Clarke, Esq.	Frank Farnell, Esq.

The Committee further considered the proposed Sewerage Works for Parramatta.

William Mogford Hamlet, Government Analyst, sworn, and further examined:—

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2128. *Chairman.*] Have you visited Parramatta and analysed the water there? Yes. I obtained a sample of water from the filter-bed at Parramatta. I took a perfectly clean bottle, dipped it beneath the surface of the water, and filled it from the filter-bed, that being the most accessible point. I found that the total solid matter contained in one gallon amounted to 14·28 grains; the quantity of chlorine, 5·8 grains per gallon; traces of nitrogen as nitrates, traces of phosphates; ·01 parts per 1,000,000 of free ammonia and ·20 parts of albuminoid ammonia per 1,000,000. The amount of oxygen absorbed in fifteen minutes was ·82 parts per 1,000,000; the oxygen absorbed in three hours was 1·90 parts per 1,000,000. The appearance of the water in a standard 2-foot tube was clear, with some suspended matter of vegetable growth. All these indications point to a water polluted with vegetable and animal organic matter, and the quantity of albuminoid ammonia is in excess of that laid down by English authorities as that which should be contained in a standard good water. The opinion to be adduced from that is, that the water is unfit for human consumption.
2129. Do you consider that you took the sample under reasonable conditions? Yes. It is, however, a water that might be much improved by aeration and filtration. I went down into the reservoir. The water was very low, and I saw cattle grazing in the vicinity of the water, and cattle-droppings were deposited in various places near the water. It presented a generally-neglected and uncared-for appearance. With proper care, and more efficient filtration of the water, it might be made suitable for drinking purposes.
2130. Would the present filter-beds require to be abandoned? They ought to be cleaned periodically and cared for.
2131. Would it require large expenditure for filtration? I should not say a large sum. It could be made fit for human consumption, but at present it is not. If a conduit could be arranged from the Nepean water supply, and the reservoir were filled with that water, it would afford a solution of the difficulty; that is, if it were properly cleaned out and cared for.
2132. *Mr. Fegan.*] Would you keep the reservoir filled from that source? Yes.
2133. *Mr. Humphery.*] Do you mean to dispense with the present supply and use the Nepean only? Plus the amount of the water that will flow in from the present source.
2134. *Chairman.*] Would you use it as a storage reservoir? Yes.
2135. What advantage would there be in that, instead of getting the Nepean water direct? You would utilise the existing works. There is a reservoir there that might be put into proper order, and it could be kept as a storage reservoir in case of accident. It might be used as a head of water for industrial purposes. It would be safer to use the Nepean water direct. The small quantity of water which I saw at Parramatta in the reservoir is being subjected to the ordinary process of atmospheric evaporation; consequently the water becomes concentrated, and the analysis would show a more polluted water than if it were diluted—that is to say, the analysis taken at the present stage would be altogether different to what it would be if the reservoir were full. That accounts for the discrepancy between the figures in the analyses I made in 1894, 1895, and 1892, as compared with the one which I have made in 1897. The variations are explained by the difference in the composition of the water owing to concentration.
2136. Have you any information to give the Committee with regard to Parramatta sewage generally? I have carefully read through the minutes of evidence, and on the first page, in the minute by the Public Works Department, I notice the following words: "or any other effective modern process." I have information to-day which shows that changes have gone on so rapidly within the last few years in England

that

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that our ideas as to sewage purification may be entirely changed, nay, revolutionised, and that what we believed to be the proper method of dealing with sewage thirty, twenty, or ten years ago, is altogether different at the present day. At one time it was considered the proper thing to treat sewage by means of chemicals, in order to effect the necessary change; at another time it was considered that only oxygen could do that; at the present day it is found that certain microbes will, by their action, bring about the necessary change quicker than any other known process. A method is at present in use in England whereby the microbes are made use of direct, and so expeditiously, that the work can be done in a place surrounded by habitations, without producing any nuisance. No emanations injurious to health take place, and there is nothing which could be considered objectionable by the most fastidious. What once required large areas of land, in the form of sewage farms and for works, can be entirely dispensed with. I have some figures with regard to the effluent from the sewage farm at Botany, and I have also some figures obtained by Mr. Dibdin, in connection with the London sewage, in connection with the system which he has introduced of making use of microbes. Free ammonia is usually taken as an index of purification in any sewage. Albuminoid ammonia, however, is a dangerous element in sewage, as it indicates incomplete chemical changes. In the Sydney sewage the amount of albuminoid ammonia is reported as 4·00 parts per 1,000,000. In a specimen of raw sewage, in Glasgow, there were 7·00 parts per 1,000,000 of albuminoid ammonia. After the sewage has passed through the filter-beds on the Botany sewage farm the albuminoid ammonia is reduced to something like 1·75 parts per 1,000,000. The Glasgow sewage, after being treated by the process of precipitation, was improved to such an extent that it only contained 2·81 parts per 1,000,000 of albuminoid ammonia. So that we have rather scored at our Sydney sewage farm, as it is slightly under that figure.

2137. *Mr. Black.*] Was the proportion of albuminoid ammonia equal in both cases before the sewage was treated? No; the quantity in the Glasgow sewage was 7, while in the Sydney sewage it was 4.

2138. Then the result, in their case, was proportionately better than in ours? I cannot tell whether their sewage always contains 7 parts per 1,000,000. For our sewage, I take the average to be 4 parts per 1,000,000. In Mr. Dibdin's experiment with London sewage, derived from 1,000,000 people, he reduced the quantity to 1·4 parts per 1,000,000. By the new process, which has been tried at Exeter, the quantity has been reduced to ·50 parts per 1,000,000. Such a figure as that brings the effluent into the category of ordinary water.

2139. *Chairman.*] Would the quantity of 1·75 in the Sydney sewage be regarded as innocuous? I would regard it as being fit to go into rivers.

2140. Would ·50 render the water innocuous in a fresh-water river? That brings it into the category of ordinary drinking-water. I have had specimens of water from a dairy which contained that quantity, and people were drinking it.

2141. *Mr. Fegan.*] What is the new process called? I can only describe it in general terms, namely, that the sewage is collected in a reservoir, and passed through a filter-press, or not, as circumstances demand. I would suggest that it should be passed through the filter-press, and the sludge removed. It is then passed into vessels which are kept excluded from the light. It remains there for about six hours, when fermentation is set up. The microbes do their work and the liquid is then allowed to pass into a tank which is exposed to the full blaze of daylight and sunlight, and open to the air. The purification of the water goes on and is completed, so that the liquid flowing away from the tank exposed to the light is fit to go into a fresh-water river or a tidal river.

2142. *Mr. Black.*] How do you account for the large proportion of albuminoid ammonia in the Glasgow sewage;—is it because they do not dilute their storm-water? I do not know whether they have a separate system at Glasgow. I may mention that there is another method of precipitation, which is superior and cheaper—that is, by means of basic perchloride of iron. It is simply passed into the sewage, the sludge is precipitated, and the liquid is permanently cleared and improved. That is being tried at Bridgeton sewage works, in the neighbourhood of Glasgow.

2143. *Chairman.*] Then there are two processes in existence which, in your opinion, are cheaper and more likely to be effective than the old process of filtration or any sewage farm? Yes.

2144. Have these processes got beyond the experimental stage? We are entirely in the dark in Sydney with regard to these processes. I do not think there is anyone in Sydney who knows anything about them. They so change our views with regard to dealing with sewage that I would suggest that it would be worth the while of the Committee to make full inquiries in England.

2145. What is the source of your information? Paragraphs from the *British Medical Journal*, the *Lancet*, and the *Chemical News*.

2146. What authority is behind them? Only the good name of the papers I have mentioned. In the proceedings of the Society of Chemical Industry, November, 1895, Mr. Dibdin's experiments are given, but they preceded the Exeter experiment. Mr. Dibdin's experiments were to simply put the sewage into a tank filled with coke, with a mass of gravel on top to keep the coke from floating up, and to keep it in the dark, so as to allow the micro-organisms to act. My own inference is that the later experiments at Exeter are based upon that experiment, which was the germ of the idea, and they have used it to fuller advantage more recently.

2147. Where did you get your first information with regard to this new process? My first hint of it was obtained from Dr. Thompson. He told me he knew nothing about it beyond the fact that it was in operation. I have read one or two paragraphs since which enable me to grasp the outlines of the process. I cannot give every detail, but I understand the rationale of the process.

2148. If your impression be correct, the sewage could be treated at Parramatta without any objectionable smell, and much cheaper than by any known process? Yes.

2149. *Mr. Humphery.*] Would a perfectly clear effluent be left to pass into the river? Yes.

2150. *Chairman.*] Is it your opinion that the days of sewage farms are numbered? Yes; that is my definite opinion. They are merely nominal farms now. They are not worked economically for the sake of the produce, but simply as filter-beds. I would hesitate to recommend any process at present without further investigation.

2151. Do you think that if one of these processes which you have briefly outlined were adopted it would be possible for a town of 8,000 inhabitants to have a sewage system? Certainly.

2152. Would the expense of sewage farms and precipitation and filtration be unnecessary, and would only a limited area be required? Yes; just like ordinary chemical works.

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2153. Can you give us an idea as to what saving per head could be effected by the new process? I cannot justifiably do so, because I have no figures as to cost. It would obviously be very much cheaper, because the perchloride of iron might be made at Sydney from scrap-iron.
2154. Have you any other evidence to give with regard to the Parramatta sewerage scheme? I saw the site of the proposed farm. At present it is little better than a water-logged swamp, and it will obviously cost a lot of money to make it suitable for a sewage farm.
2155. Did you see the outlets of the sewers on the river? Yes. I regard the present state of things as disgraceful.
2156. In what quantity of water will that sewage require to be diluted so as to make it unobjectionable? One gallon of it ought to be diluted in 100,000 gallons of water. Salt water has the advantage that the salt is a natural antiseptic and tends to cause less nuisance than fresh water.
2157. Does your estimate of 100,000 gallons of water refer to fresh water? No; to tidal waters.
2158. If it were possible to discharge the sewage which now runs into the Parramatta River above the flood-gates into a body of water 100,000 times greater than the sewage itself, would it then be innocuous? I should not recommend that to be continued, because the continual discharge of the sewage would tend to deposit it and precipitate it on all surrounding bodies, and it would thus become a great nuisance.
2159. That would be a gradual process? Yes; but a sure one. There is the Walker Convalescent Hospital on the banks of the river, and it would be extremely undesirable to pollute the shores there or anywhere else with the sewage of Parramatta, because it would be an accumulating grievance.
2160. *Mr. Hoskins.*] Is it your opinion that the land on the proposed sewage farm is unsuitable for such a purpose? Yes; it would have to be made up artificially. You would have to deposit soil on it, and bring about an efficient system of drainage.
2161. Would there have to be subsoil drainage in a great portion of it? Yes. I gathered from Mr. Darley's evidence that it would be made up of sand, or that something would be deposited on it. I do not desire to express any opinion from an engineering point of view.
2162. *Chairman.*] Supposing it were possible to shut the flood-gates on the Parramatta River so as to impound a body of water 3 or 4 feet deep at the lower end, and 1½ foot deep at the upper end, and then to wait until almost low water—the gates to be opened suddenly, and let all the water flow out;—do you think that that would leave the foreshores of the Parramatta River adjacent to the town tolerably clean? Yes.
2163. Do you think that that should be given a trial? Certainly; it would form a good scour.
2164. *Mr. Wright.*] I gather from your remarks that the soil itself deodorises sewage matter? Yes.
2165. Have you any experience as to the effect of cesspits on the surrounding soil? If the contents of the cesspits were removed, and were ploughed into the soil, it would fertilise the land and deodorise the matter.
2166. You are not in favour of a water carriage system of sewerage for Parramatta? I cannot see how it could be applied very well, unless in the future. The schemes which I have already mentioned can be adapted to water carriage. Simply putting the sewage into the river is a crime; it is a mistake for ourselves and for posterity. The sewage should never pass into the river unless it is purified so as to be harmless.
2167. Do you think that the discharge into the Parramatta River of a large quantity of what is called soup from the meat digestors is injurious to health? Yes; it is on all-fours with the discharge of sewage into the river.
2168. *Mr. Humphery.*] In the process which you have described for disposing of sewage, how would the noxious gases be consumed? They would be consumed in the tanks. I presume there would be a suitable condensing tower above the tank with a water-spray trickling through, and all the offensive gases could be passed through a furnace, so that they would not escape outside the building, and there would be no offensive odour.
2169. Is the process sufficiently rapid to dispose of the sewage of a town containing 10,000 people? I cannot speak with authority, but it is stated that six hours in the dark tank is sufficient; but I hardly think that would be the case.
2170. What quantity of sewage would be treated in that time? Perhaps one-fourth of one day's sewage.
2171. Can you speak as to the cost of that system in comparison with other systems? I should say it would be one-fourth the cost of present systems. I refer to annual cost and initial cost also.
2172. Is that the opinion you have formed from reading? Yes.
2173. Are you speaking of the treatment of sewage (say) at the pumping station at Clay Cliff Creek, assuming the sewage to be brought there? Yes.
2174. Are you of opinion that the cost of machinery, &c., in connection with the treatment, would be one-fourth less than the cost of the scheme now before us, and that the annual cost would be in the same proportion? Yes.
2175. You are speaking approximately only, and that is your opinion? Yes.

Joseph Davis, Engineer for Sewerage Construction, Department of Public Works, sworn, and further examined:—

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2176. *Chairman.*] Have you prepared a statement with regard to the proposal to establish a sewage farm at Homebush Bay? Yes. The statement is as follows:—

PROPOSED SEWAGE FARM AT HOMEBUSH BAY.

THE area that it would be practicable to drain to a sewage farm at Homebush Bay would embrace the municipalities of Parramatta, Granville, Auburn, Rookwood, Ermington, and Rydalmere, and portions of Concord, Strathfield, Dundas, Prospect, and Sherwood.

With the exception of Parramatta, Auburn, and Granville, this area is exceedingly sparsely populated.

The total area, exclusive of Parramatta, is 48,880 acres, and the present population on this area does not exceed 20,868 or ·43 per acre.

The Western Suburbs Sewerage system covers an area of 14,000 acres, and a population of 170,000 in 1888, or about 12 people per acre.

The population of Parramatta is about 10,000, and the area served slightly over 683 acres, or about 14 people per acre.

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Until the population reached (say) 14 to the acre, or thereabouts, sufficient rates could not be collected to warrant a sewerage scheme. This being the case, the population required on the 48,880 acres (nearly four times the area of the western suburbs) would be 684,320 before this area could support a sewerage scheme, which is not likely to take place under seventy years.

Before that time arrives some method of treating the sewage locally may be discovered, which will obviate it being carried long distances, as it would have to be in the case of Homebush Bay. I therefore think, considering the remote date, that it would be possible, under any circumstances, to take the matter into serious account, that the idea should be dismissed.

Granville, Auburn, and a portion of Rookwood could be conveniently drained to the Parramatta farm, and I am still of opinion that the sewage from these places should be treated there.

The plan shows approximately the lines that the main trunk sewers would take, and the tinted areas the districts that would be served thereby.

The probable cost of extending the rising main to Homebush Bay would be £7,800.

2177. What portion of the area shown on the map before us could be best drained to the Parramatta sewage farm? The Parramatta sewage farm is more centrally situated for Rookwood, Auburn, and Granville than Homebush Bay.

2178. Is there any reclamation done at Homebush? No.

2179. Would it cost as much to make up the Homebush Bay farm as the Parramatta farm? I think it would cost the same in proportion to area.

2180. How far is it from the Parramatta farm to the Homebush Bay farm? It is about a mile from centre to centre.

2181. What would be the fall? It would be level. They would be both reclaimed about 5 feet above high-water-mark.

2182. Would not Homebush, if anything, be a little lower? It would be just what it was made.

2183. Where does the contour of the country cease to lend itself to a gravitation scheme towards the Parramatta sewage farm? The eastern limit would be the Western Suburbs Sewerage scheme. Then the water-shed would run along the Main Southern Road from above Strathfield and across above Sherwood and Prospect.

2184. Would all that area go to the Homebush Bay farm? Yes.

2185. If sewage farms continue for some time to be the method by which sewage is to be disposed of, why should we have two sewage farms instead of one to deal with the municipalities in the neighbourhood of Parramatta? The Parramatta sewage farm could be added to. You will economise by treating the sewage of a number of municipalities at one place. As far as Homebush Bay is concerned, the sewage of the district which would be served by it is scarcely worth while taking into consideration at the present time, and the method of treating sewage will probably change in less than twenty years.

2186. The country between the proposed Parramatta sewage farm and the Homebush Bay farm is level, and the distance is not great? It will involve an additional cost of £7,800 to take the Parramatta sewage down to Homebush Bay.

2187. Are no portions of the other municipalities which have been mentioned ready for sewerage treatment at present? I should scarcely say that Rookwood is, but a portion of Granville might be.

2188. *Mr. Hoskins.*] If you took the Parramatta sewage to Homebush would it not have to pass through private lands? It would go through the Newington Estate, and I do not think it will be necessary to go through private land. It would go down the street, or something of that sort.

2189. *Chairman.*] For Rookwood, would not Homebush be most convenient? From the populated part of Rookwood it is just about the same distance to the Parramatta farm as it would be to Homebush Bay. For present purposes, the farm at the junction of Duck River would be more central.

2190. The objection to a small sewage farm is that it will eventually involve another sewage farm;—would it not be better to have only one pumping-station, and to concentrate all the sewage at Homebush Bay? If a sewage farm is to be adopted, I think that the junction of the Parramatta and Duck Rivers is the proper place for it.

2191. What are your reasons? It will be more central for the municipalities which will, in the immediate future, be likely to require a sewerage scheme.

2192. Taking a north and south line, passing midway between the two sites, would all east of that be better suited by the Homebush Bay site, while all west of the line will be better suited by the Parramatta site? Yes.

2193. Have you any other information to give the Committee? Yes. I was asked to prepare a history of the flood-gates and training-walls on the Parramatta River. It is as follows:—

FLOOD-GATES AND TRAINING-WALLS, PARRAMATTA RIVER.

OWING to the difficulty in securing the original papers on some of the matters connected with this report, dating back twenty-five years, and the impossibility of obtaining from the records the cost of many of the works, except in the aggregate, I have had interviewed many of the officers who are still in the Department who were engaged upon the works in question, and am enabled to report thus:—

About the year 1871 Mr. Rossbach surveyed a line in the bed of the Parramatta River for retaining-walls and drain. About 1874, at the request of the Parramatta Council, the walls were erected and drain cut, length about half-mile, starting about 50 yards below Lennox Bridge to within 100 yards of the gasworks. The cost was greater than was expected, owing to the character of the rock upon which the retaining-walls were built being flaky.

About 1882, at the request of the Parramatta council, about 100 yards of the top of retaining-walls were taken down near Brickfield Creek, to allow of a greater flow of water in the channel.

Owing to complaints constantly being made that the sewage was carried down the channel, and that the incoming tide brought it back and deposited it upon the banks of the river on each side of the retaining-wall, Mr. Williams reported that this could be effectually stopped by placing two small self-acting gates in the lower end of the central channel; estimated cost, £500.

The flood-gates were erected and finished in 1889. About 100 feet of the retaining-walls were removed at Charles-street, a dam was erected each side of the flood-gates, the material in the old walls used for concrete, and stone from river-bed used for backing for the dam—cost, £1,222. Owing to the flood-gates not being properly attended to, and allowed to remain shut, causing a bank of filth to accumulate on the Parramatta side, the gates would not work. About a year after they were completed two small sluice-gates were placed in the flood-gates to prevent the accumulation of filth. This was not effective.

In order to prevent the sewage from the Government buildings flowing down the channel, in March, 1892, a line of 12-inch pipes was laid outside the retaining wall from Lennox Bridge to the flood-gates.

On the 28th March, 1894, Mr. H. Taylor, M.P., waited upon the Minister asking a contribution of £500 towards the removal of stone by the Parramatta council from the river between Lennox Bridge and the flood-gates. The Minister promised to grant the sum of £250 for this work on condition that the council waived all further claims in respect to the drainage of the Government buildings at Parramatta, whether in connection with the river or the corporation drains which connect with the river or elsewhere.

Parramatta

J. Davis.
23 Mar., 1897.

Parramatta council declined to accept the offer of £250 on the conditions stated, but I am informed that £300 was afterwards paid to their credit in connection with the approaches to the O'Connell-street Bridge, which was expended in the removal of the training-walls and stone from the bed of the river.

On January 17th, 1895, I reported on the flood-gates and recommended that new sluice-gates be put in the walls each side training-wall and also large sluice-doors in present dam. These alterations were carried out at a cost of about £60, and another £40 was spent in removing loose rock below dam which caused filth to accumulate.

30th March, 1896: Telegram from Parramatta council *re* stench from river. Mr. Burrowes reported that the sluice had not been used for some time. The council was then informed that they had been advised of the completion of the sluice-gates and they should be opened, under their direction, at certain periods.

18th June, 1896: From Parramatta council, informing the Under Secretary for Public Works that the council has agreed on behalf of the Government to accept the control of the said gates and see that the necessary sluicing is carried out, and that council will accept no responsibility for any damage that may arise at any time to private or public property through flood-water or other causes.

2194. Then the flood-gates practically have never been tried? Yes.

2195. Is there any other information which you wish to give the Committee? I was asked by the Committee what it would cost to connect the Government institutions direct with the Prospect water supply. I have an estimate that it will take £4,800 to do the work; and if the town of Parramatta, as well as the Government institutions, is permanently connected with the Prospect supply, it would cost £7,639. I have also made inquiry as to the means by which the present supply is obtained from Prospect for Parramatta. It is obtained from the 15-inch pipe which connects Granville with the Prospect supply; so that the supply is obtained really through the Granville municipality. I may be allowed to supplement what Mr. Hamlet said about the septic tank. He spoke vaguely on the subject, but I do not know that there is any reason to be vague. We have pretty definite information on the subject as far as it has gone. I referred to it in my evidence on two or three occasions.

2196. Do you think that that process is likely to be successful? I think that is highly probable. It has had twelve months trial at Exeter, and they think that they have got beyond the experimental stage, and they are going to treat the whole of their sewage with it.

2197. Do you think that it will be cheaper than any other system? It will be cheaper in this way: The septic tank will consume the whole of the sludge. The only difference between the system of precipitation and filtration proposed in the scheme before the Committee and treating it by means of the septic tank is simply this, that in the case of precipitation the sludge, after it was precipitated, either by lime, or a compound of iron, or one hundred other things which may be used, the sludge must be treated. But in the septic tank the microbes, when the light and air are absolutely excluded, do the work. They consume not only the sewage in solution, but in suspension as well. When the effluent leaves the tank it has a brownish colour; but it must be then treated either in a tank such as Mr. Hamlet described, which enables the microbes which require oxygen to do their work, or it must be passed through land.

2198. Would it be absolutely odourless before it got to the land? It might be odourless, but it would not be in such a state that it could be turned into a river. If the Committee desire the information on the subject, I can get it together. The inventor of the tank has written a very long and exhaustive paper on the subject.

2199. Are the people of Exeter going to use it for the treatment of their sewage? Yes.

2200. Have you no doubt that it would be a cheaper way than any other process? I think it will be cheaper than precipitation, in the ordinary acceptation of the term. There is no doubt that it is a step in the right direction, because it is making use of the forces of nature.

2201. *Mr. Roberts.*] What is the distance from Homebush Bay to where the metropolitan sewerage system terminates in the west? About 3½ to 4 miles.

2202. Is it contemplated at present to carry the sewerage system any further in a westerly direction? No. We shall carry out the original idea of taking in the whole of Strathfield, and part of Concord, but it is not contemplated to carry it beyond that. It is questionable whether the sewers will be large enough.

2203. What would be the cost of taking it another 3 or 4 miles, to give Parramatta, Granville, and a portion of Rookwood an opportunity of connecting? It would be costly, and the principal expense would be involved in lifting the sewage from most of those districts by some mechanical appliance from the low-level to the high-level sewer. It would be so costly as to put it out of consideration.

2204. *Mr. Wright.*] Notwithstanding Mr. Hamlet's evidence, do you still believe in having a sewage farm? I believe in broad irrigation, certainly. In all cases where broad irrigation is used, sewage is a secondary thing, and agriculture is the primary thing. We should make use of the sewage if we can for cultivation. Sewage must of necessity be of considerable value as a fertiliser.

2205. You think that broad irrigation, with proper supervision, is a satisfactory way of disposing of sewage without being a nuisance to anybody? Yes.

2206. At the Botany sewage farm is there any attempt to disturb the soil? I do not think so.

2207. Would it not be better if the soil were disturbed—say by horse-raking? That would assist the absorption of the sewage.

2208. Would it not also assist rapid deodorisation? Very likely.

2209. Would it be expensive to pass a horse-rake daily over the surface of the farm? No; but where there is plenty of land that is unnecessary.

2210. Would it not have the effect of making it less offensive? Possibly. Certainly it would have the effect of making the land absorb more sewage, but I question whether it would purify it to the same extent.

WEDNESDAY

WEDNESDAY, 24 *MARCH*, 1897.

Present:—

THOMAS THOMSON EWING, Esq. (Chairman).

The Hon. Frederick Thomas Humphery.	Charles Alfred Lee, Esq.
The Hon. James Hoskins.	John Lionel Fegan, Esq.
The Hon. Charles James Roberts, C.M.G.	Thomas Henry Hassall, Esq.
The Hon. William Joseph Trickett.	George Black, Esq.
The Hon. Daniel O'Connor.	Francis Augustus Wright, Esq.
Henry Clarke, Esq.	Frank Farnell, Esq.

The Committee further considered the proposed Sewerage Works for Parramatta.

Joseph Davis, Engineer for Sewerage Construction, Department of Public Works, sworn, and further examined:—

J. Davis. 24 Mar., 1897.

2211. *Chairman.*] Can you state definitely what it would cost to treat separately the sewerage of the Government institutions at Parramatta? Yes; but the information I now submit is necessarily only an approximation, owing to the shortness of the time at my disposal. In order to put it concisely, I have written the following minute upon the subject:—

Parramatta Sewerage, Government Institutions.

There is no doubt that it would be quite possible to treat the whole of the sewage matter from the Government institutions locally without in any way creating a nuisance; but it must be borne in mind that for the successful operation of sewage-disposal works, be they large or small, one of the most important factors is the management. With faulty management the most perfect works would prove a nuisance; but if it is conceded, and I see no reason why it should not be, that these small works can be properly managed, there is no reason to doubt of them being successful. One of the principal items of expenditure, that of labour, need not be considered, as such labour could be provided by the institutions concerned.

I propose to establish in miniature the same class of works as those suggested under Scheme No. 1 for Clay Cliff Creek, but with certain alterations and modifications.

Taking the hospital for insane, the gaol, and the industrial school, these could be treated at one point.

The sewage would be collected through a system of drains (probably the existing drains with minor alterations would suffice) to a central well, from which it would be pumped or lifted into the settling-tanks, of which there would be two, each 12 feet by 32 feet, by an average depth of 5 feet. From these the effluent would flow into a roughing filter, which is a very simple mechanical sand-filter, easily cleaned, and materially assists the filters proper in their work. The filters would also be two in number, each 12 feet by 32 feet, composed of breeze coke 3 feet deep, after which the effluent can be discharged on to the gardens, or back into the existing drains leading to the river.

The sludge from the settling-tanks would be run into a sludge-well, and after being again allowed to settle the water would be drawn off and lifted into the settling-tanks; the remaining sludge would be lifted by means of a bucket elevator and deposited in the garden, where it could be dug in.

These works would be capable of dealing with the sewage from 1,600 people, and the probable cost would be £3,600.

For the Rydalmere asylum the works would be similar, but smaller, and no pumping would be required.

It is estimated that the cost of these works would be £2,000.

I have not considered the item of wages, as probably no extra labour would be required. The cost for precipitants would be about £75 and £30 for the two places respectively; therefore the yearly expenses would be as follows:—

Sewage Works for Hospital for Insane, Gaol, &c.

Precipitants	£75
Repairs and depreciation	108
Repayments and interest at 3½ per cent.	130
Oil, &c.	20
Power for lifting sewage	150
or, about 6/- per head per annum.	£483

Sewage Works at Rydalmere.

Precipitants	£25
Repairs and depreciation	90
Interest and repayments	72
Oil, &c.	10
Total	£197
or, an annual cost of 7/6 per head.	

That deals with Rydalmere, the gaol, the lunatic asylum, and the girls' industrial school, leaving out George-street and Macquarie-street asylums, and the public schools.

2212. What would be the total annual expenditure? £680. There is no charge allowed for labour in my estimate.

2213. What is the total amount which you propose to pay to the municipal council under the proposed scheme? £1,062.

2214. *Mr. Hoskins.*] If the sewage from the Government institutions were treated separately, would you not still have to obtain water from the Parramatta water supply? Yes; but the institutions get enough water now to do all that will be required. There would be no difficulty in placing the precipitation and filtration works close to the gardens of the institutions, which would be the proper thing to do. The effluent could be turned on to the gardens, and the sludge could be dug into the soil. At present the Government pay 10s. per head for the water supply.

2215.

J. Davis. 24 Mar., 1897.

2215. With separate sewerage works for the Government institutions the Government would still have to pay for the water supply to those institutions? Yes, unless the water supply was obtained from the Water and Sewerage Board. Even then it would have to be paid for, and probably just as much would have to be paid as is paid at present to the municipal council.
2216. *Mr. Lee.*] The Government pay so much per head at present for the water supply, and that covers everything? Yes.
2217. And the same water supply would be ample for the small sewerage works? Yes.
2218. Do you think that such a system of disposing of the sewage in the vicinity of those institutions would be likely to be deleterious to the health of the inmates? No; the Walker Convalescent Hospital has precisely the same arrangements. About 100 yards from the main portion of the building they have their precipitating plant and filters, and they treat the sewage precisely as I propose to do in connection with the Government institutions. That is working successfully. I believe that when they at first laid them down the filter-beds were not large enough, but they have increased the size of them, and the system is working very successfully. I have seen it.
2219. *Mr. Hoskins.*] What do they do with the sewage there? They dig the sludge into the garden, and the effluent passes into the bay.
2220. How many patients are there at that hospital? There are fully 100 persons, including the nurses.
2221. *Mr. Lee.*] You refer to the management of these sewerage works;—what would be the chief item of expense in connection with that? I think the principal item in the management would be to see that the precipitating tanks and filter-beds were used at regular periods—giving one set a rest while the other set was being used—and to see that when the mud accumulated at the bottom of the precipitating tank it was removed and the tank properly washed out. It would only require a little care and regularity.
2222. Would not that portion of the work necessarily have to be under the supervision of a competent man? If it is decided to do something of this kind, I should say that the work ought to be put in charge of one of the warders, and he should have as much labour at his disposal as he required.
2223. Have you provided for that expense? No; I have presumed that the labour will be provided by the institutions.
2224. Your estimate of an annual charge of £483 is for ordinary cash expenditure, irrespective of labour? Yes.
2225. Do you know whether a convenient site could be obtained in the vicinity of the institutions without resuming land? Yes; I think the precipitating works should be inside the institutions, on some high part of the gardens.
2226. Could the sewage from the King's School be connected with these works? Yes; but I have not provided for that. I have only provided for the interception of the institutions I have named, and that would take place considerably above the King's School, but it could be connected.
2227. Does the King's School contribute much to the existing nuisance? Necessarily so to some extent; but the authorities of the King's School have cried out, perhaps, more than anyone else with regard to the nuisance.
2228. *Chairman.*] If Parramatta eventually has a sewerage scheme carried out, how much of this separate work which you now propose will then become useless? It would then be better to abandon all the work which I have now been referring to, and to bring all the sewage down to the central sewerage works.
2229. How much of the work would you have to abandon in that event? We would have to abandon the whole of it, valued at £3,600, exclusive of Rydalmere; but I think that that should also be included.
2230. But there has never been any serious trouble in connection with Rydalmere, although it does discharge sewage into the river in an objectionable manner? The nuisance has never been attributed to Rydalmere, but that place has contributed to the nuisance as well as the other institutions.
2231. Does it come up with the tide? Yes.
2232. At any rate, you say that there would be a loss of £3,600—and if Rydalmere is included there will be an additional loss of £2,000—if those works have subsequently to be abandoned? Yes.
2233. How many people do you propose to deal with in these institutions? 1,600.
2234. Would you take 150 people as a sufficient estimate for the King's School? Yes.
2235. Would another £1,000 cover the expenditure if the King's School were included? Yes.
2236. If these works were carried out there would still be the sewage that finds its way in from the southern bank of the river? Yes; from both banks of the river.
2237. If the sewage from the Government institutions were intercepted, would there still be enough sewage coming in from the north and south banks of the river above the flood-gates to cause the river to be still polluted? I think so.
2238. It will only remove part of the nuisance? Yes.
2239. *Mr. Humphery.*] If the proposal which you are now giving evidence about is carried out you will really be establishing a precipitation and filtration farm in the centre of Parramatta? Yes.
2240. Have you any idea of the cost of the sewerage works at the Walker Convalescent Hospital? Probably £500 at the outside.
2241. In that case provision is made for only 100 people, as against nearly 2,000 in the scheme you are now discussing? Yes.
2242. Do you propose in connection with the Hospital for the Insane to bury all the sludge in the ground, and to carry out filtration? Yes; the effluent should go either into the river or be used for irrigating the land. It would be all right to allow it to float into the river after it is treated.

James Conley, Assistant Accountant, Department of Public Works, sworn, and examined:—

J. Conley. 24 Mar., 1897.

2243. *Chairman.*] The Committee desire you to give information with regard to the population of the various towns in the Colony, their debts, and the purposes for which those debts have been incurred? I have prepared a statement which shows that Bathurst has a debt of £51,022 8s., which was incurred for water supply works only.

J. Conley. 24 Mar., 1897.

2244. What is the population of Bathurst? 9,200.
2245. Are there any sewerage works there? No.
2246. What is the next town? Goulburn, which has an indebtedness of £51,561 4s. That is for water supply. The population is 10,000. Those are the only two towns in the Colony where there is any indebtedness on account of water supply or drainage. Parramatta comes under the Water and Sewerage Board.
2247. Have you any information with regard to Newcastle? No; the information I was asked for was the indebtedness of any towns whose population exceeded 7,000.
2248. Will you be prepared on a future occasion to give the Committee full information with regard to the financial position of all the municipalities? Yes.

William McIntyre, Chief Electoral Officer, Chief Secretary's Department, sworn, and examined:—

W. McIntyre. 24 Mar., 1897.

2249. *Chairman.*] Have you prepared a statement with regard to the population of the various towns in the Colony? I have prepared a list of towns with a population of over 7,000. They are Bathurst, Broken Hill, Goulburn, Newcastle, West Maitland, Parramatta. The West Maitland municipality extends some distance beyond the town. It takes in a large area, and the population given includes all the municipality. The towns I have given are outside Sydney and its suburbs. Although the population of Newcastle is given here as 14,000, the suburbs of Newcastle would increase that number very much. For instance, Wickham municipality has a population of nearly 7,000.
2250. Will you on a future occasion give a list of all the municipalities of the Colony, showing the population of all exceeding 5,000? Yes.

THURSDAY, 25 *MARCH*, 1897.

Present:—

THOMAS THOMSON EWING, Esq. (Chairman).

The Hon. Frederick Thomas Humphery.	Charles Alfred Lee, Esq.
The Hon. James Hoskins.	John Lionel Fegan, Esq.
The Hon. Charles James Roberts, C.M.G.	Thomas Henry Hassall, Esq.
The Hon. William Joseph Trickett.	George Black, Esq.
The Hon. Daniel O'Connor.	Francis Augustus Wright, Esq.
Henry Clarke, Esq.	Frank Farnell, Esq.

The Committee further considered the proposed Sewerage Works for Parramatta.

Cecil West Darley, Engineer-in-Chief for Public Works, Department of Public Works, sworn, and further examined:—

C. W. Darley. 25 Mar., 1897.

2251. *Chairman.*] The Committee desire to know what expenditure would be necessary to increase materially the quantity of water that could be stored behind the dam that at present impounds the water at Parramatta River? The work was carried out by Mr. Moriarty, when he was an engineer in private practice, and although I have seen the drawings many years ago they cannot now be found in the office, and probably they were removed with Mr. Moriarty's private papers. The dam is sufficiently strong to permit of our raising the water-level 6 feet. The parapet wall, 3 feet 6 inches high, would have to be removed, and that would mean 9 feet 6 inches of new work. It would be an overshot dam, as at present. It is a dam with good rock abutments, with 165 feet radius. I find that it is sufficiently strong to stand the strain which would be placed upon it by that extra height.
2252. What depth of water would the dam hold back at present? 34 feet 6 inches.
2253. Do you say the depth could be increased to 40 feet 6 inches? Yes.
2254. Do you know the shape of the impounding area? No; I have not got a contour survey, so that I cannot say how much water would be impounded.
2255. How much more water would it hold? One-half more, on an average. At present it is nearly empty, and has been so for a long time.
2256. Is it reasonable to suppose that if 25 gallons per head of water are used without a sewerage system 32 gallons per head would be used with a sewerage system? Yes.
2257. Is it reasonable to suppose that the capacity of the dams would be increased, so that it would hold sufficient water to last for the same period with a sewerage system as it would last at present without a sewerage system? Yes.
2258. That is to say, that if a sewerage system were established, and the capacity of the dam were increased as proposed, the Parramatta municipal council would only have to fall back upon the Prospect water supply for about the same period as they do at present? I think that would be the case.
2259. What would it cost to make the dam 6 feet higher? About £1,700. That is £1,200 for raising the dam itself, and the engine-house and pumps would have to be removed at a cost of about £500.
2260. If a water-borne system of sewerage is adopted for Parramatta will it be necessary to use the present water supply? I am inclined to think that the Sydney water must be brought into Parramatta very soon. Under the present system I do not see anything which will enable the water to be protected from serious contamination. There are a number of farms on the watershed, and some years ago several houses were pointed out to me where there was typhoid fever, and they drained into the watershed.
2261. Can you describe roughly the catchment area and the sources of pollution? I have not studied the question sufficiently.

C. W. Darley. 25 Mar., 1897.

2262. You believe the watershed is liable to contamination? That is the impression I have formed, but I have not professionally examined into the question or reported upon it.
2263. What are the probabilities of further settlement on the catchment area? As population increases there is nothing to prevent people settling in the neighbourhood.
2264. *Mr. Wright.*] Do you know the head of the North Rocks Creek? I have not examined it.
2265. Does it take its rise to the north-west of Pennant Hills? Yes.
2266. Does not all the country from Pennant Hills drain to the Parramatta River, while North Rocks Creek is north of Pennant Hills? Yes.
2267. *Chairman.*] Do you know the quantity of water that can be impounded at present by the dam at North Rocks? I do not. An officer I sent up said he heard the dam would hold 190,000,000 gallons, but I rather doubt that.
2268. A report was made by Mr. Hickson and Mr. Vernon, in January, 1895, on the nuisance at Parramatta. There is the following paragraph:—"The second scheme is one which follows on the recommendations laid down in the report of August, 1891, by Mr. Darley and Mr. Vernon, wherein two pipes were recommended to be laid down, at the foot of the right and left banks of the river respectively, the centre pipe being discarded. By this means an easier mode is gained of intercepting all town sewage on both banks of the river, and discharging at the weir, as in the first scheme. The estimated cost, exclusive of connections, &c., as before, is £3,000";—was it your impression at that time that that would do away with a great deal of the nuisance at present existing? At that time the sewage was discharged close to the bridge, and it was fouling the whole bed of the stream. On passing down the town side we found that there were a large number of water-tables discharging equally foul matter into the river. It was a toss-up which side brought down the most offensive matter into the river. The municipal council, of course, wanted to make out that they put no sewage into the river, but we found that a large quantity of very offensive matter came in from the town side. Then we suggested that pipes should be run down the right and left banks of the river, and that the sewage should be discharged below the flood-gates.
2269. It is also recommended to do away with the centre pipe in the river? Since then the sewers have been extended; at that time they stopped at the bridge. The Government have since carried the pipe down their side of the river, but the council have not carried a pipe along their side.
2270. The sewer which you constructed in the bed of the river leaks in a great number of places, and the town sewage still flows into the river? I was not aware of the first fact you mentioned, but I know that nothing was done on the town side of the river.
2271. Following on the lines of the suggestion, which seems to have been supported by you, supposing that the sewage which comes from the northern part of Parramatta, some distance from the flood-gates, were intercepted and the discharge taken below the flood-gates, and if the flood-gates were properly worked, the impounding area above the gates being closed at high tide, and emptied before the return of the tide, would that materially improve the sanitary state of affairs? I am sure it would, if the flood-gates received proper attention. There is no doubt a great deal could be done to improve the river by intercepting the sewage and slop-waters which come from the town side, and carrying it below the flood-gates. Proper attention will have to be paid to the sluice-gates. Proper attention has never been given them hitherto. If proper attention were given to them it would be possible to keep the place comparatively pure and inoffensive.
2272. Would an expenditure of £3,000 bring about a good result? I think it should, if judiciously spent, and if attention were paid to the flood-gates.
2273. Mr. Davis informed the Committee that after passing the flood-gates the current would travel at about 6 miles an hour, and that the effect would be felt 30 chains down the river;—do you agree with that evidence? Yes.
2274. If such an expenditure were made would Parramatta stand in exactly the same position with regard to sewage as any other town of the same number of inhabitants? Yes. They would then only have to attend to the pan system properly.
2275. *Mr. Wright.*] As a matter of fact, will there not always be a nuisance in the Parramatta River so long as the sewage is allowed to flow into the river by any process? If the sewage is intercepted at the town, and passed below, the nuisance will not be felt so much in the town.
2276. If the sewage goes below the town will it not be prejudicial to the residents lower down the river? Necessarily so, but I do not think there would be serious contamination. There is sufficient water lower down to dilute it.
2277. Are you aware that as far down as Ryde the river is very offensive, owing to the discharge of the Parramatta sewage and the meat-works? I am not aware of that.
2278. What would be the effect if the river were dredged down to the old men's asylum? It would have no great effect.
2279. Would it not increase very largely the volume of water? Yes; but there would be no more scour.
2280. Would there not be a greater quantity of water and greater dilution? It does not depend on the depth of water, because much of it would be dead water. The amount of water passing in at every tide would be much the same. There would be no difference unless you actually widened the river.
2281. If you deepened the river would there not be a greater inflow of tide? Yes. If you deepen any part which is now uncovered at low water to that extent you will increase the volume of water.
2282. If the river were deepened in the way I suggest would it not sweeten the water? Yes.
2283. What was the object of making fascine banks in front of the Newington asylum sometime ago? It was intended to reclaim the land there.
2284. Was there any intention then to clear out the river above Newington and reclaim the land there with the silt? Partly that. It was intended to make a place to receive the silt, instead of taking it out to sea. Two or three large reclamation works, however, were then undertaken at Sydney, and the silt was used there. When they are finished we will send the silt to Newington.
2285. What would it cost to deepen the river at a point above Ermington to a point above the old men's asylum? I will make an estimate of the cost. I think it would take two or three years to carry out such a work.
2286. Would such a work have a beneficial effect upon the condition of Parramatta? It would help to clean the banks of the river, but any sewage coming down would still be discharged into the water.

C. W. Darley. 23 Mar., 1897.

2287. Is it not a fact that the large accumulation of debris in the upper portions of the river comes down in the course of time into the harbour? I do not think so. There is not sufficient current to bring it down.

2288. *Mr. Clarke.*] Is it not admitted that a great deal of the nuisance in connection with Parramatta River proceeds from the drainage of the Government institutions there? Yes, on one side of the river.

2289. If the Government were made responsible for the drainage of their institutions would it be possible to effectively carry out the plan contained in your report which has been referred to? The drainage from the Government asylums is now delivered below the flood-gates.

2290. If the Government were compelled to get rid of the offensive matter from their institutions at their own expense would the remaining nuisance be remedied by the plan of sluicing the river from the dam? No, I think the sewage ought to be kept out of the river altogether, by intercepting it and delivering it below the flood-gates.

2291. Would the ratepayers of Parramatta be able to bear the expense of carrying out such work? Every street in the town is discharging foul matter into the river, and that should be intercepted and carried down below the flood-gates. That would only cost £2,000 or £3,000.

2292. Do you think that that plan could be tried with the present flood-gates? Yes.

2293. Can you give any reason why these flood-gates have never been used? No. They were handed over to the corporation, but they neglected to do anything.

2294. What would be the probable cost of attending to the flood-gates? It would only be necessary for a man to go there two or three times a week to attend to them. They work automatically when the tide comes in, and impound the water. It is only necessary to let the water out occasionally.

2295. *Chairman.*] The report which has been referred to contemplated the erection of another weir lower down;—might not the experiment be tried with the present weir without spending £1,000 on another weir? That suggestion was made by Messrs. Vernon and Hickson. I never made a proposal to put in a new weir.

2296. Would it not be a better way of dealing with this question to have a sewage farm at Homebush Bay, which would deal with the sewage not only of Parramatta but of several municipalities in that neighbourhood, such as Rookwood, Granville, and others? I think the population is rather too scattered in that neighbourhood to carry out such a large scheme. It would certainly require close investigation.

2297. Do you not think that is worthy of consideration? It would be a very large scheme, and I think the population is too scattered.

2298. Do you not think it is unwise to have several small sewage farms when a large area could be treated at one place? It would not be wise to have a number of small sewage farms; but a great deal of the Homebush district and Strathfield will be drained under the Western Suburbs scheme.

2299. Do you not think it would be worth considering that there should be one sewage farm for the whole of the municipal areas close to Parramatta? That would be the case if the population were sufficiently large to warrant the carrying out of a large central scheme, but I do not see any prospect of there being sufficient population there.

2300. If such a scheme were carried out, would it not be possible to deal with the sewage for the large number of people who will be located at the Rookwood asylum, also Newington, and a portion of Granville, and the whole cost of the sewage farm would not then be thrown on Parramatta? It is a matter which I have not gone into, and it would require to be thoroughly investigated. No doubt the whole question should receive consideration.

2301. *Mr. Lee.*] What is the depth of water at low tide at Queen's Wharf, Parramatta? I do not know, but I believe it is very shallow.

2302. Is it deeper there than at the mouth of the discharging drain in the river? I do not know. I have not been there for some time.

2303. Would the fact of conveying the sewage into water 2 feet deeper get rid of the trouble in connection with the Parramatta sewage? What I recommended was that the sewage from the town, which now runs out into the river, and which lies festering on the rocks at low water, should be intercepted and carried down to the water below the town, which would make the area above the flood-gates comparatively clean; that is, by sluicing it out at half-tide, or nearly low tide. That would pass all the sewage down the river, where it would be diluted.

2304. Supposing that had the effect of removing the whole of the offensive matter further down to deeper water, would not the trouble start there? No; it is the sewage lying on the rocks at low water which causes the trouble.

2305. Would not that be simply removing the evil lower down, where there would be precisely the same nuisance at low tide? No; because it would not be dry at low water.

2306. Is there not a fall of 4 feet at Queen's Wharf between high and low water, and would there not be a large area of dry bank? The nuisance would be away from the town. There is no doubt that if the sewage could be kept out of the river altogether it would be much better.

2307. Personally, do you favour the scheme which has been referred to? No. I think the sewage ought to be kept out of the river altogether. If, however, it has to go into the river it should be removed further down.

2308. Is it not a fact that the river as far down as Duck Creek is very badly polluted, almost as much as at the flood-gates? No doubt it is polluted to a great extent.

2309. So long as sewage is poured into the open stream will not the difficulty always remain? Yes.

2310. Do you hold that the only perfect way of dealing with sewage is to take it up and dispose of it on a sewage farm, or to destroy it? Yes.

2311. *Chairman.*] Do you regard the proposal to take all the sewage below the flood-gates as purely a temporary expedient? Yes, that is all. It would give relief from the bad smell in the town.

James Conley, Assistant Accountant, Department of Public Works, sworn, and further examined:—

J. Conley. 25 Mar., 1897.

2312. *Chairman.*] Have you prepared a return of the indebtedness of country towns in connection with water supply and sewerage? Yes; it is as follows:—

RETURN showing the indebtedness of Country Towns, where the population exceeds 5,000, in connection with Water Supply and Sewerage Works, including also loans from private sources.

Towns.	Nature of obligation.	Amount.	Total indebtedness.	Population.
		£ s. d.	£ s. d.	
Bathurst	Account of Water Supply Works	51,022 8 0		
	Loans from other sources, including overdraft	23,076 0 0		
			74,098 8 0	9,200
Broken Hill	Loans from other sources	5,000 0 0	5,000 0 0	18,580
Goulburn	Account of Water Supply Works	51,561 4 0		
	Loans from other sources, including overdraft	12,741 0 0		
			64,302 0 0	12,300
Grafton	Loans from other sources, including overdraft	3,467 0 0	3,467 0 0	6,000
Hamilton	,, ,,	8,300 0 0	8,300 0 0	5,200
West Maitland	,, ,,	23,231 0 0	23,231 0 0	7,600
Newcastle*	Sewerage Works	32,665 18 9		
	Loans from other sources, including overdraft	58,888 0 0		
			91,553 18 9	14,800
Parramatta†	Sewerage Works	23,903 7 4		
	Loans from other sources, including overdraft	59,656 0 0		
			83,559 7 4	12,500
Tamworth	Water Supply Works	14,289 6 11		
	Loans from other sources	5,000 0 0		
			19,289 6 11	5,400
Wickham	Loans from other sources	17,100 0 0	17,100 0 0	5,650

*Cottage Creek, Newcastle, £1,941 14s. 5d.; Newcastle Pasturage Reserve, and drainage Styx and Throsby's Creeks, £20,461 13s. 7d.; Ironbark Creek and Wallsend Creek, £10,262 10s. 7d.

† Clay Creek storm-water sewer; Brickfield Creek storm-water sewer; resumption of sewage farm and drainage.

FRIDAY, 26 *MARCH*, 1897.

Present:—

THOMAS THOMSON EWING, ESQ. (CHAIRMAN).

THE HON. FREDERICK THOMAS HUMPHERY.
THE HON. JAMES HOSKINS.
THE HON. CHARLES JAMES ROBERTS, C.M.G.
THE HON. DANIEL O'CONNOR.
HENRY CLARKE, ESQ.
CHARLES ALFRED LEE, ESQ.
JOHN LIONEL FEGAN, ESQ.
THOMAS HENRY HASSALL, ESQ.
GEORGE BLACK, ESQ.
FRANCIS AUGUSTUS WRIGHT, ESQ.
FRANK FARNELL, ESQ.

The Committee further considered the proposed Sewerage Works for Parramatta.

John Musson, Civil Engineer, sworn, and examined:—

J. Musson. 26 Mar., 1897.

2313. *Mr. Wright.*] What is your occupation? A civil engineer. You wish to submit a scheme of your own with regard to the Parramatta sewerage question? Yes. The scheme which I wish to submit is as follows:—

THE following is a description of my scheme, with estimate of cost and abstracts, from paper read by Mr. Benzenberg (M. Amer. Soc. C.E.) before the Engineering Congress at the Columbian Exposition, to which I would beg to draw the special attention of the Committee, as being the outcome of actual results and experience.

As to the cause of the nuisance now existing, I would beg to refer to my letter of the 23rd instant.

The method that I propose for the removal of the sewage nuisance and the purification of the river is the application of Nature's own law—dilution by water, which, in this case, can be accomplished at a low cost. The interest on cost and working expenses would not exceed (say) £350 a year, and, I think, result would be effectual.

I propose to utilize the flood-gates dam to impound about 7,500,000 gallons of clean water.

Water for this purpose I propose to take some distance below the flood-gates, by means of centrifugal pump, steam motive power, and a conduit of wooden pipe.

The pump site will have to be determined at a point clear of the town sewage in the river; the present state of the river should not, I think, influence the fixing of the locality. The long period of dry weather has made the river worse than usual, but should my scheme be adopted I have no doubt that the purification of the river would soon follow. However, my estimate is for 60 chains of wooden pipe, any additional length to be estimated at 3s. 6d. per foot run.

I lay the pipe through the public streets with provision for flushing any existing sewer that the wooden pipe would pass.

Though the level at the inlet or pump end at the natural state of the water in the river would vary little with the outlet end, the level of the water within the flood-gates dam when full would be (say) 5 feet higher than at the inlet or pump end at low tide, and at times when it is desirable to shut out the tidal water from the dam, the level would be reversed and some water would pass through on the syphon principle and would require little power to pump. The level of the pipe for a considerable distance will be some 20 feet above the river, but as the pipe will be on the syphon principle, the duty of the engine will not be increased. The pumped water from the time it enters the suction-pipe will be in the water-tight pipe.

The conduit-pipe I propose to be made of wood-staves, cut to proper bevel, about 4 inches wide; the pipe would be continuous, the staves breaking joint at irregular intervals. At sharp bends, at corners of streets, cast-iron bends, with socket ends, would be provided. In the socket the wooden pipe would be secured. To add strength to the socket a band of wrought-iron would bind it.

The hoops or bands around the wooden portion are fastened or jointed by an ingenious contrivance, not too tight, as the swelling of the wood might burst them.

The wood to be of pine. I should have preferred New Zealand kauri but for its fatal fault of shrinking endways.

Wood pipes are much used in America, made, as I have described, up to 4 feet diameter, and withstand a pressure-head of 100 lb. to the inch. In this case, where salt-water is used, I think they will outlast cast-iron; the cost per foot would be about a third that of cast-iron.

Should,

J. Musson. 26 Mar., 1897.

Should, in the future, a change be made in the disposal of sewage, this pipe could be utilised for its conveyance. The Centrifugal Cataract Pump could at once be used for sand dredging, water, or drainage.

A good steam-engine might be purchased second-hand that would answer all purposes. Distance from old dam above Lennox Bridge to the flood-gates, 38 chains, (say) 2,500 lineal feet. Height of flood-gate dam above low-water (say) 5 feet.

I estimate the depth of water at the old dam at high-water at 1 foot, this would indicate a fall of 4 feet between those two points, and the average width at high-water (say) 150 feet; the depth, of course, varies at every few feet. Approximately, from data carefully gone into, I estimate that the water that could be impounded within the above points at 5,273,437 gallons, for the purpose of this inquiry (say) 5,000,000 imperial gallons = to 800,000 cubic feet.

The dam or flood-gates could safely be raised a foot or more, but taking it at a foot the quantity so impounded would be (say) 7,500,000 gallons, or 1,200,000 cubic feet.

This quantity I propose, if necessary, to pump into the above area every (say) eight or ten hours. Should it be deemed necessary to increase to twice that quantity it may be done by working two shifts, or (say) sixteen or twenty hours, the increased cost would be for fuel and labour only, as all other appliances would be equal to it.

I estimate the cost of fuel, oil, &c., and labour at 15s. per shift, for pumping the above quantity of water. In the event of considerable water flowing over upper dam, pumping would not be necessary (say) £225 a year.

The five or seven and a half million gallons thus impounded would have a head above low tide of 4 to 5 feet at the flood-gates. This water would be discharged into the outflowing tide when it is about 3 feet lower than the impounded water, and would have the effect of forcing into deep water the impure and stagnant water that had collected at the head of the river, and thus dilute it to any extent.

The state of the river would be as though the upper dam did not exist, and water flowed from any passing shower.

I may mention here that the same method, but on a very large scale, was adopted to cleanse the Milwaukee River at Milwaukee on Lake Michigan. At a point on the river a dam was constructed 3½ miles from its outlet into the lake; the river course was about parallel with the lake. Under the lake was constructed a tunnel 2,500 feet long, with a crib at the intake in the lake. Through this tunnel was pumped daily 400,000,000 imperial gallons, and discharged above the dam; the water thus impounded is daily discharged by a tunnel 12 feet diameter into the river, which was a mass of offensive sewage.

"The forcing of such a volume of water was sufficient to displace the entire volume of water in the river from the dam to its mouth each twenty-four hours, thus ensuring a dilution of the sewage discharged into the river through forty-seven affluent sewers, sufficient to promote the natural process of purification, and to prevent the fouling of the waters or the formation of gases from the sludge on the bottom, and also to assist the work of improving the canals in the Menomonee Valley. Notwithstanding a continuous and general opposition by almost every citizen and paper in the city this work was finally authorised. . . .

"The sewage and factory liquids emptied into the Milwaukee River was estimated at about ten to thirteen million gallons daily, which, together with the gases continuously bubbling up from the river-bottom during warm weather, made the sluggish stream a detestable nuisance.

"Finding upon examination, deposit of from 18 to 24 inches of semi-liquid sludge all along the bottom of the river, it was found by experiment that a dilution of the sewage with twenty-five to thirty times its volume of clear water was sufficient to prevent it from becoming noticeable; that proportion of clean water to the sewage discharge was determined upon as the amount necessary to produce a speedy and prompt abatement of the river nuisance."

The above is an abstract from the paper read by Mr. G. H. Benzenberg, M. Amer. Society C.E., prepared for the International Engineering Congress of the Columbia Exposition, 1893.

Mr. Benzenberg is the city engineer of the city of Milwaukee, and occupies a high position as a civil and hydraulic engineer.

I draw the Committee's special attention to the abstract quoted above, as having a bearing on the question now before them, and is the result of actual practice.

The result at Milwaukee is an unqualified success; the water now in the river is fit to drink, and the fish have returned to it.

The annual report of the Board of Public Works, 1895: After the usual discontinuance of work in winter the report says:—

"The pumps were put into service on April 1st; remained so until about the 10th December, with the usual good results to our rivers. The machinery is in good condition, and needed only the usual minor repairs.

"The lake water discharged into the river was 98,996,760,647 gallons (American).

"The total expenditures were 17,514 dollars (£3,501):—

	Dollars.
Salaries	9,720.00
Fuel	4,606.80
Repairs	263.61
Tools	123.00
Sundries	102.00
Improving grounds	2,326.57
	17,514.31" = £3,503

Engineer's report:—Engine operated 5,595 hours during 1895, forcing 13,198,234,752 cubic feet of lake water into Milwaukee River developing 71,520,934 foot pounds for every 100 lb. of coal used for all and any purpose, including lighting and heating. In non-technical terms, 7,152,093 imperial gallons (10 lb.) was raised 1 foot high on a consumption of 100 lb. of coals.

Mr. Benzenberg, in private letters, also speaks of its great success. He was on the Board of Experts for Works, on same principle for the city of Cleveland, Ohio, on Lake Erie, where a discharge tunnel of 18 feet diameter was proposed.

I have maps of these localities, and detail drawings at the disposal of the Committee.

Following is detail cost of the proposed works at Parramatta:—

Cost of the plant comprising "Cataract special" Centrifugal pump, and suitable for sand dredging, 16-H.P. steam-engine and boiler, foot valve for pump screen, air exhauster bends, and all cast-iron pipes, &c., to connect with the wooden pipe conduit	£900
Platform or pier on river, for placing pump and engine, and shed	100
Easy cast-iron socket bends, into which the wooden pipes are fixed for corners of streets; also cast-iron sockets to fasten on main wooden pipe for branch flushing connections.	50
60 chains=3,960 feet of 18-inch wooden pipe, steel banded, laid and fixed in place, per foot 3s. 6d.	693
Repairs to flood-gate dam	25
Contingencies, 10 per cent.	176
	£1,944

2314. Do you know what the river is like at Milwaukee? It is a fresh-water river, very sluggish, and it sometimes flows up under the influence of the wind. The river from the dam down to the lake is 3½ miles, and during its course it takes the sewage from two other rivers.

2315. Have you looked well into this question of the Parramatta sewerage, and have you visited the place? Yes.

2316. You propose a line of 60 chains of pipes to convey the clear water into the dam site? Yes.

2317. Do you know the terminus of the Parramatta River steamers at Duck Creek? Yes.

2318. Have you examined the water about that locality? Yes; I was up there on Saturday.

2319. Are you aware that below that point a great deal of foul matter is discharged into the river from the meat preserving works, and that the river there is almost as foul as at Parramatta? I understand that is the case.

J. Musson. 26 Mar., 1897.

23 0. The distance from there to Parramatta being 3½ miles, would you not have to get water on the Sydney side of Duck Creek in order to get pure water? No; I would insist that the matter from the meat-works should be discharged at a particular state of the tide. I think before very long all the solid matter now put into the river will be utilised.
2321. Seeing that the river is badly polluted 4 miles below Parramatta, would you not have to go 240 chains instead of 60 chains in order to get pure water? Just now there is a peculiar condition of affairs in the river, because there has been no fresh water flowing into the river for a considerable time.
2322. What proportion of sewage matter do you think would flow into the river? Probably 10 gallons per head per day from the town.
2323. What quantity of water would be required to dilute that? About 20 to 25 gallons to 1 gallon of sewage. If 1 gallon is diluted twenty times over it would be clean. At Milwaukee there is a case in point. When 1 gallon of sewage was diluted in 25 gallons or 30 gallons the result was perfect—the water was fit to drink, and the fish came back to it.
2324. Is salt water better than fresh for dilution? I think salt water is the best. Salt has a purifying effect. If the upper dam had never been constructed at Parramatta there would never have been any difficulty, because a passing shower would bring all the water down.
2325. Then it would be a solution of the difficulty if we destroyed the dam? Yes, I think so; but it would now lay bare the mud and silt that has accumulated at the dam reservoir which is in the river-bed.
2326. If your scheme proved successful the sewage would be deposited lower down the river, but what would be the effect of the tide in carrying it back again? It would not be carried back. There is a rapid current going out.
2327. Would not the sewage be gradually precipitated and become a nuisance lower down the river? I do not see that that would be the case. The nuisance would be remedied by dilution, which is Nature's own process. The same objection might be raised with regard to Sydney Harbour at present, because the sewage from 10,000 to 15,000 people below the 40-foot level passes into Sydney Harbour.
2328. Is it not a fact that in consequence of that the water around Blackwattle Bay and Darling Harbour absolutely stinks? I daresay that a great deal of that is caused by the slaughter-houses and the sugar-works. I believe the sugar-works do more harm than the slaughter-houses.
2329. *Mr. Lee.*] Your plan is simply to carry the sewage further on and deposit it in deeper water? Yes.
2330. You rely upon the deeper water dissolving the sewage matter? Yes.
2331. Do you propose to pump water from the river 60 chains below the flood-gates into the river at Parramatta? Yes, into the impounding area formed by the flood-gates dam.
2332. What would be the object of pumping the water into the dam? You would impound clearer water.
2333. How are you going to flush out the river above the dam by pumping into it water which is already highly contaminated with sewage matter? In the first place, the water where I intend to pump it from is not contaminated with sewage.
2334. The evidence is all to that effect, and that can be seen by anyone to be the existing state of affairs? I do not see where the sewage matter is to come from to fill the river for a distance of 2 miles. It is true the water is green there, but that does not arise from sewage matter. If a bucket of sea-water were brought into this room it would soon turn green.
2335. Do you mean to say that sea-water would become as bad as it is up at Duck River, and in that neighbourhood in twenty years if not contaminated with sewage? Undoubtedly it would in twenty days.
2336. Is it your contention that the Parramatta River is not polluted at Duck River? It is polluted to a degree, but not to such an extent as to make it unhealthy. The water is stagnant, and consequently it becomes green. The mere fact of the water turning green is not an indication that there is sewage matter there.
2337. Is it not a tidal river, and how can it become stagnant? Although it is a tidal river, I believe that if you put a float upon the river at particular places it would remain about the same spot. The water which is exposed to the sun is light, and the tidal water being cold comes under it and lifts it up.
2338. You say that the water about Duck River is green simply because it is stagnant? Yes.
2339. Yet you propose to take that water as clean water and put it where it will become more impure from sewage? No; I propose to take the water from there, and dilute the sewage, into many times its own volume of water.
2340. Does it not follow as a matter of course that if you discharge sewage matter into a tidal river, and it is allowed to pass backwards and forwards, there must be a large amount of precipitation? My principle is that of dilution. At Milwaukee they have ascertained by actual experiment what amount of water is required for dilution.
2341. You propose to remedy the evil at Parramatta by pumping water polluted by sewage into the sewage matter which causes offence at Parramatta? No; I distinctly deny that. I propose to pump as good water as can be got in Parramatta River into the sewage water.

PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS.

Sewerage Works for Parramatta.

APPENDIX.

A.

[*To Evidence of E. J. Love.*]

ADDENDA TO EVIDENCE BY MR. LOVE.

1. Both above and below the flood-gates the nuisance is very great.
2. The whole of the space above the flood-gates is very bad indeed, as well as a distance, say, about 300 to 400 yards below this, the heavier matter settling on the rocks at low tide making the whole surrounding atmosphere unfit for anyone to approach.

B.

[*To Evidence of J. Ashburton Thompson, M.D.*]

ANALYSIS OF PARRAMATTA WATER SUPPLY.

Mark or number of sample.	Description.	Expressed in grains per gallon.				Expressed in parts per million.				Appearance in the standard 2-foot tube.
		Total solid residue dried at 220°.	Chlorine as chlorides.	Nitrogen as nitrates and nitrites.	Phosphates from animal impurity.	Free ammonia.	Albuminoid ammonia.	Oxygen absorbed in 15 min.	Oxygen absorbed in 3 hours.	
5 Dec., 1894	Parramatta Water Supply	11·60	4·8	Trace	Trace	·05	·12	1·37	2·80	Brown
3 Jan., 1895	do do	11·20	4·6	do	do	·52	·16	1·50	2·90	Turbid
21 Feb., 1895	do do	10·80	3·0	do	do	·08	·18	1·45	2·80	do
14 Oct., 1892	do do	10·64	2·2	·33	do	·00	·16	1·50	2·58	do
20 Oct., 1892	do do	9·38	2·4	·21	Heavy	·00	·12	1·09	2·19	do
25 Oct., 1892	Specially ordered by Dr. Manning...	8·12	2·4	·019	do	·00	·12	·95	1·82	do

General observations on the character of the above water :—

The waters had an objectionable odour; contained living organisms visible to the eye.
They were brown and turbid, and generally unfit for human consumption.
I have recommended filtration on several occasions.

WILLIAM M. HAMLET,
Government Analyst.

27th February, 1897.

I have knowledge of the gathering ground and general conditions under which this water is collected, stored, and distributed, and I concur in the opinions expressed by Mr. Hamlet. I add that sewage skilfully treated by modern methods would yield an effluent containing *less* organic matter than this water contains.

12th March, 1897. J. ASHBURTON THOMPSON.

C.

[*To Evidence of John R. Palmer.*]

THE LIERNUR SYSTEM OF SEWERAGE.

Sir, Eleanor-street, Granville, 11 March, 1897.

Supplementing my evidence of yesterday, I should like to be permitted to state that there appears to be an admirable system in vogue in some of the Continental cities known as Liernur's. If this system were applied to Parramatta generally, or only to its asylums (for the invention is, I understand, capable of application to a single street as well as to a town or city), it would result in much benefit to the inhabitants generally. I remember reading some time ago of the remarkable advantages of the system in preventing escape of noxious gases, in a diurnal emptying and cleansing by pneumatic agency of the whole of the sewers, and in the treatment of the excremental matter by fire; thus destroying all germs of disease, and finally furnishing a valuable marketable manure, free from all objectionable features, and, when known, highly prized by agriculturists. I am, &c.,

JNO. R. PALMER,
Mayor.

P.S.—The system was referred to in evidence given before the Committee in 1892.

The Chairman, Public Works Committee.

Sydney: William Applegate Gullick, Government Printer.—1897.

1897.

LEGISLATIVE ASSEMBLY.

NEW SOUTH WALES.

REPORT

OF THE

DEPARTMENT OF PUBLIC WORKS,

FOR THE

YEAR ENDED 30TH JUNE, 1896.

Printed under No. 17 *Report from Printing Committee,* 26 *August,* 1897.

SYDNEY: WILLIAM APPLEGATE GULLICK, GOVERNMENT PRINTER.

1897.

* 48—(*a*) [8*s.*]

[1,560 copies—Approximate Cost of Printing (labour and material), £360 11s. 10d.]

1897.

LEGISLATIVE ASSEMBLY.

NEW SOUTH WALES.

THE DEPARTMENT OF PUBLIC WORKS.

(ANNUAL STATEMENT—1895-6.)

Printed under No. 17 Report from Printing Committee, 26 August, 1897.

The Under Secretary for Public Works and Commissioner for Roads to The Hon. James Henry Young, M.P., Secretary for Public Works.

The Department of Public Works, 23rd April, 1897.

Sir,

I do myself the honour to submit, for your information, the Annual Statement relating to works carried out by this Department during the year ended 30th June, 1896.

The gross expenditure for the year amounted to £1,772,485 12s. 6d., of which the sum of £1,015,024 0s. 5d. was derived from the Consolidated Revenue, and £757,461 12s. 1d. from Loan Funds. This expenditure was distributed as under:—

DEPARTMENT OF PUBLIC WORKS.—SUMMARY OF EXPENDITURE, 1895-6.

Head of Service.	Revenue.	Loans.	Total.
	£ s. d.	£ s. d.	£ s. d.
Establishment	56,220 17 0	.....	56,220 17 0
Railway Construction	.....	208,154 8 5	208,154 8 5
Tramway Construction	.....	6,562 2 2	6,562 2 2
Harbours and Rivers	43,685 13 2	202,816 17 0	246,502 10 2
Dredge Service	108,434 15 3	.....	108,434 15 3
Water Supply	....	28,972 3 0	28,972 3 0
Government Architect	65,508 7 3	141,672 13 10	207,181 1 1
Roads and Bridges	737,824 18 7	38,575 9 2	776,400 7 9
Sewerage	2,108 5 3	130,707 18 6	132,816 3 9
Post Office Street Resumption	435 18 8	.....	435 18 8
Resumption of Land for construction of Wharfs	805 5 3	.....	805 5 3
TOTAL ... ... £	1,015,024 0 5	757,461 12 1	1,772,485 12 6

The amount expended during the year was in much the same ratio as the expenditure during the preceding eighteen months—that is, from 1st January, 1894, to 30th June, 1895—but, as will be seen from the following table, falls below the expenditure for any year since the inauguration of these Annual Reports:—

Year.	Total Expenditure. £ s. d.
1889 (twelve months)...	2,015,489 0 1
1890 „	2,139,724 14 5
1891 „	3,125,616 19 1
1892 „	3,223,495 2 2
1893 „	2,557,907 14 11
1894–5 (eighteen months)	2,585,922 5 8
1895–6 (twelve months)	1,772,485 12 6

Railway and Tramway Construction.

The Report of the Engineer-in-Chief for Railway and Tramway Construction, which is appended, shows that no new lines were completed or opened for traffic during the year. The under-mentioned lines and extensions were, however, in course of construction, namely:—

Narrabri to Moree.—The contract for the construction of this extension was let on 10th July, 1895, and the time allowed for its completion was eighteen (18) months. The length of the extension is 63 miles 9 chains.

Jerilderie to Berrigan.—This extension is intended to serve a rich tract of wheat-growing country, and has a length of 21 miles 6 chains.

Parkes to Condobolin.—This line branches off at Parkes from the Orange to Forbes Branch of the Great Western Railway, and will have a total length of 62 miles 60 chains.

All these three new lines are of the "Pioneer" class. The works are of the cheapest possible character, and are being constructed with the strictest economy. Fencing is dispensed with for the most part; the necessary bridges are built entirely of timber; the formation is carried near the surface of the ground at a height varying from 8 to 12 inches above it; while the rails used are 60-lb. steel flat-bottomed, 30 feet in length, and spiked to sleepers, which are round-topped, and placed fourteen to the rail length. It is expected that, in consequence of the strict economy thus practised, the cost of construction, including bridges, station accommodation, and charges of all kinds, will not exceed £2,300 per mile.

Rookwood Cemetery Branch Line.—A short extension of this line, of about 63 chains, has been undertaken at the request of the Cemetery Trustees. The work is being carried out by day-labour, under the direct supervision of an officer of the Department, with satisfactory results.

During the year the following railway proposals have been under the consideration of the Parliamentary Standing Committee on Public Works:—

Deviation at Locksley, Great Western Railway, for which the surveys had been made by the Department, was regarded by the Committee as a necessary work. Its execution was being carried out by the Railway Commissioners. The estimated cost of the work is £47,500.

Railway from Nevertire to Warren—length 12 miles 33 chains; estimated cost, £32,730.

Railway from Tamworth to Manilla—length 29 miles 47 chains; estimated cost, £72,150.

In neither of these cases had the Committee quite completed its inquiries at the close of the year.

Railway Surveys.

Exploration and surveys of proposed new lines have been made during the past year, details of which are duly set forth in the Engineer-in-Chief's Report.

City Railway.—The Parliamentary Standing Committee on Public Works have been appointed a Royal Commission to inquire into the question of bringing the railway from its present terminus at Redfern into the city, and Mr. Deane has for some months past been engaged in preparing plans of some of the more likely proposed schemes, with the view of assisting the Royal Commission in its investigations.

Tramway Construction.

Mosman's Bay Electric Tramway.—This single-line tramway is the only work that has been in course of construction during the past year. Its length is 1 mile 40 chains, and forms an extension of the existing Military Road tramway.

The proposed electric tramway from Circular Quay along George-street to the Redfern Railway Station, and also along Harris-street, Pyrmont, making a total distance of 6 miles 40 chains of single line, was referred to the Public Works Committee, who, after due inquiry, affirmed the expediency of carrying out the work at the estimated cost of £130,500.

This line, it is expected, will be ready for opening early next year, and it is confidently anticipated that it will be the first step towards the alteration of the whole system of tramway traction from steam to electricity.

Surveys have been made, and the working plans and sections prepared, of various proposed tramways, as fully detailed in Mr. Deane's report.

The total expenditure for the year in connection with Railway and Tramway Construction amounted to £214,716 10s. 7d., distributed as under:—

	£	s.	d.
Railway Construction	198,279	8	10
Trial Surveys	9,874	19	7
Tramways Construction	6,562	2	2
Total	£214,716	10	7

Attached to Mr. Deane's report will be found a map of the Colony showing railways open for traffic, lines in course of construction, and proposed lines for which trial surveys have been, or are being, made. A second map shows the tramway systems of the Metropolis, and of Newcastle and its suburbs.

HARBOURS AND RIVERS, DREDGING, WATER SUPPLY, WATER CONSERVATION AND BRIDGE CONSTRUCTION.

Appended will be found the report of Mr. Darley who, in consequence of the changes in organization effected by the Public Service Board, alluded to in my last statement, has now returned to the Department as Engineer-in-Chief for Public Works. The following sub-branches are under Mr. Darley's immediate control—namely, Harbours and Rivers Navigation, Dredge Service, Water Supply, Water Conservation and Irrigation, and Bridge Construction.

Attached to Mr. Darley's report are those of the several Principal Assistant Engineers, and as they all furnish very full and interesting details of the various works in hand during the year, I need here refer only to some of the larger operations which have occupied the time and attention of the Department.

Improvement

Improvement of Harbours and Rivers.

As the weather throughout the year remained favourable, no floods or heavy seas having been experienced, very fair progress has been made with the various works for the improvement, maintenance, and convenience of navigation. The total expenditure for the year under this head, excluding the Dredge Service, amounted to £247,021 6s. 4d.

Tweed River.—The Training Walls at the entrance of this river have been extended to a total length of 25,940 feet, the additions made during the year being as follows, namely:—

No. 5 wall	4,531	feet
No. 2 wall	300	„
No. 3 wall	100	„
Total...	4,931	„

The quantity of stone used amounted to 58,165 tons, and was quarried and deposited *in situ* at an average cost of 2s. per ton. Snagging operations have also been carried out in several of the tributaries of the Tweed River, and the removal of rocks at Kynamboon, on the North Arm, has permitted of a channel being cut 25 feet wide and 4 feet deep at low water.

Richmond River.—The important works at the mouth of this river were continued steadily during the year, the Northern Breakwater having been extended a further distance of 452 feet, and the Southern Breakwater 663 feet. These breakwaters have now a total length of 2,130 feet and 5,352 feet respectively, and it is calculated that it will take some five or six years longer, before the scheme for the improvement of the entrance, as designed by Sir John Coode, can be finally completed.

A channel providing a sufficient width and depth for purposes of traffic was cut in the North Creek for a distance of a little over $2\frac{1}{4}$ miles, and bridges were built over this creek and also Fisherman Creek. A sum of £2,880 3s. 1d. was expended during the year in snagging the river and its tributaries, while new wharfs and approaches were constructed at Wyrallah and Broadwater.

Clarence River.—The South Training Wall at entrance has been extended 1,100 feet, and may now be reported as practically completed. The total length of wall is 12,177 feet, and the improvement in the navigation of the river resulting from its construction has been beyond the most sanguine expectations. There is now a depth of water in the channel along the wall ranging from 30 to 50 feet, and it may be confidently asserted that a safe and convenient entrance to the Clarence River is now permanently secured. The North Training Wall was extended a further distance seawards of 1,201 feet, making its total length 2,547 feet.

The Bellinger, Nambucca, Macleay, Hastings, and Manning Rivers have all been the subjects of improvement works, and it is gratifying to be able to report that the improvements already effected in the navigation of most of these rivers have been so marked as to elicit strong expressions of approval from the persons more directly concerned in the commercial development of our northern rivers.

Trial Bay Harbour of Refuge.—A further extension of 50 feet was added to the breakwater, the work, as before, being performed by the gaol prisoners. The extension entailed the quarrying and depositing of some 11,720 tons of stone.

Newcastle Harbour.—Satisfactory progress has been made in the work of deepening parts of the harbour by the excavation and removal of rocks, and in providing additional berths to suit the needs of the large steamers that visit the port to load wool and frozen meat cargoes. All the wharfs were kept in a proper state of repair, and preparations were made for carrying out the work, as authorised by Parliament, of extending the Southern Breakwater, and constructing the guide-wall. The total amount spent during the year on the improvement and maintenance of the port reached the sum of £34,926 0s. 5d.

Sydney Harbour.—Two new wharfs, 460 feet and 447 feet long, respectively, have been constructed on the western side of Circular Quay, and provided with suitable cargo-sheds and offices. In Woolloomooloo Bay a large amount of excavation at back of proposed new wharfs has been accomplished, and other improvements effected.

A new wharf 360 feet long by 30 feet wide, with cargo-shed, waiting-room, and offices, has been constructed at Manly in order to meet the requirements of the rapidly-growing traffic.

The numerous wharfs and jetties in and around the harbour have all received the careful supervision of the Department, and been kept in regular repair.

The total expenditure incurred in the improvement and maintenance of the harbour for the year was £68,157 15s. 9d.

Shea's Creek Canal, Muddy Creek Branch, and Cook's River.

The upper section of the canal was completed, and another section commenced during the year. The Muddy Creek Branch was also completed, and the work of pitching the side slopes of the canal with stone was begun. The expenditure in connection with this locality was £35,827 14s. 4d.

To complete the canal by extending it to Buckland street, as originally designed, and so enhance the commercial value of the work, a further expenditure of at least £150,000 would be necessary; and seeing that the sum of £233,294 is already sunk in the place, the question of undertaking further operations is obviously one for serious consideration.

Fitzroy Dock Establishment.

A large amount of repairing and construction works has been accomplished during the year, entailing an expenditure of £50,017 7s. 2d. Forty-five vessels having an aggregate tonnage of 125,618 tons made use of the Fitzroy and Sutherland Dry Docks, furnishing a revenue of £4,110 4s. 7d.

Water Supply.

The Water Supply Works for the Municipalities of Junee, Lithgow, and Coonamble were completed, and additions made to those at Nyngan, Dubbo, and Moss Vale. The schemes carried out at Parkes and Cootamundra have unfortunately proved inadequate to meet the requirements of these towns, the underground flow of water having almost ceased during the dry season. Surveys have therefore been made for a gravitation supply for each municipality.

The efficiency of the Hunter District Water Supply has been increased by the laying of a duplicate suction main of wrought iron, 21 inches diameter, from the intake works to the pumping station at Walka.

Flood Protection.

The always-pressing work of protection against floods, to which almost all our rivers are so liable, has occupied the attention of the Department, and a considerable amount of work has been carried out in this direction on the Richmond River and its tributaries, the Macleay River, and the Hunter River and its tributaries. A scheme of flood prevention on an extensive scale in connection with the Hunter is now under consideration.

Naval Station, Garden Island.

The equipment of the Naval Station is now approaching completion. During the year there were erected a dressing-shed, coal-stores, and other smaller buildings, at a cost of £4,477 16s. 8d. The total expenditure on the station up to 30th June, 1896, was £300,462 11s. 7d.

Dredging and Reclamation.

Excellent results have been obtained from the dredging operations of the past year, while the cost of them bears satisfactory comparison with previous years. Signal success has more especially attended the use of the sand-pump dredges at Sydney and Newcastle. The reclamations effected by them form a very valuable asset, which, if realised on at an opportune time, will far more than repay the outlay on the work. As a consequence, the work of converting grab dredges into the much more efficient and economical sand-pump dredges has been vigorously proceeded with at the Fitzroy Dock Establishment.

The efficiency and economy in working of the Dredge Service generally have been further increased by the changes in organization made on the recommendation of Messrs. Carleton, Walsh, and Portus, who were appointed (in 1895) a Board to inquire into and report on its operations.

The total expenditure on the Dredge Service for the year was £108,434 15s. 3d.

Bridge Construction and Renewals.

During the year 125 new bridges were completed, aggregating 10,218 feet in length, made up of 296 plain beam spans, 7 timber truss spans, and 4 iron spans—the total cost being £70,492 8s. 2d.

The most important of these new bridges were the following, namely :—

Wilcannia Bridge, over the Darling River—an iron lattice girder bridge on cylinder piers, with a steel lift-span—Contract cost, £5,590 0s. 3d.

Wagga Wagga Bridge over the Murrumbidgee River—a timber truss bridge, having 3 spans of 110 feet on cylinder piers, with 9 timber approaches, having a clear width of 24 feet between curbs—Contract cost, £13,357 14s. 2d.

Deniliquin Bridge over the Edwards River—a timber truss bridge, having 3 spans of 90 feet on timber piers, with 9 timber approach spans—Contract cost, £3,566 14s. 9d.

At the end of the year there were also contracts in progress for the erection of 81 new bridges, the aggregate length of these being 9,191 feet, made up of 234 plain beam spans, 14 timber truss spans, and 5 iron spans; the total estimated cost being £71,201 3s.

Of

Of these uncompleted bridges, the most notable are the Swan Hill Bridge over the River Murray—a timber truss bridge with steel lift-span on cylinder piers—which is being constructed at the joint expense of the Colonies of New South Wales and Victoria; and the Inverell Bridge over the Macintyre River—a timber truss bridge, with three spans of 110 feet on cylinder piers, and four timber approach spans.

Water Conservation and Irrigation.

During the year under review, the Water Conservation Branch was included in the Department of Mines and Agriculture; but it was decided, in June, 1896, that it should be transferred to this Department, and placed under the control of the Engineer-in-Chief for Public Works. The Report of Mr. McKinney, the Principal Assistant Engineer, is accordingly appended hereto, and it furnishes a concise statement of the work that was done under his direction during the past year, and of the state of matters at the date of the transfer.

As one instance of the valuable work accomplished in the direction of conserving water, I may mention the weir which has been built on the Macquarie River at a point 3 miles above the township of Warren, and an illustration of which appears among the Appendices. This weir throws back and retains the water for a distance of about 11 miles, and is estimated to impound something like 172,000,000 gallons.

Other highly-important undertakings which are mentioned in Mr. McKinney's Report are the weir and lock on the River Darling at Bourke, and the Willandra Weir on the Lachlan River, both of which were commenced during the year.

It would be impossible to overrate the supreme importance to the Colony of this question of Water Conservation, as the development and settlement of the country are absolutely dependent upon securing a permanent and regular supply of water. The engagement by the Government of Colonel Home, the eminent expert, to inquire into and report upon this subject generally, should be productive of much good.

ROADS AND REPAIRS OF BRIDGES.

The Principal Assistant Engineer for Roads reports that, generally, the past year has been a good one for roadwork, the rainfall having been normal, and no flood of any magnitude having occurred.

The expenditure on roads and ordinary bridge repairs and maintenance amounted to £705,907 19s. 7d., of which the sum of £699,169 5s. 5d. was derived from the Consolidated Revenue, and £6,738 14s. 2d. from Loan Funds.

The total roads mileage under the direct or indirect charge of the Department had grown at the end of the year to 38,951 miles 76 chains, being an increase over the preceding year of 2,881 miles 50 chains. In addition to purely roads formation there were constructed 7 miles 36 chains of culverts, and 7,079 rods of fencing were erected.

Five new punts and 14 new boats were built, and 55 punts and 73 boats overhauled and repaired. At the close of the year there were in use 98 punts, 1 steam launch, 4 horse-boats, and 197 flood and other boats.

The

The bridges of 20 feet span and over, for the maintenance of which the Branch is responsible, numbered 2,772, having 7,655 spans, and an aggregate length of 260,519 feet, or 49 miles 27¼ chains.

The culverts totalled 31,073, with an aggregate length of 461,578 feet, or 87 miles 33½ chains.

The average number of men employed by the Roads Branch during the year was 9,876, of whom 1,488 were directly employed by the Branch, and 8,388 were contractors and their workmen.

With regard to the repairs and maintenance of bridges, which now demand a large and yearly-increasing expenditure, the Assistant Engineer suggests, as settlement advances in the Colony, replacing timber structures, so far as practicable, by bridges of a more permanent character, and thus reducing the annual cost of repairs and maintenance. He points out that, in consequence of the improvement effected of late years to the surface of the roads, and the cutting down of grades, the bridges are now required to bear the strain of much heavier loads than they were estimated to sustain at the time they were built.

There is something to be said in favour of this contention. At the same time, we must not lose sight of the fact that in New South Wales we possess the best timber in the world for bridge-building, which, with careful picking, has a life of from thirty to forty years. It seems to me the policy of the country should be to use this material as largely as possible. There are cases, no doubt, where it would be more economical in the long run to erect iron or, better still, stone bridges; but I feel satisfied that for many years to come it will be found more advantageous to use timber in the construction of a large proportion of our bridges.

In travelling through the country one cannot help remarking how bad the roads are in the vicinity of the towns, and how a long length of good road is spoilt by a few miles of bad road lying within a municipality. Under existing conditions, I see no prospect of improving this state of affairs, inasmuch as, to become incorporated, the areas of the municipalities have to be of considerable size; consequently Municipal Councils are obliged to take over a road mileage quite beyond their means to maintain. It seems to me power should be granted to reduce the area, and so make the Councils responsible only for those lengths of roads that lie within the inhabited portions of the municipalities.

Mr. Scarr once more draws attention to the urgent need of legislation in the matter of width of tires. The heavy loads now borne on waggons having narrow tires cut up the roads to an excessive degree, and consequently entail on the Department a large expenditure for repairs.

The competition in carriage of goods between road and rail, referred to in my last Report, has rather increased than diminished during the last year, and as a consequence some of our roads have suffered considerably, notably that portion of the Main Western Road over the Mountains.

With regard to the maintenance of the roads generally, I should like to draw special attention to the fact that, while the mileage is steadily increasing (the increase this year over last being 2,881 miles 50 chains), the funds placed at the disposal of the Department are gradually decreasing, necessarily making it more difficult for the officers to maintain the roads in that state of efficiency which the traffic warrants.

Sewerage Construction.

During the year there has been an expenditure of £132,816 3s. 9d. in connection with the sewerage schemes for the Metropolis, Newcastle and its suburbs, and some three or four country towns.

The Northern and Southern Metropolitan Systems, which include the areas of the City of Sydney and of the Municipalities of Redfern, Darlington, Waterloo, Alexandria, Paddington, Woollahra, and Waverley, have been completed, with the exception of some small areas lying around the foreshores of the Harbour, the sewage from which will have to be lifted to the gravitation sewers.

Work in connection with the Western Suburbs Scheme has been urgently pressed forward, and the extension of the Main Eastern Branch Sewer has been almost completed. This extension provides for the drainage of a large area of Petersham, Leichhardt, and Annandale. The Main Northern Sewer has been extended to Balmain; this work rendered necessary the construction of aqueducts crossing White's and Johnston's Creeks.

The Sewerage Farm in connection with the Western Suburbs system is being prepared at Arncliffe, and a great deal of work has been done in the levelling of the sandhills to form filter-beds for the reception of the sewage. This portion of the work was carried out by men provided by the Labour Bureau.

At North Sydney the main sewers have been nearly completed, and a contract was let for the excavation and filling on the area required for the filter-beds and settling-tanks at the Outfall Works on Willoughby Bay.

In the Parramatta District extensions have been made to the Clay Cliff Creek and the Brickfield Creek stormwater channels.

At Newcastle good progress has been made with the main stormwater channel through the Pasturage Reserve, and the stormwater drainage of Plattsburg and Wallsend has been steadily pushed on.

Government Architect's Branch.

The Report of the Government Architect shows that, while no new buildings of any magnitude were completed during the year, there were twenty-three new structures erected at an aggregate cost of £37,194 17s. 1d., classified as follows, namely:—

	£	s.	d.
8 Post and Telegraph Offices, costing	1,146	18	1
4 Court-houses, costing	8,488	13	9
5 Police Stations, costing	7,470	1	5
6 Lock-ups, costing	9,771	3	10
Total cost	37,194	17	1

The expenditure under all heads, including erection of new buildings, additions to and repairs, furnishing, and improvements of existing buildings, amounted to £207,181 1s. 1d., while the cost of supervision and contingencies, which covered a large number of miscellaneous services, amounted to £16,561 10s., making a total expenditure by the Branch of £223,742 11s. 1d.

This expenditure was incurred in connection with 560 separate buildings, and was provided for to the extent of £141,672 13s. 10d. from Loan Funds, and of £82,069 17s. 3d. from the Consolidated Revenue.

Among

Among the more notable additions and improvements made to public buildings during the past year may be mentioned the improvements to Government House, costing £2,658 13s. 11d.; the additions to the Crown Law Offices, costing £4,961 4s.; and the additions and improvements to the Public Works and Chief Secretary's Buildings, costing £16,256 11s. 7d.

These last additions have assisted very considerably in the efforts that are now being constantly put forth to reduce the large amount of rental paid by the Government to private owners for offices outside the public buildings, as they have provided suitable accommodation for, amongst others, the Railway Commissioners and their entire office staff.

Mr. Vernon reports that the total amount expended on the erection of public buildings up to 30th June, 1896, exclusive of the cost of sites, was, as nearly as could be ascertained, £4,852,000, of which the sum of £1,472,338 had been derived from Loan Funds, and therefore remained a debt on the properties.

Once again Mr. Vernon emphasises the urgent need that exists to provide larger Votes for the proper repair and maintenance of the public buildings of the Colony. The work is one of vast proportions, and, viewed in the light of economical administration, claims the special attention of the Government.

Land Valuation.

The Report of the Land Valuer shows that during the year claims were dealt with, and valuations and estimates made, as follows:—

	£	s.	d.
Claims for land resumed for railway and tramway purposes	14,158	5	0
Other purposes	42,627	6	6
Total	£56,785	11	6
Valuations of resumptions for railway and tramway purposes... ...	5,167	6	9
Other purposes	8,752	13	6
Total	£13,920	0	3
Estimates of value of proposed resumptions	£127,490	0	0

The Draftsmen of the Branch have been engaged, in addition to the ordinary work of the office, in compiling for the Railway Commissioners copies of the working plans of all railway lines, as verified by the deeds; and much information relating to lands resumed out of grants, &c., has been supplied to the Land Tax Commissioners.

Water and Sewerage Boards.

The Report of the Metropolitan Board for the period extending from 1st January, 1895, to 30th June, 1896, has already been presented to the Honorable the Minister, and laid before Parliament. It furnishes an interesting statement of the Board's varied and important functions and operations.

During that period over 99 miles of new water-mains, 28 miles of sewers (5½ miles being transferred from the Government), and 4½ miles of stormwater channels were laid by the Board, making a total of 891 miles of water mains, 230 miles of sewers, and 14½ miles of stormwater channels now under its control.

The capital cost of the water and sewerage works combined stood, on 30th June, 1896, at £5,565,704.

The

The gross revenue for the eighteen months was £259,843, and the working expenses £67,799, absorbing £26·09 per cent of the gross revenue, and leaving a net revenue of £192,043, or a return of £3·46 per cent. on the capital debt of the Board.

The average daily supply of water was 16,645,014 gallons, and the estimated number of persons supplied was 408,282.

The Hunter District Water Supply and Sewerage Board not having presented a report, I am unable to give any particulars of their operations during the past year. The President of the Board has, however, furnished a brief description, drawn up by the Board's Engineer, of the waterworks as they existed at the date of the inception of the Board, namely, 1st July, 1892, and of the works subsequently executed up to 30th June, 1896. This statement is printed in the Appendix, and shows that, during the four years which have elapsed since the Board took control of the waterworks, new water-mains have been laid to the extent of 25 miles 1,422 yards, and 3,228 houses connected with the mains, the respective totals being thus increased to 131 miles 1,106 yards water-mains, and 6,246 houses connected.

Amongst other improvements, some important works were carried out at the Pumping Station for the purpose of increasing the supply and improving the quality of the water.

Miscellaneous.

I have only been able to refer in a very general way to the Works and Services carried out by the Department, but there is much interesting information to be found in the Reports of the various branches which will well repay perusal.

The business of the Department is of great magnitude, and it will be readily understood that the economical disbursement of a sum of £1,772,485 12s. 6d., which was the amount expended during the year, demands the exercise of incessant vigilance and intelligent supervision. During the year 46,798 vouchers were examined and checked to the minutest detail before being forwarded to the Treasury for payment; 65,771 letters and other documents were received and recorded; 11,855 letters were written and despatched; and 5,061 contracts were entered into, being at the rate of about 17 contracts per working day.

In concluding this Report, I desire to bear testimony to the energy and zeal displayed by all the officers, and to the satisfactory manner in which the work of the Department has been performed.

ROBT. HICKSON, M. Inst. C.E.,
Under Secretary for Public Works and Commissioner for Roads.

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Railways and Tramways.

(I.)

REPORT OF THE ENGINEER-IN-CHIEF FOR RAILWAYS.

Department of Public Works, Railway Construction Branch,
Sydney, 1 September, 1896.

Sir,

I have the honor to make the following report on the operations of this branch during the year ending 30th June, 1896.

RAILWAYS.

The following works have been in process of construction :—

Narrabri to Moree Railway.

This is an extension of the North-Western Railway from the present terminus at Narrabri. It leaves this station at the Newcastle end, and after crossing the Namoi River and Narrabri Creek proceeds in a northerly direction to Moree.

The works as carried out are of the most economical description. To save expense, the bridges over the Namoi River and Narrabri Creek are built entirely of timber—new designs for the truss spans having been prepared for the purpose.

For the greater part of the distance the formation of the line is carried near the surface of the ground, at a height varying from 8 inches to a foot above it.

Fencing for the most part is dispensed with.

The rails used are 60-lb. steel, flat bottomed, 30 feet in length. They are spiked to sleepers which are round topped and placed fourteen to the rail length.

A contract for the construction of this extension was let to Messrs. Smith, Finlayson, and Timms on 10th July, 1895. The date fixed for completion is 10th January, 1897.

The length of the extension is 63 miles 9 chains, and the terminal point at Moree is 315 miles 15½ chains from Newcastle.

The works are in an advanced state.

Station and siding accommodation will be provided at Narrabri North, Edgeroi, Woolabra, Gurley, Tycannah, and Moree. Buildings will be erected at Narrabri North, Woolabra, Gurley, and Moree.

Trucking of stock will be provided for at Edgeroi, Woolabra, and Moree.

The water supply will be obtained from the artesian bores that have been sunk at Woolabra and Moree; the water will be conveyed in pipes to circular wrought-iron tanks, each of 20,000 gallons capacity resting on circular brick towers.

The contractors for the various works, together with the total amount of each contract, are given below :—

Contract No. 1, for main works. Messrs. Smith, Finlayson, and Timms, £36,452 3s. 8d.
Contract No. 2, for water tanks. Messrs. J. Rodgers and Sons, £535.
Contract No. 3, for sheep and cattle yards. Mr. W. Mitchell, £963.
Contract No. 4, for brick towers and water tanks. Mr. W. Mitchell, £197 4s. 8d.
Contract No. 5, for station buildings. Mr. W. Mitchell, £2,392 10s.

Jerilderie to Berrigan Railway.

This extension is intended to serve a tract of country which produces large quantities of cereals.

The line follows the Jerilderie to Berrigan public road for the whole distance—the position of the old road, which was a somewhat crooked one, having been straightened up to bring the railway and road in juxtaposition.

The strip of land thus carrying railway and road is 3 chains wide, and where passing through private property is fenced on both sides. The railway occupies about a chain of this width, the balance being left for road traffic.

The railway works are of the cheapest possible character, and the line follows the surface of the ground nearly throughout, the formation being raised above the surface for the most part from 8 inches to a foot only.

The rails are 60-lb. steel, flat-bottomed, spiked to the sleepers, which are for the most part round-topped, and placed fourteen to the rail length.

A contract for this extension was let to Messrs. Smith, Finlayson, and Timms, on the 25th January, 1896, the time allowed for completion being six months, and the date 25th July, 1896, but the completion will be considerably delayed.

The length of the line is 21 miles 6 chains, and the terminal point at Berrigan is 434 miles 5 chains from Sydney.

Station and siding accommodation are being provided at Green Swamp Road, and at Wonnemurra and Mairjimmy, sidings have been laid for the benefit of the holders of property.

The names of the contractors for the various works, and the amount of each contract, are given below :—

	£	s.	d.
Contract No. 1, for the main works, Messrs. Smith, Finlayson, and Timms ...	19,879	8	6
Contract No. 2, for the station buildings, Mr. Chas. Baker	1,100	0	0

Parkes to Condobolin Railway.

This railway leaves the Orange to Forbes Branch of the Great Western Railway at Parkes at 267 miles 2 chains. Its course is generally in a westerly direction to Condobolin.

A contract for a length of 23 miles 38 chains of this line was let in February to Messrs. Smith, Finlayson, and Timms, and the time fixed for completion is the 18th November, 1896. The amount of the accepted tender is £19,615 1s. 6d.

The terminal point of this contract is at Bogan Gate.

No. 2 contract will take the line to Condobolin, and the terminal point will be 329 miles 62 chains from Sydney, and the length, 39 miles 22 chains.

This line has been carefully laid out so as to obtain a ruling grade of 1 in 100, with a minimum of earth-works.

The sharpest curve is of 15 chains radius, and, as in the case of the last-mentioned line, the works are of the cheapest possible character.

The formation level has been kept as near as possible to the surface of the ground.

The rails are 60-lb. steel, flat-bottomed, 30 feet long, spiked to the sleepers, which are round-topped, and placed fourteen to the rail length.

This line passes through very dry country, and, except at Condobolin, there are no permanent creeks or water-holes available for use in convenient situations. It is proposed to excavate a tank on Gunningbland Creek, at 294½ miles, having capacity for 2,800,000 gallons, which will give a supply of water for a couple of years. At Condobolin water will probably be obtained from the Lachlan River or the Billabong Creek.

Station and siding accommodation have been designed for three points on contract No. 1, namely, at Nelungaloo, Gunningbland, and Bogan Gate. The drawings for these are in an advanced state.

Extension of the Rookwood Cemetery Branch.

This is an extension of the present branch line beyond the receiving-house at the Necropolis, and is being constructed in compliance with an application from the Trustees.

The works on this extension are being carried out by day-labour, under the direct supervision of an officer of this Branch. The result as to cost has so far proved satisfactory.

The length of the extension is about 68 chains.

Drawings have been prepared for alterations and additions to the existing receiving-house, including an extension of the platform, and for the construction of another receiving-house with platform at the end of the extension, and tenders are about to be called for this work.

Water Supply, Moura, on the Molong to Parkes and Forbes Railway.

During the construction of the Molong to Parkes and Forbes line, the question as to whether water should be provided at Moura was taken into consideration, but it was not then thought necessary. As, however, the town supply at Parkes, from which the Railway Commissioners have been drawing, has proved unsatisfactory, it has been decided that the Moura proposal shall be carried out. The point fixed upon is at 250 miles 74 chains from Sydney. Here a tank has been excavated, and a brick tower, carrying a circular wrought-iron tank of 20,000 gallons capacity, has been built and a pumping plant provided.

Three contracts were let for these works on May 13th, May 15th, and May 18th, respectively, as given below:—

No. 1.—For the excavation, Mr. Thomas Lees; price, £236 1s. 4d.

No. 2.—For the wrought-iron tank, Messrs. Pope, Maher, & Co.; price, £273.

No. 3.—For the brick tower, Messrs. Hunter Bros.; price, £77.

Store-shed, Clyde.

The want of a store-shed for permanent-way fastenings and other railway construction materials liable to injury by exposure to the weather has been felt for some time past. It was decided to provide for this, and a design was prepared for a shed facing one of the sidings at Clyde. The size is 36 ft. 6 in. by 30 feet.

A small traveller has been provided, so arranged that goods can be lifted direct off the trucks into the shed.

A contract was let to Mr. F. Vernon on the 26th February last for the sum of £134 4s., and the work has been completed.

Staff.

The field staff employed in the supervision of the above works during the year under review has consisted of the following:—Three supervising engineers; four field assistant engineers; one cadet.

For the construction of the Rookwood extension the services of the assistant engineer of the Railway Survey Branch were utilised.

One resident engineer has been employed for some months on the case of McSharry *v.* The Railway Commissioners, now under arbitration.

Inspectors and sub-inspectors for the various classes of work carried out have been employed as required during the progress of the work.

Proposed Railway Extension into the City of Sydney.

The Railway Commissioners in a letter to the Premier, dated 28th April, 1896, invited serious consideration to the necessity for an immediate settlement of the question of an extension of the railway system of the Colony into the city, representing that the difficulties of working the station at Redfern have increased and are increasing to such an extent as to necessitate considerable improvement in the terminal arrangements.

They pointed out two ways of meeting the difficulty, namely, either that the railway should be continued to some point in the city—such as the south-east corner of Hyde Park, or that a new terminus should be made by extending the present railway station at Redfern across Devonshire-street, into the Benevolent Asylum grounds. For this scheme a large area would be required extending from Devonshire-street to Belmore Park, and from Pitt-street back again.

The Minister gave instructions that plans and estimates for the scheme of extension of the railway and construction of a new terminus in Hyde Park, between Park-street and Liverpool-street, should be prepared for submission to the Public Works Committee.

These plans and estimates are in a forward state.

Designs for Permanent-Way Material.

This matter has been carefully gone into in conjunction with the principal officers of the Railway Commissioners Department, and drawings and specifications have been prepared for rails and fishplates of an improved type.

Proposed Manufacture of Steel Rails and other Permanent-Way Material in the Colony.

In compliance with pressing representations made by manufacturers, it was decided by the Government to issue invitations for tenders for supply of 150,000 tons of steel rails and the corresponding quantities of fastenings.

Specifications have been drawn up which define that the whole of this material is to be manufactured in the Colony of New South Wales out of ores and other minerals, the natural product of the Colony.

Office Staff in connection with Construction.

This consists of an average of twenty-one architectural, engineering, and general draftsmen.

The work comprises the preparation of working plans for contracts, as well as designs for various proposals which may from time to time be required. Under the latter head are the designs for the proposed City Railway Extension.

Railway Surveys.

I give below in tabular form a synopsis of the work carried out by the Railway Survey Staff from the 1st July, 1895, to 30th June, 1896:—

Trial Surveys.

	Total Length.	Date of Commencement.	Date of Completion.	No. of Surveys.	Length Surveyed during year.	Total Length Completed.	Remarks.
	m. c.				m. c.	m. c.	
Tamworth to Manilla survey	27 40	20 Jan., 1896	25 Jan., 1896	1	12 72	27 40	As requested by Public Works Committee.
West Tamworth to Manilla	28 70	8 Apr., 1896	2 May, 1896	1	13 53	28 70	do
Singleton to Jerry's Plains	24 0	1 May, 1896	.....	1	10 0	10 0	
Moree to Inverell, *via* Paramellowa and Warialda.	101 28	29 Oct., 1894	31 July, 1895	3	8 52	101 28	
Moree to Inverell—Deviation *via* Kelly's Gully.	17 52	1 Aug., 1895	28 Nov., 1895	1	17 52	17 52	
Moree to Inverell—Branch to Warialda from preceding.	3 25	15 Aug., 1895	15 Oct., 1895	1	3 25	3 25	
Moree to Inverell—Alternative line south of the Gwydir River and *via* Ezzy's Crossing.	44 7	23 Mar., 1896	.....	2	27 0	27 0	Adopted and submitted for consideration of the Public Works Committee.
Woolabra to Collarendabri	80 0	16 May, 1896	.....	2	16 40	16 40	
Deviations to avoid the Zig Zag, Lithgow, No. 4.	6 69	17 Apr., 1895	26 July, 1895	3	4 49	6 69	
Do do No. 4A	5 31	17 June, 1895	26 July, 1895	2	5 31	5 31	
Do do No. 5	7 26	10 Apr., 1895	26 July, 1895	2	5 49	7 26	
Eskbank Deviation in connection with above.	1 22	17 June, 1895	26 July, 1895	1	1 22	1 22	
Deviation of G.W.R. at Dargan's Creek.	3 33	1 Apr., 1896	11 Apr., 1896	3	3 33	3 33	Since permanently staked.
Parkes to Condobolin	62 60	3 Jan., 1895	25 July, 1895	...	5 60	62 60	
Condobolin to Broken Hill, *via* Mossgiel.	366 40	3 Mar., 1896	.....	5	141 0	141 0	
Coolamon to Ariah	42 0	11 May, 1896	.....	1	9 40	9 40	
Picton or Thirlmere to Mittagong *via* Catherine's Hill.	40 55	1 Feb., 1896	5 June, 1896	1	40 55	40 55	Includes deviation on alternative lines.
Do Hilltop to Colo Vale	2 38	1 June, 1896	26 June, 1896	1	2 38	2 38	
Do Colo Vale to Braemar	1 67	1 June, 1896	26 June, 1896	1	1 67	1 67	
Do Braemar to Mittagong	1 21	1 June, 1896	26 June, 1896	1	1 21	1 21	
Rock to Brookong	33 40	6 May, 1896	14 May, 1896	1	6 30	33 40	
Do Alternative line *via* Green's Gunyah.	35 0	2 June, 1896	11 June, 1896	1	15 0	35 0	
Total	937 4	.....	.....	...	353 69	584 37	

PERMANENT SURVEY.

	Total Length.	Date of Commencement.	Date of Completion.	No. of Surveys.	Length Surveyed during year.	Total Completed.	Remarks.
	m. c.				m. c.	m. c.	
Glen Innes to Inverell, *via* Madis Valley.	52 25	19 Mar., 1894	23 Aug., 1895	2	7 20	52 25	Trial holes also sunk.
Deviation of G. W. R. at Dargan's Creek.	2 27	4 Dec., 1895	18 Jan., 1896	2	1 0	1 27	For grade of 1–55.
Do do ...	3 33	6 Apr., 1896	7 May, 1896	3	3 33	3 33	Second staking for further improvement of grade 1–60 to 1–70.
Parkes to Condobolin	62 60	29 July, 1895	7 Nov., 1895	5	62 60	62 60	
Parkes to Condobolin—Deviation to get improved station sites.	6 74	5 Feb., 1896	7 Mar., 1896	1	6 74	6 74	
Temora to Wyalong—improvement of line previously staked.	15 40	17 Apr., 1895	31 July, 1895	1	12 67	15 40	
Jerilderie to Berrigan—Deviation	14 11	22 July, 1895	21 Aug., 1895	1	14 11	14 11	Additional deviation to comply with requirements of land owners.
Picton to Mittagong—Deviation Colo Vale to Braemar.	7 67	29 June, 1896	.....	1	.....	.....	Just commenced.
Total.....	165 17				108 25	156 30	

The following explorations over possible railway routes have been made and reports furnished thereon :—

Barraba to Inverell, *via* Bingara	90 miles.
Barraba to Inverell, *via* Bundarra	70 „
Condobolin to Broken Hill	366½ „
Moree to Inverell, *via* Yallaroi	150 „
Rydal to Jenolan Caves	30 „
Singleton to Jerry's Plains	24 „
West Tamworth to Manilla (alternative route suggested by the Public Works Committee)	30 „

In order to comply with the instruction of the Minister and the requirements of Parliament, plans and sections of the following lines have been under review, and in many cases entirely new estimates made, others being revised where found desirable :—

Tamworth to Barraba
Tamworth to Manilla.
West Tamworth to Manilla.
Glen Innes to Inverell.
Moree to Inverell.
Deviations to avoid the Lithgow Zig-zag (7).
Deviations at Dargan's Creek (2).
Locksley Deviations.
Mudgee to Gulgong (2).
Gulgong to Coonamble and Walgett.
Gulgong to Coonamble (2).
Coonamble to Walgett.
Dubbo to Coonamble and Walgett (2).
Nevertire to Warren.
Warren to Coonamble.
Byrock to Brewarrina.
Condobolin to Broken Hill.
Berrigan to Finley.
Coonong to Urana.
Picton to Mittagong, *via* Catherine's Hill.
Hill Top to Colo Vale.
Colo Vale to Mittagong.
Goulburn to Crookwell.
Gundagai to Tumut.
The Rock to Brookong.
The Rock to Green's Gunyah.
Wagga Wagga to Humula.
Darling Island Extension.
Rookwood Cemetery Extension.

The following proposed railways have been under the consideration of the Public Works Committee, and a large number of wall maps, plans, sections, and compilations of lithographs have been prepared for their use :—

Tamworth to Manilla.
West Tamworth to Manilla.
Locksley Deviation.
Nevertire to Warren.
Condobolin to Menindie and Broken Hill.
Berrigan to Finley.

Construction having been authorised of the following lines, the working plans, sections, proclaimed plans, police district copies of the same, as well as the land resumption, tracings, &c., have been prepared and arrangements for lithography completed:—

Jerilderie to Berrigan.
Locksley Deviation.
Parkes to Condobolin.
Rookwood Cemetery Extension.
Dargan's Creek Deviation.

Much work has been done in calculating the bearings and distances of the boundaries of land resumptions, for descriptive purposes, as now arranged to be supplied to the Valuation Branch. This work is peculiar to railways, the resumptions for which take place in long and often very crooked strips.

The duties of the office include a great deal of work which cannot be detailed, but which arises through the inquiries of other Departments and Parliament as to railway survey.

The office staff has generally during the year been only sufficient for the current work, and little has been done in the necessary, though less urgent, work of completing trial plans and sections left in an unfinished state, though sufficiently advanced to permit of estimates being prepared.

The staff employed in connection with the railway surveys consisted, on an average, of 32 officers, divided as follows:—1 engineer, 1 assistant engineer, 16 surveyors, and 14 draftsmen.

TRAMWAYS.

The following work is in course of construction:—

Mosman's Bay Electric Tramway.

A single-line tramway from junction of Spit Road and Military Road, North Sydney, forming an extension of the existing Military Road Tramway to Mosman's Bay. Total single track construction, 1 mile 40 chains.

The construction of this tramway, which is on the overhead trolly system, was authorised in January 1896.

Plans and specifications for seven contracts have been prepared as under, for all of which tenders had been accepted by the 30th June:—

No. 1. Plastic bond...	Noyes Bros.
No. 2. Accumulators	R. B. Baynes & Co.
No. 3. Generator and foundations	H. H. Kingsbury & Co.
No. 4. Overhead work, bonds, and switchboard ...	Brush Electrical Engineering Co.
No. 5. Poles and brackets...	Eaton Bros.
No. 6. Permanent-way and accumulator shed ...	George Walters.
No. 7. Motor booster	Brush Electrical Engineering Co.

This tramway is expected to be opened for traffic at the end of October, 1896.

Surveys for Tramways.

Surveys have been completed and working plans and sections prepared for the following proposed tramways:—

A double line electric tramway along George-street and Harris-street, with 6 miles 40 chains of single track.

A double line tramway from Wynyard-street *via* George and Market Streets to Elizabeth-street, with 70 chains of single track.

A double line tramway from foot of Erskine-street to George-street, with 50 chains of single track.

Trial surveys with report and estimate have been made of the following proposed tramways:—

Falcon-street to Willoughby tramway.
Extension of Balmain and Forest Lodge tramway along Darling-street.
Ocean-street to Rose Bay.
Randwick Road *via* Kensington to Rifle Range.
Neutral Bay to Military Road.
Connection of Sydney with North Sydney by sub-aqueous tunnel.

In connection with the proposed tramway to the Field of Mars, estimate of cost and plans, together with other information, were prepared for the Parliamentary Standing Committee.

In connection with the inquiry by the Parliamentary Standing Committee into the George-street and Harris-street Electric Tramway, plans and estimates, together with map of route and drawings for insertion in the report, were also prepared.

A report dealing with a proposed system of rapid transit for the City of Sydney and Suburbs was prepared, together with two maps showing in detail the routes of new tramways suggested. The total cost of the scheme was estimated at £1,748,047. This report was ordered to be printed by the Legislative Assembly on the 10th September, 1895.

A considerable amount of time and attention has been devoted to the design of a standard type of tramway rail. A number of designs were prepared, and eventually a grooved rail of 83 lb. to the yard was selected, and standard permanent-way drawings have been prepared to suit this new rail.

Specifications have been prepared and tenders invited for the supply and delivery of rails and fastenings of the new type for 26 miles of road, but up to the present the contract has not been let.

The staff employed during the year under review on tramway construction, inclusive of the office-work in connection with the preparation of the plans and specifications for the works carried out and proposed, has comprised 1 Supervising Engineer, 2 Assistant Engineers, and 1 Draftsman.

H. DEANE,
Engineer-in-Chief for Railway Construction.

The Under Secretary for Public Works.

(II.)

RETURN of Expenditure on Public Works carried on by Railway Construction Branch from 1st July, 1895, to 30th June, 1896.

RAILWAYS.

Work.	When commenced.	If finished, actual amount of expenditure.	If unfinished, amount of expenditure to 30 June, 1896.	Amount expended from 1 July, 1895, to 30 June, 1896.
		£ s. d.	£ s. d.	£ s. d.
Berrigan to Jerilderie	1895	.....	20,637 15 5	20,637 15 5
Cootamundra to Gundagai	1881	.....	240,437 11 0	3,407 16 3
Cootamundra to Temora	.....	166,556 18 4	.....	1,267 9 9
Culcairn to Corowa	1890	140,239 9 6	.....	2,809 7 4
City Extension	1883	.....	3,776 6 10	52 18 5
Goulburn to Crookwell	1883	.....	6,828 1 10	161 6 0
Gundagai to Tumut	1883	.....	36,843 16 4	48 0 8
Goulburn to Cooma	1881	1,374,610 14 8	.....	59 8 6
Goulburn to Wagga	1879	99,573 1 4	.....	0 7 6
Homebush to Waratah	1881	2,145,247 3 3	.....	896 1 4
Inverell to Glen Innes	1883	.....	11,954 17 0	1,991 17 6
Kiama to Nowra	1883	360,694 3 2	.....	2,294 8 7
Lismore to The Tweed	1883	900,738 12 1	.....	17,977 11 8
Marrickville to Burwood Road	1890	178,592 7 7	.....	15,868 2 4
Molong to Parkes and Forbes	1883	381,217 14 11	.....	2,711 12 4
Murrumburrah to Blayney	1881	1,043,960 10 5	.....	45 9 11
North Shore, from Junction to Crow's Nest	1883	92,057 13 2	.....	99 17 3
Narrabri to Moree	1883	.....	92,057 13 2	83,593 15 11
Nyngan to Cobar	1883	296,273 1 2	.....	3 0 9
Orange to Dubbo	1880	26,429 1 1	.....	25 0 0
Parkes to Condobolin	1895	25,134 15 1	.....	25,134 15 1
Rookwood Cemetery Extension	1895	2,067 7 4	.....	2,067 7 4
Sydney to Wollongong and Kiama	1881	1,048,781 16 10	.....	76 5 9
St. Leonards to Milson's Point	1890	.....	327,332 0 0	16,726 14 3
South Grafton to Glen Innes	1883	.....	9,557 12 11	152 19 8
Tamworth to Tenterfield	1886	232,886 17 1	.....	138 19 4
Tarago to Braidwood	1883	.....	3,365 8 10	5 0 0
Wallerawang to Mudgee	1879	926,663 9 3	.....	9 0 0
Wagga to Tumberumba	1883	.....	5,353 6 2	17 0 0
Total, Railway Construction		9,441,724 16 3	758,144 9 6	198,279 8 10

RETURN of Expenditure on Public Works carried on by Railway Construction Branch, from 1st July, 1895, to 30th June, 1896.

TRIAL SURVEYS.

Work.	Amount expended from 1st July, 1895, to 30th June, 1896.	Work.	Amount expended from 1st July, 1895, to 30th June, 1896.
	£ s. d.		£ s. d.
Broken Hill to Cobar	27 18 4	Locksley Deviation	528 14 11
Broken Hill to Condobolin	29 19 6	Maitland to Grafton	42 5 0
Barraba to Inverell	13 9 5	Monaro to the Coast	50 0 0
Bombala to Eden	7 0 0	Mudgee to Gulgong	3 10 0
Bowral to Robertson	4 0 0	Mudgee to Walgett	116 8 2
Byrock to Brewarrina	77 17 1	Moree to Inverell	1,855 1 11
Barmedman to Hillston	2 6 0	Miscellaneous	372 6 10
Berrigan to Finley	11 18 0	Narrabri to Collarendabri	70 3 0
Casino to Lismore	49 1 0	Nevertire to Warren	86 4 3
Cooma to Bombala	5 19 4	Picton to Mittagong	372 10 5
Coonamble to Menindie	4 0 0	Parkes to Condobolin	1,112 4 9
Coolamon to Ariah	12 1 8	Petersham to Eastwood	18 6 8
Clarence Siding	16 5 2	Rock to Brookong	57 9 6
Cobar to Cockburn	3 13 4	Ryde to St. Leonards	6 0 0
Cobar to Wilcannia	21 10 0	Rydal to Jenolan Caves	14 12 2
Colo Valley	20 0 0	Rock to Green's Gunyah	9 0 6
Coonamble to Walgett	9 3 4	Singleton to Jerry's Plains	181 18 8
Dubbo to Coonamble	65 0 7	Tamworth to Barraba	416 11 0
Dubbo to Walgett	9 0 0	Tamworth to Manilla	286 14 8
Dubbo to Parkes	17 7 1	Tamworth to Inverell	2 0 0
Darling Island	142 5 11	Temora to Hillston	234 3 3
Dargan's Creek Deviation	1,060 19 0	Tempe and Long Nose Point	6 0 0
Eskbank Deviation	0 13 5	Warren to Coonamble	106 9 5
Forbes to Condobolin	106 5 7	Woolabra to Collarendabri	170 0 6
Gulgong to Dubbo	19 10 0	West Maitland to South Grafton	4 10 0
Gulgong to Walgett	7 0 0	Wagga to Humula	3 0 3
Gulgong to Coonamble	12 10 0	Wilcannia to Broken Hill	68 0 0
Guyra to South Grafton	26 6 0	Zig Zag Deviation	1,103 1 9
Glen Righ to Coff's Harbour	9 0 0		
Inverell to Bengalla	4 0 0	Total, Trial Surveys £	9,874 19 7
Jerilderie to Berrigan	781 12 3		

(III.)

RETURN of Expenditure on Public Works carried on by Tramway Construction Branch from 1st July, 1895, to 30th June, 1896.

TRAMWAYS.

Work.	Amount expended from 1st July, 1895, to 30th June, 1896.	Work.	Amount expended from 1st July, 1895, to 30th June, 1896.
	£ s. d.		£ s. d.
Ashfield to Druitt Town	405 17 2	Mossman's Bay (Electric)	339 17 8
Bondi to the Beach	3 16 9	Market-street to George-street Post Office	45 6 0
Balmain—Forest Lodge	10 15 0	Newcastle—Merewether	88 3 8
Circular Quay to Redfern	132 19 0	Newcastle—Tighe's Hill	18 5 8
Day-street	22 8 0	Neutral Bay	13 10 0
Darling-street, Balmain	2 10 0	Rose Bay to Ocean-street	21 4 0
Erskine and King Streets	45 7 4	Redfern to Circular Quay	16 3 4
George-street (Electric)	352 11 6	Regent-street	90 10 11
Hunter's Hill—Field of Mars	33 5 10	Tunnel under the Harbour	1 2 4
Harris-street	168 15 0	Willoughby Extension	4 0 0
King-street	4,724 2 2	Yass Extension	0 12 6
Kensington Extension	13 10 10		
Lane Cove Road	5 10 0	Total Tramway Construction..... £	6,562 2 2
Military Road, North Sydney	1 17 6		

TOTAL Expenditure on Railway and Tramway Construction.

Year.	Railways.	Tramways.	Year.	Railways.	Tramways.
	£ s. d.			£ s. d.	£ s. d.
1857-8	51,467 6 0	.....	1879	946,380 2 6	15,227 10 8
1859	73,659 7 11	.....	1880	1,430,042 15 0	29,008 19 5
1860	210,687 0 2	.....	1881	1,652,978 16 6	108,026 14 8
1861	250,017 12 7	.....	1882	1,695,070 13 3	190,979 0 7
1862	248,245 7 10	.....	1883	2,111,057 9 2	200,835 18 7
1863	311,787 8 5	.....	1884	2,871,684 6 10	105,308 18 10
1864	348,707 11 8	.....	1885	2,489,776 12 7	64,657 17 6
1865	356,234 7 11	.....	1886	2,048,706 13 5	88,509 18 7
1866	494,165 7 8	.....	1887	1,275,118 15 11	49,509 4 11
1867	536,327 1 5	.....	1888	660,885 16 0	.....
1868	538,480 16 5	.....	1889	257,022 14 1	5,546 12 6
1869	444,361 2 11	.....	1890	151,788 11 10	25,453 14 5
1870	436,756 12 11	.....	1891	601,507 17 8	82,808 19 4
1871	282,215 17 7	.....	1892	970,030 10 0	83,260 11 5
1872	134,014 8 3	.....	1893	849,184 13 4	133,094 12 0
1873	81,063 6 8	.....	1st Jan., 1894, to 30th June, 1895	474,763 6 10	116,357 11 1
1874	348,180 18 4	.....	1st July, 1895, to 30th June, 1896	208,154 8 5	6,562 2 2
1875	471,895 4 10	.....			
1876	647,272 5 3	.....			
1877	589,439 19 1	.....			
1878	793,351 4 7	.....	Totals..... £	28,342,484 11 9	1,305,148 6 8

Harbours and Rivers, Water Supply, Water Conservation, and Bridge Construction.

(IV.)

REPORT OF THE ENGINEER-IN-CHIEF FOR PUBLIC WORKS.

Sir, Public Works Department, Sydney, 1 April, 1897.

I forward, herewith, reports of the Principal Assistant Engineers on various works under control of this Branch of the Public Works Department during the year ending 30th June, 1896.

During the greater part of the time covered by the reports, Mr. R. P. Hickson was Engineer-in-Chief for Public Works, while I held the position of President of the Metropolitan Board of Water Supply and Sewerage, and Engineer-in-Chief for Sewerage Construction. The Public Service Board having made further changes, I again found myself back in the Department as Engineer-in-Chief for Public Works, with the following sub-branches under my immediate control:—

1. Harbours and Rivers Navigation.
2. Country Towns Water Supply.
3. Bridge Construction and Renewals.
4. Water Conservation and irrigation.
5. Dredge Service.

The Water Conservation Sub-branch was only transferred to this Department from the Mines Department towards the end of the period under consideration.

1. Harbours and Rivers Navigation.

Mr. H. R. Carleton, Principal Assistant Engineer for Harbours and Rivers, deals fully with all works carried out during the year connected with Harbours and Rivers works; also with Country Towns Water Supply.

I need only add that the weather remained favourable for carrying on the various harbour works, no floods or heavy seas having been experienced, so that very fair progress is apparent at each port.

The total expenditure during the year on various harbours and rivers along the coast was as follows:—

	£	s.	d.
1. Tweed River improvements	6,730	3	5
2. Richmond River improvements	37,694	6	2
3. Clarence River improvements	25,639	2	0
4. Bellinger River improvements	5,077	19	2
5. Nambucca River improvements	303	2	7
6. Macleay River and Trial Bay...	7,773	17	1
7. Manning River improvements	6,026	11	11
8. Hunter River and Newcastle Harbour	17,314	9	8
9. Sydney Harbour	61,799	6	9
10. Reclamation Works, Cook River and Shea's Creek	35,827	14	4
11. Twofold Bay Works	426	10	0
12. Miscellaneous Works at various ports and rivers	42,408	3	3
Total expenditure on Harbour and River works	247,021	6	4
Expenditure on Dredging and Dredge Service	108,434	15	3
Total expenditure on Harbour and River improvements ...	£355,456	1	7

The workshops at Fitzroy Dock were busily employed in reconstructing and altering dredge plant, converting grab dredges into suction dredges, constructing and repairing harbour plant, and sundry work for various other Departments, the total expenditure at the dock being £50,017 7s. 2d.

2. Country Towns Water Supply.

Works connected with the water supply of eleven country towns were in progress during the year, the total expenditure on these water works being £28,453 6s. 10d.

3. Bridge Construction.

Mr. E. M. de Burgh, Assistant Engineer for Bridges, gives full details of the progress made with bridge construction during the year. His staff were kept busily employed, having constructed 125 new bridges, while some 81 were in progress at end of year.

The work in the Drawing Office, under charge of Mr. P. Allen, has been much simplified by adopting type designs, and lithographing sheets of various truss spans in full detail. This system enables a comparatively small staff to speedily turn out complete drawings and specifications for so many contracts.

The principal bridges completed during the year were as follows, namely:—

Wilcannia Bridge, over the Darling River.
Wagga Wagga Bridge, over the Murrumbidgee River.
Deniliquin Bridge, over the Edwards River.

Of those still in progress the principal ones are as follows, namely:—

Swan Hill Bridge, over the Murray River.
Inverell Bridge, over the Macintyre River.

4. Water Conservation.

The report of Mr. H. G. M'Kinney, Principal Assistant Engineer for Water Conservation and Irrigation, is attached, and deals fully with all works in progress; but, as before stated, most of the work referred to was initiated and so far constructed under the Mines Department before the branch was transferred to this Department.

The following works were in course of construction when the transfer was made:—

Lock and Weir across the Darling River at Bourke.
Weir across the Macquarie River at Warren.
Weir across the Macquarie River at Ewenmar, Gil Gil—11 miles from Trangie railway station.
Weir across the Lachlan River to divert water into the Middle Billabong.
Erection of pumping plant and laying out of an irrigation settlement on the Murray River near Wentworth.
Extensive surveys for draining half a million acres of land in the Gwydir District, and numerous other works of a similar nature.

5. Dredging Work.

It will be seen by the returns herewith, accompanying the report of the Superintending Engineer of the Dredge Service, that the dredging operations during the year have been carried out satisfactorily compared with the records of previous years. The continued success of the reclamation work, in Sydney and Newcastle especially, is gratifying, and justifies further expenditure in reclaiming land near large centres of population. The steam barge "Castor" is about being fitted with a very large dredging pump, to be driven by engines of 800 horse-power, with the view of utilising the silt lifted by the Newcastle ladder dredges for forming land at that port, and with the exceptionally large number of ships now coming for coal it may be necessary to ask for a special vote to expedite the contemplated harbour extension. While providing for the wants of Sydney and Newcastle, the rivers and ports north and south have not been overlooked, no less than five combined sand-pumps and grabs having been, during the past twelve months, completed at the Fitzroy Dock and sent away from Sydney.

Owing to the cessation of floods and the improvements resulting from works carried out, it has been found practicable, in many cases, to lessen expenditure by curtailing dredging operations. In reverting to day-work, the services of the Repairing Staff have been availed of to work the plant during meal hours, the dredges thus working 58 hours, and their crews 48 hours per week. Further economy has been effected by placing all the dredges working near each other, as in Sydney and Newcastle, under one Chief Engineer, instead of having, as before, separate controlling officers on each vessel.

Negotiations are in progress for procuring a very light draft self-loading and self-propelling sand-pump, to fill its own hopper while steaming slowly over the shallow bars of the northern and southern rivers.

C. W. DARLEY, M.Inst.C.E.,
Engineer-in-Chief for Public Works.

The Under Secretary for Public Works.

(V.)

REPORT OF THE PRINCIPAL ASSISTANT ENGINEER FOR HARBOURS AND RIVERS.

I FORWARD herewith, for the information of the Engineer-in-Chief for Public Works, my report on the principal Works carried out by this branch of the Works Department during the year July 1st, 1895, to June 30th, 1896, classified as follows:—

(*a*) Works for the Improvement, Maintenance, and convenience of Navigation.
(*b*) Water Supply (gravitation or pumping).
(*c*) Works not comprised under either of the above heads.

H. R. CARLETON,
29/12/96. Principal Assistant Engineer for Harbours and Rivers.

(*a*) North Coast District.

Tweed River.

Training-walls at Entrance.—The total length of these walls is now 25,940 feet, with an output of 192,470 tons of stone. The length constructed during the year was 4,931 feet, with 58,165 tons of stone, costing £6,062 8s. 3d., or 2s. 1d. per ton.

No. 5 Wall was extended 4,531 feet to 10,650 feet from Cave Point seawards, its total length, including portion above Cave Point, being 18,770 feet. The stone used was 55,499 tons costing 2s. 1·05d. per ton. The total quantity of stone used in this wall has been 160,882 tons at a cost of 2s. 0·8d. per ton.

No. 2 Wall.—This wall was extended 300 feet with 733 tons of stone, which cost 1s. 9·96d. per ton. The total length of wall is now 3,800 feet; stone used 9,151 tons at 2s. 6·85d. per ton.

No. 3 Wall.—This wall was completed in September, 1895, 100 feet having been constructed during the year, making its total length now 3,370 feet. 1,933 tons of stone were deposited, costing 2s. 1·2d. per ton. The total quantity of stone in this wall has been 22,437 tons at 2s. 3·49d. per ton.

Cave Point Quarry.—The output of stone for the year was 58,165 tons, costing 18·63d. per ton, making the total output 180,415 tons, costing 20·93d. per ton.

Removal of Rocks at Kynamboon, North Arm.—A channel was cut 25 feet wide and 4 feet deep at low water in May, 1896, through these rocks at a cost of £120.

Snagging of the various creeks mentioned was carried out at the cost set opposite them:—Lavender Creek, £45 19s. 3d.; Murdering Creek, £19 17s.; Dunbible Creek, £10 15s.

Repairs to Wharfs.—Various small repairs have been carried out at a cost of £62 0s. 11d.

Richmond

Richmond River.

Northern Breakwater.—This breakwater has been extended 452 feet, being now 2,130 feet from high-water mark. The stone used was 27,421 tons, at 4s. 1·67d. per ton.

Southern Breakwater.—This wall has been extended 663 feet, having now a total length of 5,352 feet. The stone used was 47,126 tons, costing 3s. 8·26d. per ton.

Riley's Hill Quarry.—94,547 tons of stone were quarried and loaded into punts at a cost of 2s. 0·58d. per ton.

North Creek Canal.—This work was commenced in January, 1895, and on June 3, 1896, the channel was sufficiently far advanced to allow traffic through, the dredge "Alcides" having cut a channel 6,272 feet long, 60 feet wide, and 6 to 8 feet deep at low water; and the grab-dredge "Zeta" one 5,781 feet long, 32 feet wide, and 4 to 5 feet deep, the whole channel being a little over 2¼ miles long.

Bridges over North Creek canal and Fishery Creek were constructed with span, which can be lifted out when it is required for the dredges to go through to deepen the canal. They are both now complete and open for traffic.

Snagging Richmond River and Tributaries.—Work was done at the undermentioned places to the amount set opposite them:—

	£	s.	d.
South Arm	978	14	9
North Arm	283	9	2
Wilson's Creek	908	2	9
Leycester Creek	78	18	11
Bungawalbin Creek	71	14	10
Sandy Creek...	101	12	9
Emigrant Creek	231	5	9
Teven Creek...	102	10	7
Duck Creek	100	1	4
Removing rock, Bungawalbin Wharf	23	12	3
Total	£2,880	3	1

Wharf and Approach at Wyrallah.—A timber wharf 46 feet by 20 feet, with landing stage and approach, was completed on the 15th August, 1895, at a cost of £277 19s. 4d.

Wharf and Approach at Broadwater.—A similar wharf to that at Wyrallah was completed on the 3rd September, 1895, at a cost of £305 8s. 6d.

Tucki and Gunderimbah wharfs were repaired at a cost of £118, and Coraki wharf, shed, and crane at a cost of £125 16s. 3d.

Clarence River District.

Improvement Works at Entrance.

South Training-wall at Entrance.—The work under this contract is practically completed, the staging from which the stone is deposited has been finished for some time and the stone-work carried out to its full length, but there is still stone-work to be done in raising parts of the wall and filling in subsidences. The total length of wall is 12,177 feet, 1,110 feet having been completed during the year. There was no extension on the breakwater, the work done being merely repairs.

This work has proved a complete success, the depth of water now obtainable in the channel along the wall ranging from 30 to 50 feet.

North Training-bank.—The work of removing the old walls to low water and depositing the stone in the north training bank was carried on by day labour, 57,773 tons of stone having been removed at a cost of 2s. 0·68d. per ton, extending the wall seawards a distance of 1,201 feet, making its total length 2,547 feet.

Removal of Court-house Rocks, Maclean.—The work of removing these rocks was continued till April, when the work was stopped for want of funds, about 10,570 tons having been removed, leaving about a quarter of the work still to be done when funds are available.

Removal of Rocks, South Arm.—This consists in cutting a straight channel 100 feet wide and 8 feet deep through the centre of the South Arm about three-quarters of a mile from its juncture with the main river at Maclean. 805 tons of rock had been removed on June 30th for an expenditure of about £400.

A timber wharf, 60 feet by 15 feet, with landing stage, has been erected at Woodfordale by contract, at a cost of £267.

Woolgoolga Jetty Repairs.—A contract was let for replacing the wooden landing stage by a galvanized iron ladder, repairing the crane seating, and replacing two piles which had been destroyed by *teredo*, for the sum of £125.

Macleay River District.

Bellinger River Improvements.

Half-tide Training-wall.—This wall was extended outwards from 2,500 to 2,810 feet from wharf, or 310 feet, and inwards from 200 feet to 1,100 or 900 feet, making total for year 1,210 feet, and length of wall to date 3,920 feet. The stone used for the twelve months was 26,338 tons, costing £4,938, or a total to date of 61,285 tons, costing £11,491. This work is being done by contract.

Nambucca River Improvements.

North Training-wall.—Work was started on this wall February 29th, 1896, and 334 feet constructed 12 feet wide on top, 4 feet above high-water mark, with 2,978 tons of stone, at a cost of £438.

Macleay River Improvements.

Works at New Entrance.—A start was made on April 1st, 1896. Two quarries have been opened at Rudder's Hill. 7,400 feet of railway formation have been completed, and 5,400 feet of rails laid and ballasted. The clearing of line of channel in front of dredge has been nearly completed, and tip trucks received from the Clarence are being repaired. Stone will be sent from the quarry very shortly.

Repairs, Yarrahappini Wharf.—A new front row of piles was put in at a cost of £65.

Sundry small repairs to wharfs were carried out, costing £145.

Trial Bay Harbour Works.

11,720 tons of stone were deposited in the breakwater, which was extended from 487 to 537 feet, or 50 feet, the cost being 5s. 2·78d. per ton, the high price being due to the very large quantity of stripping and small stone in the quarry. It is now, however, improving, and very much better results may be looked for. The average number of prisoners in the gaol has been 92, 48 of whom have been employed in the breakwater works. In addition to the work on the breakwater, the gaol and quarters have been kept in repair.

Newcastle District.

Hastings River.

Wauchope Wharf.—A new wharf, 46 feet frontage by 20 feet deep, with boat landing-stage and shoot from cargo shed, was in course of construction to replace the old wharf, which was not fit for repair.

Manning River.

North Training-wall.—This wall was extended 575 feet, with 24,448 tons of stone, costing £3,872.

River Training-wall, North Side.—This wall was run out 420 feet with 9,688 tons of stone, costing £993. The scour having deepened the water in front of the north training-wall very considerably, it was thought advisable to coat the bottom with small stone deposited by punts, and the coating is now extended 500 feet in front of the tip head. This has taken 4,227 tons of stone, at a cost of £614, and has had a very beneficial effect on the progress of the wall.

Glenthorne Wharf.—A new timber wharf, 90 feet long by 10 feet wide, and 30 feet on the front, was constructed at a cost of £207.

Taree Wharf was repaired at a cost of £55.

Cape Hawke.—Tuncurry Wharf was repaired, at a cost of £20.

Karuah River.—Booral Wharf was redecked and otherwise repaired, at a cost of £108.

Newcastle Harbour.

The Rock-breaker "Poseidon" removed a portion of the 13-feet rock near No. 4 crane. 2,332 cubic yards were lifted, at a cost of £1,147; also about 424 square yards of the 12-foot patch at Stony Point to an average depth of 3 feet. Neither of these works was finished.

The "Poseidon," in conjunction with the Rock-excavator "Cliona," also excavated 12,000 cubic yards of rock in front of the wool berths at the Queen's Wharf, leaving a depth of 24 feet at low water. The cost was £2,500, exclusive of lifting.

Newcastle Wharfs.

The timber wharfs at Newcastle, Bullock Island, and Stockton, 11,800 feet in length, were kept in repair, at a cost of £1,416.

A contract was let for reconstructing and widening by 10 feet 760 feet of the Queen's Wharf, to provide two berths for loading wool and frozen meat with 24 feet at low water, so as to allow the large steamers to load to their capacity.

A waiting-shed and lamp were erected on the ferry wharf at Hereford-street, Stockton.

The light-keepers' quarters at Nobby's, and the leading-light towers on the southern breakwater were repaired, at a cost of £115.

Breakwaters and Guide Wall.—In preparation for carrying out this work, the railway lines on the southern breakwater were relaid, line to guide wall commenced, line from Wallsend railway to site for new quarry nearly finished, and a large amount of work done in opening up the quarry at Waratah. Reservoir, powder magazine, store, and blacksmith's shop, were constructed at quarry.

Paterson River.—Hunter Wharf was repaired, at a cost of £48. A wharf and shoot were being erected at Woodville.

A large amount of work was also done in connection with repairs to dredges and other plant at the workshop at the south end of Bullock Island Wharf. All the coal used by the Department on the northern rivers was purchased and shipped, and numerous surveys and soundings for wharfs and other proposed works were carried out in various parts of the district.

Sydney and South Coast District.

Port Jackson.

Wharfs.—The No. 1 Berth of west side of Circular Quay, 460 feet long, was completed in August, 1895, by contract. The land ties were broken by the weight of the filling at the back, and the wharf moved slightly out, but new wire-rope ties were put in, and the wharf successfully restored to its position. The cargo shed on this wharf, 250 feet by 30 feet, of timber, roofed with tiles, was let by contract; but, owing to the movement in the wharf, the contract was terminated, and the shed completed by day labour. A wharfinger's office was also erected by contract, at a cost of £146.

No. 2 Berth.—The old wharf, including the cargo shed, was removed during August, 1895. The new wharf, commenced by the contractor in November, consists of a timber structure on piles. It is 447 feet long, and 48½ feet wide, and was practically completed on June 30th.

The filling received for the back of this wharf and for the completion of No. 1 Berth was 40,809 tons, consisting of 21,041 tons deposited by drays and ships free of cost and 19,225 tons from the excavation at Woolloomooloo Bay.

The retaining-wall at back of wharf was extended with 1,246 cubic yards of masonry.

No. 2 Jetty, Circular Quay, was altered so as to allow of a floating stage being attached to it.

460 tons of large boulders and clay were removed from the front of No. 3 Berth by the floating 15-ton crane.

Woolloomooloo Bay.—The work of levelling off the resumed land and filling in at back of proposed new wharfs was commenced in July, 1895. 25,569 tons have been excavated, of which 19,255 tons have been sent to other works, and 6,314 tons deposited on site. The back rows of piles for the new wharfs were driven by contract, 284 piles being now in place. A contract was let for the renewal and straightening of this berth for a distance of 400 feet at the western end, and is now nearly completed. The foundations and floor of wood blocks for new cargo-shed at this berth were done by day-labour, and a contract was let for the erection of shed 175 by 35 feet, with tiled roof.

The work of deepening in front of the eastern berth, Pyrmont Wharf, was commenced in November, 1895, and 3,772 tons of rock were excavated.

A ferry jetty of timber on piles was completed in November, 1895, at Augustus-street, Leichhardt.

Wharf at the Spit, Middle Harbour, was repaired by contract.

A new jetty and shed at Alexandria-street, Hunter's Hill, which were required for the use of the ferry steamers, to replace the old worn-out structure, were completed in June.

A new ferry jetty at Manly Beach was completed in October, 1895, and consists of a timber wharf on piles, 360 feet long by 30 feet wide, with cargo-shed, waiting-rooms, and offices.

A small wharf was erected at Cockatoo for landing timber to be stored on the island for the use of the Bridges Branch.

The following wharfs have been repaired:—

Late A.S.N. Co's. Wharf; Princes Stairs; Manly Co-operative Jetty; Port Jackson Co's. Wharf and Shed; Watson Bay Co's.; Southern Berth, eastern side of Circular Quay; Orient Co's.; Messageries Maritimes Co's.; P. and O. Co's.; Horse Ferry; Man-o'-war Steps; Pyrmont Wharfs; Erskine-street Ferry; Blackwall; Drummoyne; Longueville; Woolwich; Cockatoo Island (2); Augustus-street, Leichhardt; Gladesville; Mortlake; Putney; Shark Island; and Neutral Bay.

Rushcutters' Bay Sea-wall.—The foundations for this wall have been dredged out, 35,612 tons of silt having been lifted and deposited inside the line of wall. A masonry wall, 915 feet long by 6 ft. 6 in. high, on a stone ballast foundation, was also completed.

Cook's River.

Shea's Creek Canal.—The upper section of the canal was completed in January, 1896, the work being kept dry by diverting the creek and all water in the bottom of the excavation pumped out. The next section was commenced in March, and is not yet complete. Work was stopped during the whole of June owing to the flooding of the workings. The quantity excavated from the upper section was 185,430 cubic yards, and from the lower 77,959 cubic yards—a total of 263,389 for ten months' work. The whole of the resumed land above Ricketty-street, and for a considerable distance below, has been brought to formation level. The pitching of the side slopes of the canal with stone has been commenced, and 1,650 square yards have been done since February.

Cook's River.—The banks of this river, between the dam at Tempe and the Sewer Syphon Bridge, have been repaired or faced up with fascines for a length of $4\frac{3}{4}$ miles, and a small subsidence at the Sewerage Farm made good with silt. The whole of the resumed land in connection with these works has been fenced in where practicable, and a mound and drain constructed on the shore boundary where necessary. The flood-gates at the Tempe Dam have been repaired at the northern end. The upper end of the river has been flushed out.

Muddy Creek.—The extension of this branch canal to Bestic-street was completed in August, 1895. The extension was 2,000 feet; the dimensions of the canal being 100 feet wide on top, 50 feet at the bottom, and 10 feet deep.

Coogee Sea-wall Extension.

This wall was extended as far as the north side of Dolphin-street with a similar class of work to the old wall, and the road and footpath were made up along the extension.

Coogee Baths.

These baths have been cleaned out, all loose rocks and awkward projections removed, and concrete dressing platforms erected.

South Coast Wharfs.

The following wharfs have been repaired:—Bermagui, Nelligen, Eden, Tathra, Bateman's Bay, and Narooma.

Wharf and Crane, Montague Island.

A wharf and crane for landing stores, &c., for the use of the lighthouse keepers are in course of construction.

Lighthouses, Leading Light Towers, Quarters, &c.

Tacking Point Lighthouse.—The keeper's quarters were prepared and some additions made, costing £47.

Nobby's.—The lightkeeper's quarters were repaired at a cost of £110.

Bull Beacon, Newcastle.—Small repairs were done.

Barrenjoey Lighthouse.—The electric bells were put in order.

Hornby Lighthouse.—In July, 1895, new eaves, gutters, and downpipes were placed on keeper's quarters, and in February, 1896, general repairs were done to same buildings. New lightning conductor was placed on lighthouse, and electric bells put in order.

Signal Station, South Head.—New eaves, gutters, and downpipes were erected and roofs repaired; new tarred metal pathways and paving in yards put down outside of all buildings, and flagstaffs painted.

Macquarie Lighthouse.—The whole of inside and outside of the lighthouse buildings and quarters are being painted and repaired.

Jervis Bay Light.—Plans are being prepared for a new lighthouse on Point Perpendicular, and the lantern and machinery are now being constructed in England by Messrs. Chance Brothers.

Surveys, Sounding, and Borings.

The following surveys were carried out by the Head Office Survey Staff, under the Chief Surveyor, in addition to those carried out by the local Engineers; Wharf sites at Long Cove, Montague Island, Jervis Bay, and Alexandria-street (Hunter's Hill); Ulladulla drainage; part of Bradley's Head; east side of Woolloomooloo Bay; part of Garden Island; Seal Rocks (search for rock supposed to have caused wreck of "Catterthun"); soundings round Garden and Spectacle Islands; east side of Rushcutter's Bay; sites for Horse Ferry, Fort Macquarie and Dawes' Point; east end Glebe Island Bridge; Coogee Seawall; Hen and Chicken's Bay; Mansfield-street (Balmain). Surveys and soundings of Newcastle Harbour from entrance to 3 miles above Fullarton Cove.

Plans were made from previous surveys of Bellambi Haven, Port Kembla, Newcastle Harbour, Parsley Bay, part of Hunter River (above Maitland), Berry's Bay, Clarence River entrance, Clarence River at Lawrence, and Table Bay.

A report was made on the Tuggerah Lake entrance, and 121 cases of private reclamation were examined and dealt with.

Fitzroy Dock Establishment, Cockatoo Island.

Work carried out from July 1st, 1895, to 30th June, 1896:—

	£ s. d.	£ s. d.
Dredge Service—		
General Repairs to Ladder Dredges	3,431 8 10	
General Repairs to Suction and Grab Dredges	4,723 3 11	
New Sand Pumps, inspecting Stores, &c.	98 8 10	
General Repairs to Tugs	5,673 9 11	
General Repairs to Barges and Reclamation Punts	1,994 19 10	
		15,921 11 4
Dredge "Delta"—Ordinary Repairs	9 10 1	
Lengthening 26 feet, and converting into combined Grab Dredge and Sand Pump	2,835 4 9	
		2,844 14 10
Dredge "Eta"—Ordinary Repairs	10 13 2	
Purchase of portion of material for alterations	146 0 3	
		156 13 5
Dredge "Rho"—Lengthened and converted into a combined Grab and Sand Pump Dredge	.....	4,207 6 7
Dredge "Sigma"—Lengthened and converted into a combined Grab and Sand Pump Dredge	.....	4,169 16 9
Dredge "Tau"—Lengthening 28 feet, and converting into a combined Dredge and Suction Dredge, cost to date	.....	1,840 1 8
Dredge "Theta"—Ordinary Repairs	24 2 2	
Lengthening and converting into a combined Grab and Suction Dredge, cost to date	310 19 0	
		335 1 2
Tug "Dayspring"—Docking, taking out old machine and refitting with new boilers and engines	.....	774 1 1
Tug "Little Nell"—Docking, taking out old engine and replacing with engine out of "Achilles"	.....	279 11 8
Tug "Mikado"—Docking, taking out old boiler and replacing with "Dayspring's" old boiler, and general overhaul	.....	946 15 7
Anchor boat "Octopus"—Constructing new hull and boiler and fitting with "Swift's" engines	.....	1,661 6 4
Tug "Galatea"—Constructing new hull and boiler and fitting with "Little Nell's" engines, part cost	.....	1,671 16 9
Special Service—Repairing "Thetis" boat, &c.	.....	545 17 6
5-ton Floating Crane—Repairs	.....	74 0 0
15-ton Floating Crane—Repairs	.....	107 2 0
Reclamation Works—New gymbal joints, silt valve, pipes, and repairs to pipes, &c.	.....	1,316 6 4
"Leila," Steam Launch—Repairs and wages	.....	552 19 2
New Boiler Shop	.....	172 6 11
Dock and Establishment (Fitzroy Dock)—		
Rock excavation	693 9 1	
Tramline	187 18 2	
Material for Docking, General Repairs, &c.	1,227 15 6	
Fitting up "Swift"	275 3 5	
Boiler, Blacksmith's, Machine, Moulding, and Pattern Shops, and Saw-mill	854 4 3	
		3,238 10 5
Sutherland Dock—		
Repairs to Cranes and Tramline	181 9 0	
Repairs to Machinery, Boilers, &c., and material for Docking	708 18 1	
		890 7 1
H.M. Vessels—		
Labour and Materials for Repairs	466 5 3	
Labour for Docking	236 17 4	
		703 2 7

	£ s. d.	£ s. d.
Merchant Vessels—Labour for docking		259 13 6
Electric Light—Working expenses		393 5 9
Circular Quay Improvements, &c.—Land ties, repairs to boats, &c.		677 0 6
Shea's Creek—Repairs to locomotive, &c.		222 6 7
Darling Harbour Wharf—		
Repairs to wharf...	249 13 7	
Repairs to cranes	333 2 7	
		582 16 2
Divers' punt—Repairs to hull, machinery, &c.		151 16 10
Spectacle Island—Altering cranes, &c.		217 1 6
Floating Jetty, Prince's Stairs		299 10 3
South Solitary Island—Crane		42 13 5
Country Towns' Water Supply—Sundries		155 12 11
Centennial Park Reservoir—Testing coke, concrete arch...		112 7 5
Metropolitan Water and Sewerage Board—Repairs, silt barge "Ino"		30 3 9
Mines Department—General repairs, launch "Golden Fleece"...		122 1 5
Torpedo Launch "Avernus"—General overhaul		513 18 6
Pilot Steamer "Captain Cook"—Docking and general repairs		234 9 8
Health Department Launch—Docking and general repairs		105 5 10
Abattoir punt—Docking and alteration		620 14 7
N.T.S. "Sobraon"—Repairs to hull, pump, launch, &c.		587 1 8
Trial Bay Harbour Works—Repairs to steam-winches, boilers, cranes, trucks, &c.		222 13 10
Richmond River Harbour Works—Repairs to locomotive, drills, &c.		115 0 9
Glebe Island Bridge—Repairs to girders and widening fairway...		298 15 5
Middle Harbour Steam Ferry Punt—Repairs		90 8 8
Roads and Bridges Branch—Various repairs	287 13 11	
Roads—Wharf, &c., for storage of timber at Cockatoo	416 9 5	
		704 3 4
Sundry small works		848 15 9
Total		£50,017 7 2

(*b*) Water Supply.

Junee.—These works (described in previous report) were completed, but owing to prolonged dry weather the storage reservoir is not yet filled. The dam was completed by day labour.

Lithgow.—These works (described in previous report) were completed.

Armidale.—The works in connection with this scheme (previously described) were completed, with the exception of the concrete dam, which is being carried out by day labour. The town is being supplied with water from a temporary dam.

Coonamble.—These works were completed. The water, which flows from an artesian bore about 1,300 feet in depth, is cooled and ærated by spraying into an elevated tank, from which it is distributed through the town in the usual manner. The whole of the water not being required for domestic purposes, a considerable quantity will be available for irrigation.

Nyngan.—An earth-work levee, 35 chains in length, was constructed by day labour to protect the right bank of the Bogan River above the dam from erosion by floods.

Dubbo.—The engine house was enlarged and a duplicate boiler erected to enable a large factory to be supplied with water. The flow from the diluvial drift from which the water is pumped shows no signs of diminishing, even in the dryest seasons.

Moss Vale.—The down-stream face of the dam was protected with a rubble-stone apron.

Parkes.—The work of deepening the pump-well, referred to in the previous report, was completed, but without increasing the flow of underground water so much as was expected. A survey was made for a gravitation supply from the Billabong Creek at a point about 12 miles from the town.

Cootamundra.—The flow of underground water from which the town is supplied not proving in dry seasons so great as was expected from the borings, a survey for a gravitation scheme from Hardy's Creek, at a point about 4 miles from the town, was made.

Tamworth.—A survey was made for a gravitation scheme from Moore Creek, at a point about 13 miles from the town.

Hunter District Water Supply.—A duplicate suction main of wrought-iron, 21 in. in diameter, was laid from the intake works to the Walka pumping-station. The cost of laying was £1,917 9s. 2d.

Country Towns Water Supply.—The contract for the supply of valves, hydrants, &c., also contract for engines, boilers, and reservoir for Dubbo Water Supply, were carried out under this office.

Surveys and investigations were made with the view of supplying water to the following towns, viz., Wollongong, Condobolin, Bowral, Cooma, Inverell, Tenterfield, and Shellharbour.

(*c*) Works not included under (*a*) or (*b*).

North Coast District.

Richmond River Flood-prevention Works.—Widening and deepening the channel of the Evan's River at the Irongates. This work was commenced in April, 1895, a contract having been let for £2,550. In December the contractor abandoned the work, leaving about three-quarters of the under-water excavation to be done.

Construction of Flood-relief Channel, Weir, and Bridge near Woodburn.—This work was begun on August 7th, 1895, a contract having been let for £5,155, but owing to the unsatisfactory manner in which the work was carried out the contract was cancelled in March, 1896, and the work is now being completed by men employed by the Government.

Macleay

Macleay River District.

Crescent Head Flood Cutting, No. 2.—This cutting, 400 feet long, was completed at a cost of £139. It was constructed for the purpose of relieving the Hastings of some of its flood waters by way of the Maria River, and the Macleay of some by way of the Belmore.

Newcastle District.

Reclamation at Stockton.—The retaining-walls were extended 550 feet with 13,142 tons of stone and 630 tons of clay ballast obtained from ships. 11,650 tons of ballast were discharged at the Stockton ballast jetty and used for covering the sand pumped ashore by the sand-pump "Juno."

Reclamation at Bullock Island.—The wall, west side of new basin, was extended 350 feet with 1,760 tons of stone and 715 tons of clay.

102,971 tons of ballast were discharged from 176 vessels at the Bullock Island ballast jetties, averaging 585 tons per ship, and were used for reclaiming Crown lands at the north end of Carrington.

Hunter River Bank Protection, West Maitland.—During August and September, 1895, 513 cubic yards of rubble stone were deposited along the toe of the bank at the Horse Shoe Bend, where the scour had undermined portion of the fascine work. During May and June, 1896, 2,086 cubic yards of stone were placed at the toe of the bank.

Cleaning out Wallis Creek.—This work was completed in July 1895, at a cost of £488, being done by a gang of the unemployed from West and East Maitland.

Removal of Bridge, Hexham Island to Mainland.—This bridge which was erected by the North Stockton Coal Company, for the purpose of conveying coal to the Government Railway line, and afterwards abandoned as the company had gone into liquidation, was removed by the Department, as it had become an obstruction to the flow of water in the channel, at a cost of £193 10s.

Sydney and South Coast District Reclamations.

The following works were carried out in connection with the reclamation of land by the sand-pump dredges :—

Long Cove.—The ground reclaimed by the "Groper" has been levelled, 3,818 tons of silt having been landed and spread over the surface, 1,200 cubic yards of new bank, and 292 lin. ft. of road, 18 ft. wide constructed. The finished portion has been grassed. 13,163 lin. ft. of old piles and 6,674 feet of new have been driven under contract for the purpose of sustaining the banks.

Rozelle Bay.—The work of levelling off, covering with silt, planting grass, shifting pipes, and constructing berms has been carried out by day labour. 2,120 tons of silt having been landed and spread, a drain 2,287 ft. x 12 ft. x 4 ft. cut to divert Johnston's Creek and a berm 2,200 feet long constructed to protect the tram-line.

White's Creek.—This work was commenced in January 1896, the Gordon-street embankment having been backed up with silt and fascines to prevent subsidence.

White Bay.—The filling in of the low-lying land adjoining the north side of the Government reclamation was commenced in September 1895, and about 3,000 tons of ballast were used. The storm-water drain from the Abattoir-road has been diverted to the southern side of Glebe Island near Swan's Wharf.

Naval Station, Garden Island.

Dressing-sheds, &c., at Swimming baths.—A contract for the erection of dressing-sheds, latrines, urinals, shower-baths, fencing, and gates in connection with the swimming-baths, was completed in July, 1895, at a cost of £352.

Coal-stores.—A contract for coal-stores, to hold 2,500 tons, was completed in August, 1895, costing £2,012.

Latrines for Workmen.—A contract was let for the erection of latrine accommodation for workmen in connection with engineering workshops. The building is of brick and cost £143. It was completed at end of April.

Boat-repairing Shop.—The old building not being worth repairing, a contract was let for a new one on the same site, of timber on stone foundations with tiled roof. It is 80 ft. x 40 ft. with a 13-ft. awning along one side. Store-rooms are provided ; also a gantry for lifting the boats into position. The cost was £647.

The ballast-wall at north-western portion of Island was trimmed off to a uniform batter, and 600 lineal feet of 15 in. by 9 in. coping set.

Spectacle Island.

Ammunition racks and repairs to Gunners' quarters.—In February new ammunition racks were placed in the fireworks and fuze stores, and general repairs and painting were carried out at the quarters of the officer-in-charge. Cost £120.

The whole of the tarred blue-metal paving on the Island was repaired and top-dressed, all the old lightning-conductors were repaired and six new ones erected, and additional fittings, arm racks, &c , were constructed. The wooden tram-lines have also been overhauled and repaired.

H. R. CARLETON,
Principal Assistant Engineer, Harbours and Rivers.

29 December, 1896.

(VI.)

REPORT OF THE SUPERINTENDENT OF DREDGES.

Sir, Department of Public Works, Harbours and Rivers Branch, 5 April, 1897.

I beg to submit for your information the customary detailed returns of dredging work for the year 1896, by which it will be seen that the operations and the cost of them compare satisfactorily with those of the preceding and of previous years.

In a Colony like ours, the volume of trade has depended so much upon the conditions of the many rivers and ports of the seaboard that it became a necessity to take advantage of the best methods of dealing with obstructions to navigation, and so successful has been the use of the improved appliances that it was found, as shown in the last Dredging Report, that the cost of work did not exceed that of the Mother Country and the Continent of Europe. To have been satisfied with these results would have meant a speedy alteration from a foremost to a secondary position in regard to deepening operations, and when Mr. Carleton, Mr. Walsh, and the writer were appointed, in 1895, to report upon the Dredge Service, there was no hesitation in recommending, for further economy, that the dredges should no longer cease working during meal-hours, the plants during these periods to be kept going by the repairing staff and others, thereby, as in Queensland, utilising the machinery so as to obtain 20 per cent. more work out of it without asking the employees to do more than would be required of them in the mercantile marine service of the Colony. This arrangement, after obtaining approval, came into force in August last, and, with the exception of a little friction which can be reduced, has worked with distinct advantage to the Dredge Service vote. Another recommendation approved, and from which the best results may be looked for, was reducing the annual vote for dredging, with the understanding that if Parliament thought any special work, beyond upholding the channels in their normal condition, desirable, the laid-up plant could be employed at it and paid from a special vote for the particular work. Under this arrangement; he sand-pump "Neptune" has been put to work deepening Cook's River and reclaiming land near Botany Bay. Similarly, the sand-pump "Dorus," partly paid from special vote, is being used for cutting the new entrance to the Macleay, on completion of which the vessel may either be laid-up and expenditure upon crew, &c., cease, or be sent to some other special work for which the Legislature may be disposed to vote funds.

Throughout the past year the conversion of grab dredges into sand-pumps (see plates attached) has been vigorously proceeded with at the Fitzroy Dock. Already five vessels have been so altered, and have been found to perform the work required of them admirably. The first of them, the "Sigma," after being lengthened 20 feet and fitted with large boiler, compound engines, sand-pump, and Priestman's grab, was sent to the Myall River in March last; the "Rho," finished in May, was sent to Cape Hawke; the "Delta," in September, to Camden Haven; the "Tau," in December, to Port Hacking, preparatory to going to Moruya; and the "Theta," last week, to the Bellinger. Two more vessels are being lengthened, risen upon, and fitted with pumping machinery, viz., the "Eta," for the Hastings, and the "Gamma," for the Paterson-Hunter Rivers and Lake Macquarie.

Excellent reclaiming work continues to be done by the Von Schmidt suction dredge "Groper" opposite the Abattoirs, Sydney Harbour, and by the "Jupiter" at Newcastle, the material at both places being pumped through 20-inch pipes a distance of half a mile. The system of reclaiming alternate months at the White's Creek and Glebe Point areas will result in securing for the State 80 acres of valuable building land, which, if sold, will far more than repay the Government the cost of converting it from a hot-bed of disease to sanitary dwelling-house sites for the citizens of Sydney; while, at Newcastle, although in lesser degree, the reclamations effected at Carrington by the "Jupiter," and at Stockton by the "Juno," will, after all expenses are calculated, be sources of no inconsiderable emolument to the State, and will amply justify, apart altogether from the ordinary Dredge Vote, the placing of a substantial sum of money on the Estimates for the dual purpose of increasing the deepwater area for ships, and reclaiming land to be sold at an opportune time, in order to recoup the Treasury for the expenditure required to create the asset.

The information conveyed in the attached sheets is so complete in all details, as to localities where dredging has been carried out, the quantity and cost of work, and the percentages of working hours at dredging, coaling, repairs, &c., that I have not deemed it necessary to repeat the particulars in this Report.

All the dredge plant has been kept in good working condition, and such of it as has not been in commission has been properly cared for.

I have, &c.,

A. B. PORTUS.

The Engineer-in-Chief, Public Works, Sydney.

HARBOURS AND RIVERS DEPT. N.S.W.

DIAGRAM SHEWING TOTAL DREDGING OPERATIONS FROM 1875 TO 1896.

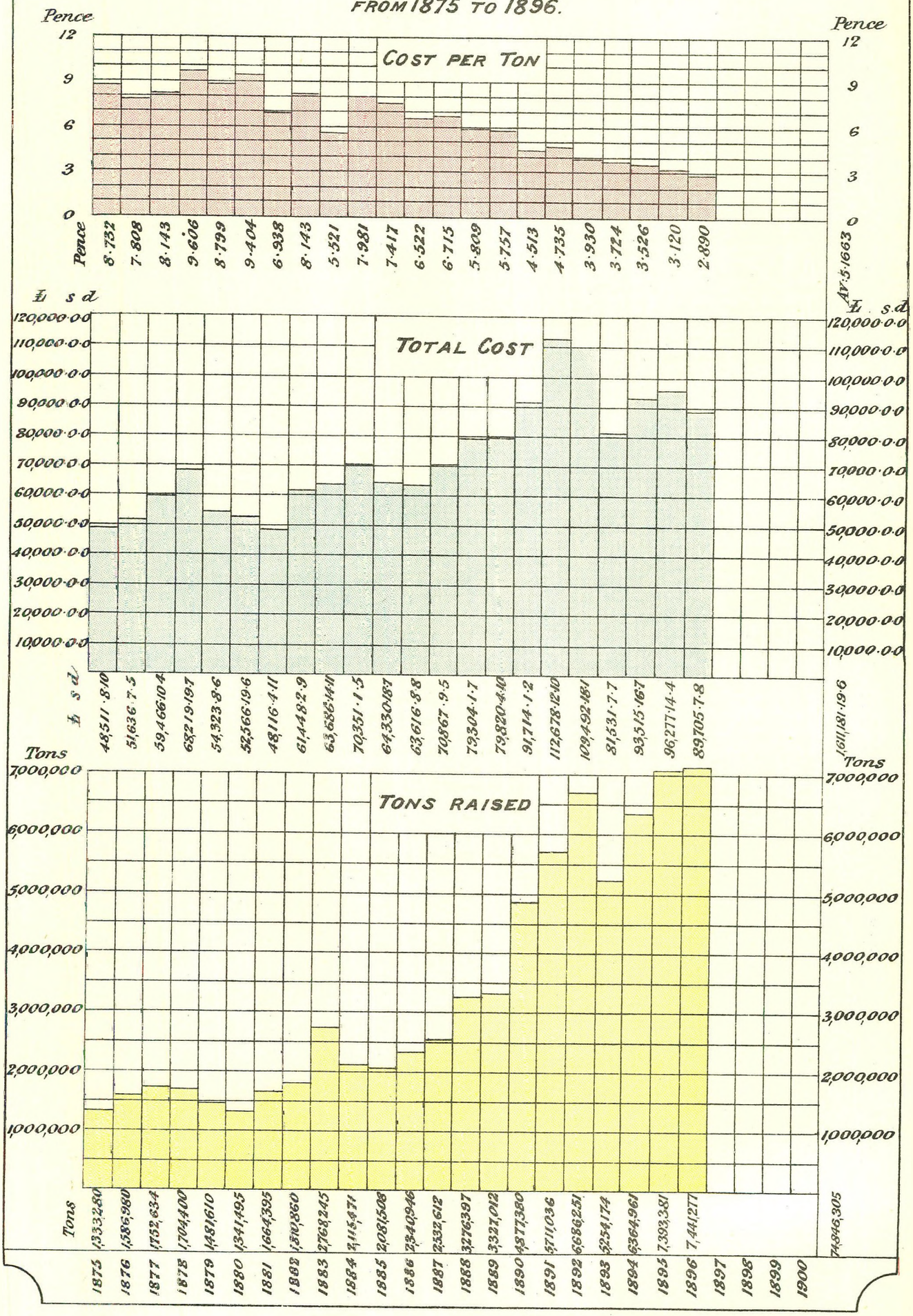


PHOTO-LITHOGRAPHED AT THE GOVT. PRINTING OFFICE,
SYDNEY, NEW SOUTH WALES.

DIAGRAM

SHEWING QUANTITY OF SAND AND ROCK DREDGED YEARLY IN NEWCASTLE HARBOUR.

FROM 1859 TO 1896.

YEAR	TONS DREDGED YEARLY ROCK	SAND	TOTAL
1859		37,388	37,388
1860			
1861	14,710		14,710
1862	15,600		15,600
1863	11,500		11,500
1864	24,980		24,980
1865	22,210	6,840	29,050
1866	11,480	47,200	58,680
1867	4000	223,865	227,865
1868	10,515	101,068	111,583
1869	3,836	24,380	28,210
1870	7,984	160,760	168,744
1871	26,280	86,860	113,140
1872	15,900	16,800	32,786
1873	32,570	217,190	249,760
1874	16,580	351,840	368,420
1875	680	650,080	650,760
1876	17,480	803,720	821,200
1877	11,960	824,598	836,558
1878	12,710	662,833	675,545
1879	70,800	391,880	462,680
1880	4,640	435,260	439,900
1881		524,250	524,250
1882		566,250	566,250
1883	470	920,925	921,395
1884	8095	791,575	799,670
1885	17,035	633,588	650,683
1886	13,440	846,121	859,561
1887		981,027	981,027
1888		1,328,727	1,328,727
1889	725	1,396,175	1,396,900
1890	8,772	1,476,645	1,485,417
1891	10,338	2,005,515	2,015,853
1892	6,392	2,256,898	2,263,290
1893	5,268	1,539,742	1,545,010
1894	4,705	1,492,215	1,553,920
1895	4,273	2,501,442	2,505,715
1896	3,047	2,405,528	2,408,575
1897			
1898			
1899			
1900			
1901			
TOTAL	419,120	28,037,166	28,456,286

TO END OF 1896.

PHOTO-LITHOGRAPHED AT THE GOVT. PRINTING OFFICE,
SYDNEY, NEW SOUTH WALES.

STATEMENT of Ladder-dredge Expenditure and Work for the Year 1895.

Ladder Dredges.	Where dredging.	Material lifted	Tons dredged.	Hours dredging	Working hours.	Expenditure	Cost per ton	Cost per hour dredging	Cost per working hour.	Percentage Working Hours.							Remarks.
										Dredging.	Coaling.	Removals.	Bad Weather	Waiting Punts	Repairs.	Other causes	
						£ s d	d	£ s. d.	£ s. d								
"Samson"	Newcastle Harbour	Sand and mud	545,625	2,707	4,181	5,686 4 1	2·501	2 2 0	1 5 4	60	1	2	12	2	22	1	
"Sydney"	Sydney Harbour	Sand and sewage	363,290	1,706	2,399	2,633 19 5	1·740	1 10 10	1 1 11	72	1	9	1	2	14	1	
"Charon"	Hawkesbury	Mud and sand	170,340	1,831	2,381	1,853 18 11	2 612	1 0 3	0 15 6	77	3	6	..	1	12	1	
"Newcastle"	Newcastle Harbour	Sand and mud	1,312,430	4,057	6,807	8,593 8 9	1·571	2 2 4	1 5 2	59	1	1	24	1	13	1	
"Hunter"	Sydney Harbour	do	403,840	1,634	2,401	3,724 9 7	2·134	2 5 7	1 11 0	68	1	5	1	6	18	1	
"Vulcan"	Newcastle & Hunter River	do	229,480	1,471	2,406	3,331 17 11	3·484	2 5 4	1 7 8	61	1	6	14	2	15	1	
"Alcides"	Richmond River	Clay and mud	215 500	2,928	3,955	3 067 18 11	3 416	1 0 11	0 15 6	74	1	1	1	1	19	3	
"Fitzroy"	Macleay River	Sand and clay	186,590	1,314	2,610	2 821 15 5	3·629	2 2 11	1 1 7	51	3	11	2	2	28	3	
"Ulysses"	Manning River	Shingle and mud	186,040	1,312	2,422	2,421 19 5	3 124	1 16 11	0 19 11	55	1	7	3	4	29	1	
"Minos"	Clarence River	Sand and shingle	239,030	1,619	2,410	2,303 17 2	2 313	1 8 5	0 19 1	67	2	8	3	1	18	1	
"Pluto"	Shoalhaven	Sand	92,400	682	1 330	1,308 3 11	3·396	1 18 4	0 19 8	51	4	5	1	4	34	1	
"Archimedes"	Moruya	do	35,560	437	1,09	937 8 10	6·326	2 2 10	0 17 2	40	2	1	19	26	11	1	
			3,980,125	21,698	34,692	38,685 2 4											
	Averages						2 332	1 15 8	1 2 3								

STATEMENT of Sand-pump Dredge Expenditure and Work for the Year 1895.

Sand pump Dredge.	Where pumping.	Material lifted	Estimated tons lifted	Hours pumping	Working hours	Expenditure	Cost per ton	Cost per ton towing.	Cost per working hour	Percentage Working Hours.							Remarks
										Pumping.	Coaling.	Removals	Bad weather	Conveying silt to sea	Repairs.	Other causes	
						£ s d	d.	£ s d	£ s. d.								
"Neptune"	Sydney Harbour and Bateman's Bay.	Sand and mud	309,670	1,383	2,268	3,393 6 5	2·629	2 9 0	1 9 11	61	1	9	3	16	9	1	Includes cost of depositing 146,700 tons at sea.
"Juno"	Sydney and Newcastle	do	295,410	1,495	2 510	2,585 13 11	2 100	1 14 7	1 0 7	59	1	14	1	6	18	1	
"Jupiter"	do do	do	197,890	1,058	1,790	2,793 9 5	3 384	2 12 9	1 11 2	59	1	24	1		11	4	Includes cost of depositing 28,900 tons at sea.
"Actor"	Tweed River	Sand	331,812	1,327	2,393	1,950 4 3	1·410	1 9 4	0 16 3	57	4	14	5		19	1	
"Alesus"	Macleay and Nambucca Rivers.	do	461,137	2,614	4,108	3,744 16 4	1 948	1 8 8	0 16 11	59	2	17	6	.	15	1	
"Dorus"	Newcastle	Sand and mud	312,800	1,564	2,153	2,332 11 0	1 789	1 9 10	0 19 0	63	2	18	2	...	14	1	
"Dictys"	Richmond River	Sand	301,575	1,235	2,402	2,536 10 2	2·019	2 1 1	1 1 1	51	3	25	1	...	17	3	
"Groper"	Sydney Harbour	Sand and mud	343,370	1,029	2,399	3,836 2 0	2 681	3 14 6	1 11 11	42	14	1	..	13	29	1	
			2,553,664	11,705	20,623	23,169 13 6											
	Averages						2·177	1 19 7	1 2 5								

Statement of Grab Dredge Expenditure and Work for the Year 1895.

Grab Dredge.	Where dredging.	Material lifted.	Tons dredged.	Hours dredging.	Working hours.	Expenditure.	Cost per ton.	Cost per hour dredging.	Cost per working hour.	Percentage working hours.							Remarks.
										Dredging.	Coaling.	Removals.	Bad weather.	Waiting punts.	Repairs.	Other causes.	
						£ s. d.	pence.	£ s. d.	£ s. d.								
"Alpha"	Tweed River	Snaggs and gravel	61,535	1,427	2,561	688 15 0	2·686	0 9 8	0 5 4	56	11	12	3	1	16	1	
"Beta"	Cape Hawke	Sand and shells	30,200	1,705	2,413	906 13 4	7·205	0 10 7	0 7 6	70	1	1	1	1	26	...	
"Gamma"	Hastings River	Shingle	43,950	1,798	2,430	821 8 0	4·485	0 9 2	0 6 9	73	1	1	7	1	17	...	
"Delta"	Hunter & Paterson Rivers	Sand and timber	80,800	1,846	3,633	1,032 9 6	3·066	0 11 2	0 5 8	50	1	8	2	22	13	4	
"Zeta"	Richmond River	Sand, snaggs, &c.	74,534	3,166	3,947	1,091 18 10	3·516	0 6 11	0 5 6	80	1	1	1	...	10	7	
"Eta"	Camden Haven	Fine sand	46,650	1,849	2,414	757 10 4	3·897	0 8 2	0 6 2	75	2	3	1	1	16	2	
"Theta"	Clarence River	Shingle and rock	9,585	858	2,688	710 7 0	17·786	0 16 6	0 5 3	31	1	1	7	...	4	56	
"Iota"	Nambucca River	Gravel	52,902	1,669	2,400	810 10 1	3·677	0 9 8	0 6 9	70	1	4	1	...	22	2	
"Kappa"	Sydney Harbour	Mud	71,080	2,147	3,432	1,406 0 9	4·747	0 13 1	0 8 2	62	1	6	...	6	20	3	
"Mu"	Sydney and Myall River	Sand, rocks, &c.	23,030	861	2,318	1,010 19 11	10·535	1 3 6	0 8 8	38	4	8	3	18	19	10	
"Nu"	Sydney and Newcastle	do do	18,935	1,383	2,104	706 2 9	8·950	0 10 2	0 6 8	66	1	13	1	6	12	1	
"Omicron"	Cook's River	Sand and mud	61,194	2,012	2,405	507 18 4	1·992	0 5 1	0 4 2	84	1	3	...	4	7	1	
"Pi"	Moruya	Sand	58,170	1,326	2,428	721 19 9	2·978	0 10 10	0 5 11	55	4	6	2	8	20	5	
"Sigma"	Myall River	Hard sand	1,310	66	486	234 19 2	43·045	3 11 2	0 9 8	14	3	26	46	3	7	1	
"Rho"	Newcastle	Mud and rock	13,855	1,007	1,544	541 3 10	9·374	0 10 8	0 7 0	66	1	8	9	3	9	4	
"Tau"	Richmond River	Indurate, sand, &c.	52,807	1,638	2,476	745 6 0	3·387	0 9 1	0 6 0	67	1	7	1	1	16	7	
"Chi"	Bellinger River	Mud	102,880	3,677	5,369	1,327 10 3	3·096	0 7 2	0 4 11	69	1	4	1	1	23	1	
"Omega"	Clarence River	Rock and clay	56,175	1,774	2,422	859 1 10	3·670	0 9 8	0 7 1	74	1	8	2	...	7	8	
			859,592	30,209	47,500	14,880 14 8											
	Averages						4·154	0 9 10	0 6 3								

Statement of Tug Expenditure and Work for the Year 1895.

Tugs.	Where employed.	Tons towed.	Miles run towing.	Miles run on special service.	Total working hours.	Hours attending.	Cost of towing.	Cost of special service.	Cost per ton.	Cost per mile towing.	Cost per mile special service.	Cost per working hour.	Cost per hour attending.	Percentage of time.					Remarks.
														Steaming.	Coaling.	Repairs.	Bad weather.	Other causes.	
							£ s. d.	£ s. d.	pence.	pence.	pence.	s. d.	s. d.						
"Ajax"	Sydney and Newcastle	165,960	7,752	612	2,131	1,809	1,452 18 7	126 5 5	2·10	44·98	49·51	14 10	17 6	65	1	16	11	7	
"Thetes"	Sydney	21,280	1,020	5,562	1,852	1,776	222 16 0	1,304 19 7	2·51	52·42	56·30	16 6	17 2	48	1	4	22	25	
"Castor"	do	249,530	7,620	197	2,338	2,119	1,533 16 1	99 8 5	1·47	48·30	121·12	13 11	15 4	62	4	9	1	24	
"Ceres"	Newcastle	514,425	15,167	235	4,211	3,646	2,940 7 8	65 19 5	1·37	46·52	195·91	14 3	16 5	62	2	13	11	12	
"Orestes"	do	1,304,850	23,605	110	6,558	5,999	2,945 4 7	13 6 5	0·54	29·94	29·00	9 0	9 10	67	1	9	19	4	
"Dione"	Newcastle and Manning River.	197,000	7,058	108	2.641	2,260	918 14 2	31 19 4	1·11	31·23	71·03	7 3	8 4	60	1	14	12	13	
"Rhea"	Newcastle and Richmond River.	70,821	12,401	.....	3,392	2,981	1,550 3 1	.....	5·25	30·0	...	9 10	10 4	69	1	12	11	7	
"Dawn"	Sydney	53,705	2,925	11,622	3,221	2,879	243 13 4	1,170 16 8	1·08	19·99	24·18	8 9	9 9	83	1	10	...	6	
"Achilles"	Sydney and Richmond River.	179,632	5,246	232	2,021	1,669	1,669 13 5	60 2 0	2·23	76·38	62·17	17 1	20 8	64	1	18	5	12	Extensive alterations and repairs.
"Little Nell"	Sydney and Newcastle	196,560	5.308	365	1,756	1,566	1,264 7 0	89 18 11	1·54	57·11	59·14	15 5	17 3	72	2	11	2	13	
"Charbydis"	Manning River	125,600	2,462	98	1,863	1,242	568 6 4	14 10 11	1·08	55·40	35·62	6 3	9 4	40	1	34	4	21	
"Athena"	Macleay River	142,660	4,321	10	2,229	1,824	562 3 6	1 10 10	0·94	31·22	37·0	5 0	6 3	56	1	19	3	21	
"Ganymede"	Newcastle	20,750	809	5,840	2,597	2,402	83 12 2	597 2 6	0·96	24·80	24·53	5 3	5 8	85	1	7	...	7	
"Dayspring"	Hawkesbury River	161,245	3,807	107	2,470	2,183	696 7 7	12 6 8	1·03	43·90	27·66	5 8	6 6	61	3	12	1	23	
"Mikado"	Moruya and Shoalhaven	127,540	7,400	332	2,527	2,064	810 6 0	47 15 0	1·52	26·28	34·51	6 9	8 3	58	2	18	7	15	
"Scylla"	Sydney	127,990	3,970	2,684	2,596	2,118	457 16 0	314 15 11	0·85	27·67	28·14	5 11	7 3	73	1	18	1	7	
"Callisto"	Bellinger River	39,180	2,143	.....	3,247	1,673	747 16 4	.....	4·58	83·74	...	4 7	8 11	34	2	48	4	12	
"Ariel"	Myall River	16,264	1,809	58	2,467	1,668	205 13 0	1 7 3	3·03	27·28	5·63	1 8	2 6	31	4	33	2	30	
"Vesta"	Clarence River	116,200	3,713	218	2,303	1,889	320 0 2	9 11 10	0·66	20·68	10·55	2 10	3 5	54	3	18	2	23	
"Oberon"	Hastings River	42,550	3,352	64	2,441	1,889	271 0 1	2 18 1	1·52	19·40	10·89	2 2	2 10	44	1	23	4	28	
"Aurora"	Sydney	237,975	4,253	2,398	2,863	2,607	443 19 5	194 8 11	0·44	25·05	19·46	4 5	4 10	72	2	9	1	16	
"Europa"	Moruya	10,590	664	.....	916	639	94 13 10	.....	2·14	34·22	...	2 0	2 11	43	3	30	...	24	
"Red Lechtie	Hunter and Paterson Rivers.	74,200	4,221	10	3,698	3,159	310 15 7	0 15 9	1·00	17·67	18·90	1 8	1 11	38	3	15	1	43	
"Cyclops"	Sydney and Newcastle	31,860	1,707	5	659	480	1,287 17 4	10 16 6	9·70	181·07	519·06	39 4	54 1	56	3	28	7	6	Extensive repairs.
"Galatea"	do do	52,210	2,312	.....	644	619	315 19 10	.....	1·45	32·80	...	9 10	10 2	58	1	4	12	25	
		4,280,577	135,045	30,867	63,646	53,160	21,918 1 1	4,170 16 4											
	Averages								1·22	38·95	32·42	8 2	9 9	58	2	17	6	17	

Statement of Ladder Dredge Expenditure and Work, year 1896.

Ladder Dredges	Where dredging.	Material lifted.	Tons dredged.	Hours dredging	Working hours.	Expenditure.	Cost per ton	Cost per hour dredging.	Cost per working hour.	Percentage working hours.							Remarks
										Dredging.	Coaling.	Removals.	Bad weather.	Waiting punts.	Repairs.	Other causes	
						£ s. d.	d.	£ s. d.	£ s. d								
"Simson"	Newcastle	Sand and mud .	547,585	2 191	3,896	4,286 11 4	1·877	1 19 1	1 1 11	56	2	2	13	10	16	1	
"Sydney"	Sydney Harbour ..	Clay, sewage, and mud	363,070	1,842	2,591	3,375 2 11	2 242	1 16 9	1 6 0	72	2	6	...	4	13	3	
"Charon"	Brisbane Water and Port Hacking.	Sand and mud	145,370	1,380	2,175	2,151 15 6	3 552	1 11 2	0 19 9	64	5	9	...	3	19	...	Brisbane Water, 11,390 tons, £188 10s 8d, 3 97d per ton; Port Hacking, 133,980 tons, £1,963 4s. 10d, 3·51d. per ton.
"Newcastle"	Newcastle	do	963,250	3,062	5,049	6,737 3 4	1 678	2 4 0	1 6 8	60	1	2	15	10	12	...	
"Hunter"	Sydney Harbour and Lane Cove River.	Sand, sewage, and mud	204,950	1,247	1,764	2,659 14 10	3 114	2 2 7	1 10 1	70	2	6	...	6	15	1	
"Vulcan"	Hunter River	Sand and mud	212,130	1,755	2,593	2,704 1 1	3 059	1 10 9	1 0 10	67	...	6	6	8	13	...	
"Alcides"	Richmond River .. .	do	104,900	1,966	2,804	2,337 12 8	5 348	1 3 9	0 16 8	70	...	3	...	...	21	6	
"Fitzroy"	Macleay River	do	183,546	2,102	3,698	3,087 7 4	4 036	1 9 4	0 16 8	56	5	7	.	...	23	9	
"Ulysses"	Manning River . .	do	220,630	1,577	2,559	3,202 16 8	2 505	1 9 2	0 17 11	62	2	6	.	5	23	2	
"Minos"	Clarence River	Shingle	153,360	1,145	2,516	2,072 5 0	3 242	1 16 2	0 16 5	45	2	9	16	2	26	...	
"Pluto"	Shoalhaven	Sand and mud	128,280	948	1,821	1,570 10 11	2 939	1 13 1	0 17 2	53	4	4	5	7	27	..	
"Archimedes"	Rozella Bay	do	76,170	727	981	867 14 8	2 734	1 3 10	0 17 8	75	1	15	...	1	8	...	
			3,303,241	19,942	32,447	34,149 16 3											
	Average						2·481	1 14 2	1 1 0	63	2	6	4	4	19	2	

Statement of Sand-pump Dredge Expenditure and Work for the year 1896.

Sand pump Dredge	Where pumping	Material lifted.	Estimated tons lifted.	Hours pumping	Working hours	Expenditure.	Cost per ton	Cost per hour dredging	Cost per working hour.	Percentage working hours.							Remarks.
										Pumping.	Coaling.	Removals.	Bad weather	Conveying silt to sea.	Repairs	Other causes	
						£ s d	d.	£ s. d.	£ s d								
"Neptune"	Bateman's Bay, Twofold Bay, and Sydney Harbour	Sand and mud	175,200	902	2,092	2,429 9 6	3·32	2 13 10	1 3 2	43	1	8	5	20	21	2	Includes cost of depositing 151,400 tons at sea Bateman's Bay, 134,800 tons, £1,179 14s 5d, 2 10d per ton, Twofold Bay, 16,600 tons, £929 4s 8d, 13 43d. per ton Sydney, 23,800 tons, £320 10s. 5d. 3 23d per ton.
"Juno"	Newcastle	do	312,300	1 527	2,535	2,726 5 6	1 91	1 15 8	1 1 6	60	1	12	...	1	23	3	Includes cost of depositing 8,000 tons at sea.
"Jupiter"	do	do	546,300	1,748	2,544	2,862 4 11	1·25	1 12 8	1 2 6	68	4	6	2	...	19	1	
"Actor"	Tweed River	Sand	386,250	1,545	2,603	2,275 0 2	1 41	1 9 5	0 17 5	59	3	15	...	.	22	1	
"Alesus"	Nambucca River	do	294,400	1,472	2,549	2,821 18 8	2 30	1 18 3	1 2 1	57	2	10	2	..	28	1	
"Dorus"	Macleay River	do	444,000	2,220	3,687	3,472 13 10	1 87	1 11 3	0 18 10	60	3	12	2	...	20	3	
"Dictys"	Richmond River	do	321,360	1,111	2,195	2,076 0 2	1·55	1 17 4	0 18 10	50	1	23	4	.	15	7	
"Groper"	Sydney Harbour	Sand and mud	583,015	1,740	2,545	3,192 14 6	1 31	1 16 8	1 5 1	68	...	5	...	...	15	12	
			3,092,825	12,265	20,750	21,856 16 3											
	Averages						1·69	1 15 7	1 1 0	58	2	12	2	2	20	4	

Statement of Combined Grab and Sand-pump Dredge Expenditure and Work for 1896.

Grab and Sand-pump	Where pumping	Material lifted	Estimated tons lifted.	Hours pumping	Working hours	Expenditure.	Cost per ton	Cost per hour dredging.	Cost per working hour.	Percentage working hours.							Remarks.
										Pumping.	Coaling.	Removals.	Bad weather.	Conveying silt to sea.	Repairs.	Other causes.	
						£ s. d.	d.	£ s. d	£ s. d.								tons. £ s. d.
"Delta"	Sydney and Camden Haven	Sand	70,460	626	1,124	716 4 7	2·43	1 2 10	0 12 8	55	1	32	...	...	4	8	Sydney..... 500 49 3 11
"Sigma"	Myall River	Sand and mud	149,600	1 360	2,393	1,477 12 1	2·37	1 1 8	0 12 4	56	5	19	1	...	8	11	Camden H. 69,960 667 0 8
"Rho"	Cape Hawke	do	166,790	1,283	1,973	1,352 10 2	1·91	1 1 1	0 13 8	65	3	21	...	...	7	4	
"Tau"	Port Hacking	Sand	18,980	146	476	779 11 1	9·85	5 6 9	1 12 9	30	1	39	...	...	10	20	Outfitted and started work, December, 1896.
			405,830	3,415	5,966	4,325 17 11											
		• Averages...					2·55	1 5 4	0 14 6	52	2	28	...	...	7	11	

Statement of Grab Dredge Expenditure and Work for the year 1896.

Grab Dredge.	Where dredging.	Material lifted.	Tons dredged.	Hours dredging	Working hours.	Expenditure	Cost per ton.	Cost per hour dredging.	Cost per working hour.	Percentage working hours.							Remarks
										Dredging	Coaling.	Removals	Bad weather.	Waiting punts	Repairs.	Other causes.	
						£ s. d.	d	£ s. d.	£ s. d.								
"Alpha"	Tweed River	Sand and mud	41,423	1,102	2,508	816 1 5	4 728	0 14 9	0 6 6	44	12	7	2	. .	33	2	
"Beta"	Cape Hawke	do	29,625	1,209	2,458	1,539 15 7	12 474	1 5 5	0 12 6	49	...	8	...	6	34	3	
"Gamma".	Hastings River..... . .	do	49,850	1,844	2,413	714 18 10	3 442	0 7 9	0 5 11	76	2	4	2	...	16	. .	
"Zeta"	Richmond River	do	63,950	2,956	3,736	1,065 9 11	3 998	0 7 2	0 5 8	79	...	...	...	...	16	5	
"Eta"	Camden Haven	Mud	46,220	1,260	1,740	573 11 9	2 978	0 9 1	0 6 7	72	4	13	.		11	...	
"Theta"	Clarence River	Rock	2,025	239	1,095	389 14 4	46·188	1 12 7	0 7 1	21	..	1	17	2	14	45	
"Iota"	Nambucca River	Gravel	45,991	1 495	2 445	940 0 4	4·905	0 12 6	0 7 8	62	2	8	. .	...	28	.	
"Kappa"	Hunter River and Lake Macquarie.	Sand and shingle .	75,450	1,698	3,550	1,105 7 1	3·516	0 13 0	0 6 2	47	3	12	6	18	14	...	
"Lambda"...	Richmond River	Sand, gravel, and clay	6,995	1,093	1,726	271 14 10	9 323	0 4 11	0 3 1	64	...	6	2	..	4	24	
"Mu"	Myall & Richmond Rivers	Mud, sand, and clay .	50,950	1 355	2,505	839 5 0	3·953	0 12 4	0 6 8	55	2	12	11	...	18	2	
"Nu"...	Newcastle	Rock	9,140	1,905	2,664	606 19 11	15 938	0 6 4	0 4 6	72	2	4	...	7	12	3	
"Omicron"	Cook's River	Sand and mud	66,148	1 974	2,475	506 13 10	1 838	0 5 1	0 4 1	82	...	9			9	...	
"Pi"	Moruya	do ...	47,675	1 174	2,130	710 14 3	3 577	0 12 1	0 5 10	49	5	10	...	9	18	9	
"Chi"	Bellinger River	Sand	84,368	2 913	3,791	1,014 5 10	2 885	0 6 11	0 5 4	76	2	3	2	3	14	...	
"Omega"	Clarence River	Sand, shingle and rock	19,571	1,025	2,563	707 1 3	8 670	0 13 9	0 5 6	40	1	6	7	1	6	39	
			639,381	23,248	38,098	11,801 14 2											
		Averages					4,429	0 10 1	0 6 2	59	2	6	4	4	16	9	

Statement of Tug Expenditure and Work for the Year 1896.

Tugs.	Where employed	Tons towed.	Miles run towing.	Miles run special services	Total hours working	Hours attending	Cost of towing	Cost of special service.	Cost per ton	Cost per mile towing	Cost per mile special service	Cost per working hour.	Cost per hour dredging.	Percentage of time.					Remarks.
														Steaming.	Coaling.	Repairs	Bad weather.	Other causes.	
							£ s. d.	£ s d.	pence	pence	pence	s. d	s. d						
"Ajax"	Sydney	5,610	575	1,400	543	509	110 8 9	252 4 7	4·72	46 09	43·23	13 4	14 3	57	2	6	22	13	
"Thetis"	do	7,370	679	7,851	3,154	2,444	153 3 7	2,661 11 11	4 98	54 14	81·36	17 10	23 0	36	1	28	13	22	
"Ceres"	Newcastle	528,535	14,146	... ..	3,859	3,214	2,610 4 6	....	1·18	44 28	...	13 6	16 2	63	2	12	10	13	
"Orestes"	do	962,750	19,013	... ..	4,968	4,501	2,931 14 10	.. ..	0 73	37 00	...	11 9	13 0	73	2	9	12	4	
"Dione"	Manning River	219,830	5,817	24	2,897	2,240	1,061 8 4	1 14 3	1 15	43 79	17 12	7 4	9 5	55	2	16	3	24	
"Dawn"	Sydney	107,435	4,571	4,611	2,351	1,976	614 8 1	582 16 9	1 37	32 25	30 33	10 2	12 1	75	2	14	...	9	
"Achilles"	do	262,330	8,080	16	2,700	2,566	869 15 9	1 7 2	0 79	25 83	20 37	6 5	6 9	65	4	4	.	27	
"Little Nell"	do	218,940	4,827	16	1,641	1,562	707 6 4	1 16 4	0 77	35 16	27·25	8 7	9 0	69	2	5	...	24	
"Ganymede"	Newcastle	8,210	325	6,582	2,579	2,399	30 8 5	664 11 11	0 89	22 49	24 23	7 6	7 6	84	.	8	...	8	
"Dayspring"	Sydney	31,120	1,111	2,908	2,318	1,161	682 5 3	1,906 6 6	5 26	147 38	157 33	22 4	14 7	35	1	49	2	13	
"Cyclops"	Brisbane Water and Shoalhaven	79,105	2,999	256	1,826	1,317	676 14 7	90 5 4	2 05	54 15	84 62	8 4	11 7	52	3	26	6	13	
"Mikado"	Shoalhaven and Sydney	68,740	4,195	4,788	2,878	2,120	727 3 3	822 3 3	2 53	41 60	41 21	10 9	14 7	64	1	19	4	12	
"Scylla"	Sydney & Lake Macquarie	25,400	3,555	4,882	2,742	2,596	192 11 2	232 16 6	1 81	12·99	11 44	3 1	3 3	78	5	8	...	9	
"Callisto"	Bellinger River	70,150	2,746	.....	3,808	3,187	625 19 4	....	2 14	54·70	...	3 1	3 11	51	2	16	2	29	
"Ariel"	Myall River and Newcastle	3,320	386	4,578	2,541	2,091	62 17 11	270 0 7	4 54	39·10	14·15	2 7	3 2	47	3	17	...	33	
"Vesta"	Clarence River	92,700	3,193	799	2,779	2,178	262 4 8	66 7 7	0 67	19·71	19·93	2 4	3 0	54	3	22	9	12	
"Oberon"	Hastings River	49,700	3,384	34	2,394	1,981	244 8 3	0 19 10	1 18	17 33	7 00	2 0	2 5	46	3	19	1	31	
"Europa"	Moruya	6,215	213	1,500	1,529	1,290	216 2 10	93 13 4	8·34	243 39	14 98	4 0	4 9	25	1	16	..	58	
"Aurora"	Sydney and Port Hacking	172,380	7,013	633	2,681	2,521	555 15 8	50 14 1	0 77	19 02	19 30	4 6	4 9	75	3	6	2	14	
"Red Lechtie"	Newcastle & Hunter River	56,700	1,675	60	2,735	2,055	349 8 10	3 8 0	1 47	50 06	13 60	30·96	41·20	23	2	23	3	49	
"Galatea"	do do	213,180	10,694	60	2,750	2,632	1,025 9 9	5 17 7	1 15	23 01	11·11	7 6	7 10	74	3	4	4	15	
"Octopus"	Sydney	20,520	1,282	4,193	2,215	2,039	100 9 10	423 11 9	1·17	18 81	24·24	4 8	5 1	88	1	7	2	2	
"Castor"	do	260	215	418	183	182	51 0 8	193 7 11	47 10	56·96	111 04	26 8	26 10	58	1	...	20	21	
		3,210,500	100,694	45,609	58,071	48,752	14,861 10 7	8,325 15 2											
	Averages								1 11	35 42	43·81	7 11	9 5	58	2	15	6	19	

Statement of comparative quantity and cost of work done by Ladder Dredges (including towing), 1894, 1895, 1896.

Ladder Dredges	1894 Dredging, towing, and repairing			1895. Dredging, towing, and repairing			1896. Dredging, towing, and repairing			Remarks.
	Tons.	Expenditure.	Pence per ton.	Tons.	Expenditure	Pence per ton	Tons.	Expenditure	Pence per ton.	
		£ s d.			£ s d			£ s. d		
"Samson," at Newcastle	500,280	7,580 12 9	3 572	545,625	8,852 9 10	3 893	547,585	6,956 13 3	3 04	
"Sydney," at Sydney	318,080	7,101 12 0	5·358	363 290	4,421 4 10	2 920	363,070	4,717 11 4	3 11	
"Charon," at Hawkesbury River and Port Hacking	113,760	2,831 12 1	5 974	170,340	2,612 9 9	3 680	145,370	2,785 15 11	4 59	
"Newcastle," at Newcastle	1,193,045	11,822 12 3	2 378	1,312,430	11,586 18 2	2·118	963,250	9,681 15 9	2 41	
"Hunter," at Sydney	253,725	6,350 14 2	6 007	403,840	6,764 3 5	4 019	204,950	3,973 0 7	4 65	
"Vulcan," at Newcastle and Hunter River	231,150	4,106 17 1	4 264	229,480	5,238 18 4	5 479	212,130	3,727 3 10	4 21	
"Alcides," at Richmond River	166,340	2,776 6 5	4 005	215,500	3,239 11 10	3 607	104,900	2,337 12 8	5·34	
"Fitzroy," at Macleay River	245,310	3 326 19 1	3 254	186,590	3,383 18 11	4 352	183,546	3,435 2 2	4·48	
"Ulysses," at Manning River	234,200	3,488 19 8	3 575	186,040	3,267 10 1	4 215	220,630	3,364 5 0	3 65	
"Minos," at Clarence River	171,540	2,921 10 2	4 087	239,030	2,623 17 4	2 634	153,360	2,334 9 8	3 65	
"Pluto," at Shoalhaven	.....	... . ..	... ...	92,400	1,887 4 4	4 901	128,280	2,747 2 4	5·14	
"Archimedes," at Moruya and Sydney	65,370	2,857 4 1	10 489	35,560	1,346 8 1	9 087	76,170	1,463 2 3	4 61	

1896	Tons.	£	s.	d.	Pence per ton.
Hawkesbury River.	11,390	214	1	4	4 51
Port Hacking	133,980	2,571	14	7	5·41
1895.					
Newcastle	12,000	265	12	11	5·31
Hunter River	217,480	4,973	5	5	5·48

STATEMENT of comparative quantity and cost of work done by Sand-pump Dredges (including towing), 1894, 1895, 1896.

Sand Pump Dredges.	1894. Dredging, Depositing, and Repairing.			1895. Dredging, Depositing, and Repairing.			1896. Dredging, Depositing, and Repairing.			
	Tons.	Expenditure.	Pence per ton.	Tons.	Expenditure.	Pence per ton.	Tons.	Expenditure.	Pence per ton.	
		£ s. d.	d.		£ s. d.	d.		£ s. d.	d.	1896. Tons. £ s. d. Pence per ton
"Neptune," at Sydney, Bateman's, and Twofold Bays	24,900	3,552 18 9	3·424	309,670	3,396 3 11	2·632	175,200	2,497 8 7	3·42	Bateman's Bay 134,800 1,212 14 4 2·15 Twofold Bay... 16,600 955 4 6 13·81 Sydney ..... 23,800 329 9 9 3·32
										1895. Sydney .....168,070 1,856 0 2 2·65 Bateman's Bay 141,600 1,540 3 9 2·61
"Juno," at Newcastle	238,400	3,023 5 4	3·043	295,410	2,585 13 11	2·100	342,300	2,726 5 6	1·91	Sydney .....107,960 1,076 1 8 2·39 Newcastle .....187,450 1,509 12 3 1·93
"Jupiter," at Newcastle	.....	....	.....	197,890	2,793 4 5	3·386	546,300	2,884 2 7	1·26	Sydney ..... 80,990 1,265 18 8 3·75 Newcastle .....116,900 1,526 5 9 3·13
"Actor," at Tweed River	246,200	2,629 18 5	2·564	331,812	1,969 4 3	1·424	386,250	2,275 9 2	1·41	
"Alesus," at Macleay and Nambucca Rivers	485,300	3,994 11 2	1·975	461,137	4,091 1 4	2·129	294,400	2,821 18 8	2·30	
"Dorus," at Newcastle and Macleay River	289,400	2,379 0 8	1·973	312,800	2,332 11 0	1·789	444,000	3,730 9 10	2·01	
"Dictys," at Richmond River	337,500	2,598 8 10	1·847	301,575	2,549 4 5	2·028	321,360	2,087 18 11	1·55	
"Groper," at Sydney Harbour	428,175	3,470 12 6	1·942	343,370	3,839 12 0	2·737	583,015	3,194 1 8	1·31	

STATEMENT of quantity and cost of work done by Grab and Sand-pump Dredges (including towing).

Grab Sand Pump.	1894.			1895.			1896.		
	Tons.	Expenditure.	Pence per ton.	Tons.	Expenditure.	Pence per ton.	Tons.	Expenditure.	Pence per ton.
								£ s. d.	d.
"Delta" at Sydney and Camden Haven							70,460	873 13 1	2·98
"Sigma," at Myall River							149,600	1,543 5 1	2·48
"Rho," at Cape Hawke							166,790	1,422 10 8	2·04
"Tau," at Port Hacking							18,980	1,008 7 3	12·7

STATEMENT of comparative quantity and cost of work done by Grab Dredges (including towing), 1894, 1895, and 1896.

Grab Dredges.	1894. Tons.	1894. Expenditure.	1894. Pence per ton.	1895. Tons.	1895. Expenditure.	1895. Pence per ton.	1896. Tons.	1896. Expenditure	1896. Pence per ton.
		£ s. d.	d.		£ s. d.	d.		£ s. d.	d.
"Alpha," at Tweed River	31,950	952 3 7	7·161	61,535	688 15 0	2·686	41,423	816 1 5	4·72
"Beta," at Cape Hawke and Sydney	32,850	1,332 8 9	9·734	30,200	1,186 13 4	9·430	29,625	2,012 4 0	16·32
"Gamma," at Hastings River	32,700	1,805 7 8	13·250	43,950	1,092 8 1	5·965	49,850	959 7 1	4·61
"Delta," at Hunter and Paterson Rivers	35,340	1,327 5 4	9·013	80,800	1,356 0 6	10·566	.....	.....	.....
"Zeta," at Richmond River	13,237	710 9 6	12·881	74,534	1,091 18 10	3·516	63,950	1,065 9 11	3·99
"Eta," at Camden Haven	41,170	1,148 17 3	6·697	46,650	1,031 5 4	5·305	46,220	955 16 10	4·96
"Theta," at Clarence River	47,855	809 16 4	4·061	9,585	710 7 0	17·786	2,025	660 7 4	78·26
"Iota," at Nambucca River	35,386	712 5 8	4·730	52,902	810 10 1	3·677	45,991	950 10 4	4·90
"Kappa," at Sydney, Hunter River, & Lake Macquarie	52,855	1,035 2 6	4·700	71,080	1,527 5 6	5··56	75,450	1,713 7 9	5·45
"Lambda," at Richmond River	.....	.....	.....	.....	.....	.....	6,995	276 14 10	9·49
"Mu," at Myall and Richmond Rivers	.....	.....	.....	23,030	1,226 9 6	12·781	50,950	980 9 11	4·61
"Nu," at Newcastle	5,335	811 7 1	36·499	18,935	807 9 4	10·233	9,140	638 6 6	16·77
"Omicron," at Cook's River	37,386	711 4 11	4·565	61,194	507 18 4	1·992	66,148	506 13 10	1·83
"Pi," at Moruya	21,580	998 1 1	11·099	58,170	816 19 11	3·370	47,675	1,224 8 7	6·16
"Sigma," at Myall River	68,235	993 14 6	3·495	1,310	281 8 5	51·558	.....	.....	.....
"Rho," at Newcastle	13,035	905 1 11	16·659	13,855	615 13 1	10·664	.....	.....	.....
"Tau," at Richmond River	36,357	740 18 2	4·890	52,807	805 16 0	3·662	.....	.....	.....
"Chi," at Bellinger River	83,080	1,323 16 0	3·823	102,880	2,075 6 7	4·841	84,368	1,640 5 2	4·66
"Omega," at Clarence River	835	383 10 11	110·240	56,175	865 0 4	3·695	19,571	715 19 3	8·77

				Pence
1895.	tons.	£ s. d.	per ton.	
Sydney	600	201 11 9	80·63	
Myall River..	22,430	1,024 17 9	10·96	
Sydney	14,130	413 10 3	7·02	
Newcastle ...	4,805	393 19 1	19·67	

AVERAGE Cost of Dredging and Conveying, 1895 and 1896.

Class Dredge.	1895. Tons dredged.	1895. Hours dredging.	1895. Dredging only. Expenditure.	1895. Dredging only. Average cost per ton.	1895. Dredging only. Average cost per hour.	1895. Dredging and Towing. Expenditure.	1895. Dredging and Towing. Average cost per ton.	1896. Tons dredged.	1896. Hours dredging.	1896. Dredging only. Expenditure.	1896. Dredging only. Average cost per ton.	1896. Dredging only. Average cost per hour.	1896. Dredging and Towing. Expenditure.	1896. Dredging and Towing. Average cost per ton.
			£ s. d.	d.	£ s. d.	£ s. d.	d.			£ s. d.	d.	£ s. d.	£ s. d.	d.
Ladder Dredges	3,980,125	21,698	38,685 2 4	2·33	1 15 8	55,224 14 11	3·33	3,303,241	19,942	34,149 16 3	2·48	1 14 2	47,523 14 9	3·45
Sand-pump Dredges	2,553,664	11,705	23,169 13 6	2·17	1 19 7	23,555 14 3	2·21	3,092,825	12,265	21,856 16 3	1·69	1 15 7	22,217 14 11	1·72
Grab and Sand-pump Dredges	.....	.....	.....	...	.....	.....	...	405,830	3,415	4,325 17 11	2·55	1 5 4	4,847 16 1	2·83
Grab Dredges	359,592	30,209	14,880 14 8	4·15	0 9 10	17,497 5 2	4·87	639,381	23,248	11,801 14 2	4·42	0 10 1	15,116 1 11	5·67
	7,393,381	63,612	76,735 10 6	2·49	1 4 9	96,277 14 4	3·12	7,441,277	58,870	72,134 4 7	2·32	1 4 6	89,705 7 8	2·89

(VII.)

RETURN of Expenditure on Public Works carried on by Harbours and Rivers Branch from 1st July, 1895, to 30th June, 1896.

Work, and where situated.	Whether Constructing or under Repair	Fund from which the Expense is defrayed	When Commenced	If Finished, actual amount of Expenditure	If Unfinished, amount of Expenditure to 30 June, 1896	Amount expended from 1 July, 1895, to 30 June, 1896.
				£ s. d.	£ s. d.	£ s. d.
WATER SUPPLY—						
Providing Country Towns	Constructing	Loans.	1879		956,023 6 11	28,453 6 10
Duplicate rising Main, Walka to Buttai	"	"	1896		52 4 9	52 4 9
Reservoir, Potts' Hill	"	"	1888		106,996 7 8	4 18 6
Laying Second Pipe Line between Potts' Hill and Crown-street	"	"	"		160,182 13 3	457 5 6
Sydney	"	"	1880		2,277,502 19 7	4 7 5
DREDGE SERVICE—						
Excavation of Silt by Dredges	Annual Service	Con. Rev.	1894	314 9 5		314 9 5
" "	"	"	1895	151,764 4 5		11,961 0 5
" "	"	"	"		96,159 5 5	96,159 5 5
Additional Dredge and Punts for Sydney	Constructing	Loans	1879			
Tugs and Punts for Dredge Service	Annual Service	Con. Rev.	1895	2,517 2 10		5 2 11
" " "	"	"	"		2,009 15 3	2,009 15 3
Dredge Plant for Richmond and other Northern Rivers	Constructing	Loans	1883		24,998 7 10	*a*
Dredge and Punts for Myall River	"	"	1888		8,002 11 9	*a*
Appliances for Reclaiming Land by Sand Dredges	"	"	1889		55,199 8 7	*a*
Dredge and Plant for service first at Nambucca	"	"	1890		7,991 18 7	*a*
Landing Silt and forming Ground	Annual Service	Con. Rev.	1894	15 4 11		15 4 11
" " "	"	"	1895	14,273 19 3		1,051 19 5
" " "	"	"	"		6,314 1 7	6,314 1 7
Reclamation and Dredging, including cost of resumption of Land	Improving	Loans	1893		95,998 0 2	*c*
Conversion of Grab Dredge "Sigma" into a Sand-pump Dredge	Constructing	"	1895	6,500 0 0		4,920 10 3
Conversion of Grab Dredges into Sandpump Dredges	"	"	"		9,822 9 3	9,822 9 3
Dredge and Plant Sydney Harbour	"	"	1890	386 12 7		381 16 9
SYDNEY DISTRICT—						
Extension of Darling Harbour Wharf, including Compensation for Land, &c	"	"	1881		477,334 16 1	2,467 16 3
White Bay Reclamation	Improving	Loans & Con Rev	1886		12,249 14 5	*a*
Circular Quay Improvements	Constructing	Loans	1888		87,811 5 8	15,119 3 9
Woolloomooloo Bay Improvements	"	"	"		12,959 11 2	11,069 5 10
Cook's River and Shea's Creek Reclamation and Dredging	Improving	Loans & Con. Rev	1887		137,295 2 9	35,827 14 4
Admiralty Wharf, Woolloomooloo	Constructing	Loans	1889		1,490 15 1	*a*
Long Cove Reclamation	Improving	Loans & Con Rev	1890		43,732 17 0	3,335 12 4
Naval Stations, Garden Island, &c.	"	Loans	1884		300,462 11 7	4,477 16 8
Sea Wall, Coogee Bay	Constructing	Con. Rev.	1890		4,893 1 11	792 4 5
Rebuilding Stone Dyke-wall, Rushcutters' Bay	"	"	1889		3,799 19 9	*a*
Reclamation, Careening Cove and Neutral Bay	Improving	Loans	1890		12,002 1 6	704 2 1
Improvements, Cowper Wharf, Woolloomooloo Bay	"	"	1889		6,949 12 3	*a*
Cargo Shed, Woolloomooloo Bay	Constructing	Con. Rev.	1891		2,903 4 3	*a*
Construction of Jetties, foot of Erskine-street	"	Loans	"		8,217 6 9	*a*
New Jetty and Shed, Circular Quay, and extending old A S N Co.'s berth	"	"	1892		21,439 8 8	7,535 0 6
Wharf, White Bay	"	"	1894		1,585 3 4	1 11 0
Shelter Shed, and Fencing Drill Shed, Fort Macquarie	"	Con. Rev.	"	452 18 1		*a*
Waiting-room, Neutral Bay Wharf	"	"	1893	97 0 3		*a*
Goods Shed, eastern side Circular Quay	"	Loans	1895		1,411 2 5	*a*
Wharf, eastern side Woolloomooloo	"	"	"	2,000 0 0		10 8 11
Fencing, &c., Cowper Wharf	"	Con. Rev.	1894	178 14 6		
Rushcutter's Bay, northern extension of reclamation	Improving	Loans	1895		1,866 1 10	1,866 1 10
Straightening Wharf, Woolloomooloo Bay, &c	Constructing	"	"		3,242 1 0	3,242 1 0
New Wharf, Manly Beach	"	"	"		3,006 15 1	3,006 15 1
Painting, &c., Passenger and Cargo Sheds, Sydney Harbour	Improving	Con. Rev.	1896		117 8 2	117 8 2
Wharf, foot of Augustus-street, Leichhardt	Constructing	"	1895		413 2 10	*b* 413 2 10
Fencing, Military Stores, Circular Quay	"	"	"	17 16 3		17 16 3
HUNTER RIVER AND NEWCASTLE DISTRICT—						
Wharf and Shipping Appliances, Newcastle, including Steam Cranes, Newcastle Wharf.	Constructing & improving	Loans & Con Rev.	1858		330,389 0 11	11,044 3 8
Protection of Banks, Hunter River, at West Maitland	Constructing	Con. Rev.	1866		41,331 16 1	*a*
Expenses, Special Services, Tugs unconnected with Dredging, and for Rocket Apparatus, Newcastle	Annual Service	"	1895	1,184 9 10		93 4 8
" " "	"	"	"		800 0 0	800 0 0
Removal of Rocks, Newcastle Harbour	Improving	Loans	1858		18,576 10 4	*a*
Repairs, Newcastle Wharfs	Repairs	Con. Rev.	1887		12,966 13 5	76 2 3
" Northern Breakwater, Newcastle	"	Loans & Con Rev	1883		9,695 15 9	58 17 10
Reclamation, North Harbour, Newcastle	Improving	Loans	1894		3,378 5 4	1,700 14 0
Expenses, Rocket Apparatus, Newcastle	Annual Service	Con. Rev.	"	466 7 4		9 1 4
" " "	"	"	1895		300 0 0	300 0 0
Stockton Ballast Jetty	Constructing	"	1894	945 3 7		407 0 4
New Lighter for Newcastle Harbour	"	Loans	1896		19 15 11	19 15 11
Maintenance, Newcastle Harbour Works	Maintenance	Con Rev.	"		519 18 2	519 18 2
Southern Breakwater, Newcastle	Constructing	Loans		1,635 11 9		1,635 11 9
Clearing Wallis Creek, West Maitland	Improving	Con. Rev.	1895	599 6 3		599 6 3
LAKE MACQUARIE DISTRICT—						
Improvements at Entrance	"	Loans & Con Rev	1877		92,634 6 7	50 13 6

(*a*) No expenditure in 1895-6. (*b*) £113 2s. 10d. paid from Vote for Incidental Expenses. (*c*) Under Vote for Cook's River Reclamation. £35,827 14s 4d. expended from Vote for Reclamation and Dredging.

Public Works carried on by Harbours and Rivers Branch—*continued.*

Work.	Whether Constructing or under Repair	Fund from which the Expense is defrayed.	When Commenced.	If Finished, actual amount of Expenditure.	If Unfinished, amount of Expenditure to 30 June, 1896.	Amount expended from 1 July, 1895, to 30 June, 1896.
				£ s. d.	£ s. d.	£ s. d.
CLARENCE RIVER DISTRICT—						
Improvements at Heads	Constructing & improving	Loans & Con Rev	1862		289,061 15 8	23,211 13 1
Woolgoolga Bay Jetty	Constructing	Loans	1889		13,487 16 10	*a*
Coff's Harbour Jetty	"	"	"		12,596 12 8	*a*
Removal of Argyle Reefs, South Arm	Improving	"	"	3,000 0 0		9 18 3
Removal of Rocks, Maclean	"	"	1894	3,000 0 0		1,753 8 10
Wharf at Woodforddale	Constructing	Con. Rev.	1895	278 3 8		*b*258 16 8
Erection of Flagstaff and supply of Flags Coff's Harbour and Woolgoolga Bay Jetties	Erection, &c	"	1894	168 10 11		99 5 6
Wharfinger's Cottage, Woolgoolga Bay Jetty	Constructing	"	1895	291 8 5		4 4 11
Removal of Rocks, South Arm	Improving	"	1896		301 14 9	301 14 9
HASTINGS RIVER—						
Wharf, Wauchope	Constructing	"	1896		0 19 6	0 19 6
MANNING RIVER—						
Improvements of River	Improving	Loans	1895		6,519 12 3	6,026 11 11
TRIAL BAY DISTRICT—						
Harbour of Refuge	Constructing	Loans & Con Rev	1874		120,550 17 0	6,011 10 1
WOLLONGONG DISTRICT—						
Deepening Harbour	"	Loans	1870		5,680 17 5	*a*
Maintenance of Harbour Works	Maintenance	Con. Rev.	1895		136 1 0	136 1 0
RICHMOND RIVER—						
Improving River	Improving	Con Rev. & Loans	1878		173,203 16 3	29,308 12 8
Byron Bay Jetty	Constructing	Loans	1884		15,413 8 7	*a*
Improving Richmond River and Tributaries	Annual service	Con. Rev.	1895			*a*
" " "	"	"	"		1,840 13 0	1,840 13 0
Flood Relief Works, Richmond River, *via* Evans River	Improving	Loans	1895		5,025 19 5	4,610 15 6
Snagging Richmond River and Tributaries	"	"	1894		2,278 7 5	1,244 0 11
Wharf at Wyrallah	Constructing	Con. Rev.	1895		320 10 11	310 18 11
" Broadwater	"	"	"		341 11 11	323 1 1
Clearing and Draining German Creek	Improving	"	"	56 4 1		56 4 1
NAMBUCCA RIVER—						
Clearing Obstructions	"	"	1879		3,388 9 9	*a*
Wharf at Bowra	Constructing	"	1895		29 0 9	15 14 5
Improving Entrance	Improving	Loans	"		287 8 2	287 8 2
TWEED RIVER—						
Improving Navigation of the Brunswick River	"	"	1889		1,168 4 7	20 12 4
Improvements, Tweed River	"	"	1890		24,276 15 0	6,550 1 11
Snagging Tributaries of the Tweed	"	Con. Rev.	1895	121 0 7		1 8 4
" " "	"	"	1896		158 0 10	158 0 10
MACLEAY RIVER—						
Improving Bellinger River	"	Loans & Con Rev	1890		16,676 19 8	5,077 19 2
Improving Entrance	"	Con. Rev.	1896		1,762 7 0	1,762 7 0
MORUYA RIVER—						
Improving Entrance, Fascine Banks	"	Loans & Con Rev	1888		14,783 8 8	*a*
MURRAY, MURRUMBIDGEE, AND DARLING RIVERS						
Improving	"	"	1856		203,491 9 3	65 16 3
COCKATOO ISLAND—						
Fitzroy Dock	Constructing & in use	"	1848		33,590 5 3	*a*
Dock and other works in connection with Dock Establishment	Elongation of	Con. Rev.	1873	10,684 15 6		*a*
Workshops and other Buildings	Constructing	"	"	9,735 4 2		*a*
Dock Establishment, Contingencies	Annual Service	"	1894	6,207 0 0		628 1 6
" Salaries	"	"	"	1,058 19 2		66 13 4
" Contingencies	"	"	1895		4,691 12 5	4,691 12 5
" Salaries	"	"	"		800 0 0	800 0 0
Machinery		"	1883		12,314 0 0	*a*
New Dock, Biloela	Constructing	Loans	1881		282,270 10 8	*a*
Boiler Shop and Store, Fitzroy Dock	"	Con. Rev.	1894	2,366 16 9		994 10 7
" "	"	"	1895		782 1 8	782 1 8
Maintenance, Electric Light, Cockatoo	Maintenance	"	"	172 17 4		70 17 11
" "	"	"	"		381 6 10	381 6 10
MISCELLANEOUS.						
Harbour and River Surveys	Annual Service	"	1894	4 11 6		4 11 6
" "	"	"	1895	3,894 15 8		151 15 7
" "	"	"	"		1,868 9 4	1,868 9 4
Incidental Expenses to Wharfs, Bridges, &c.	"	"	1894	17 3 10		17 3 10
" " "	"	"	1895	25,297 19 2		1,936 7 5
" " "	"	"	"		11,719 16 1	11,719 16 1
Improving Navigation of the Hawkesbury	Improving	Loans	1889		891 14 4	*a*
Repairs, Roads and Bridges and other Public Works damaged by heavy rains	Repairs	Con. Rev.	1893	25,698 6 11		305 9 2
Lighthouse, Point Perpendicular	Constructing	Loans	1890		487 3 9	329 11 5
Eden Wharf, Reconstruction	"	Con. Rev.	1894	1,920 4 5		*c*426 10 0
Wharf, Kendall, Camden Haven	"	"	"		29 7 3	29 7 3
Improvements to Entrance, Cape Hawke	Improving	Loans	"		10 14 0	10 14 0
	Total		£	277,323 3 4	6,725,668 16 5	383,909 8 5

Total Expenditure for the year :—

Loans	£231,789 0 0
Revenue	152,120 8 5
	£383,909 8 5

(*a*) No expenditure in 1895-6. (*b*) £28 3s. 8d. paid from Vote for Incidental Expenses. (*c*) £419 14s. paid from Vote for Incidental Expenses.

HARBOURS and Rivers Expenditure.

Year.	Amount.	Year.	Amount.
	£ s. d.		£ s. d.
Previous to 1859	95,765 10 8	1878	218,001 4 11
1859	16,183 19 4	1879	247,110 1 10
1860	31,134 1 11	1880	279,913 18 7
1861	52,314 4 9	1881	313,217 0 1
1862	84,280 19 5	1882	596,332 7 4
1863	53,318 16 11	1883	733,620 0 0
1864	80,830 9 5	1884	698,458 6 2
1865	58,347 6 8	1885	689,171 14 10
1866	53,678 15 0	1886	817,631 16 11
1867	70,840 7 10	1887	596,743 8 8
1868	83,204 11 10	1888	435,658 5 6
1869	81,279 12 9	1889	703,198 9 11
1870	65,675 14 5	1890	573,789 10 0
1871	67,425 7 11	1891	660,734 17 4
1872	67,121 3 9	1892	541,955 11 5
1873	111,160 12 6	1893	404,783 11 8
1874	137,749 17 1	1st January, 1894, to 30th June, 1895	601,903 14 6
1875	222,913 19 6	1st July, 1895, to 30th June, 1896	383,909 8 5
1876	175,189 8 4		
1877	186,916 18 0	£	11,291,465 6 1

(VIII.)

REPORT OF THE ASSISTANT ENGINEER FOR BRIDGE CONSTRUCTION AND RENEWALS.

Sir,

I have the honor to report that during the year ending 30th June, 1896, 125 new bridges were completed and opened for traffic, the names, cost, and character of each being set out in detail on Appendix marked "A." The total length of these bridges is 10,218 feet, and they are made up of 296 plain beam spans, seven timber truss spans, and four iron spans, the total cost being £64,287 19s. 10d.

The most important of these bridges are :—

Wilcannia Bridge, over the Darling River.—Iron lattice-girder bridge, on cylinder piers, with a steel lift span. This work was carried out under considerable difficulties, owing to the distance which all the material had to be taken.

Wagga Bridge, over the Murrumbidgee River.—Timber truss, three spans of 110 feet each, on cylinder piers, with nine timber approach spans, having a clear width of 24 feet between curbs. This bridge was built to replace the old Company's bridge.

Deniliquin Bridge, over the Edwards River.—Timber truss bridge, three spans of 90 feet, on timber piers, with nine timber approach spans. This bridge replaces an old truss bridge which has for years been under the control of the Deniliquin Council, and on which tolls were collected. The new bridge has been erected on the condition that the toll be abolished.

In addition to the bridges referred to as completed, contracts were in progress during the year for the erection of eighty-one new bridges, which are not yet completed, particulars of which are given in Appendix "B."

The total length of these bridges is 9,191 feet, and they are made up of 234 plain beam spans, fourteen timber truss spans, and five iron spans, the total cost being estimated at £71,201 3s.

Of these uncompleted bridges, the most important are :—

Swan Hill Bridge, over the River Murray.—Timber truss bridge, with steel lift span on cylinder piers, being constructed at the joint expense of the colonies of New South Wales and Victoria.

Inverell Bridge, over the Macintyre River.—Timber truss bridge, three spans of 110 feet, on cylinder piers, with four timber approach spans.

It will be seen then, that, taking the number of works completed, and adding the number of those in progress, the total contracts dealt with was 207, representing an expenditure of £135,900 18s. 8d.

I am glad to report that the work has gone smoothly during the year, attention being specially directed to securing the highest class of timber obtainable, and the best workmanship. The great number of contracts in progress, and the distances separating them, render this a matter of some difficulty; but by moving the officers from district to district, and making use of the most experienced to inspect works in progress near them, a uniform standard has been obtained.

It is satisfactory to note, that in spite of the large number of contracts carried out, no serious claims from contractors have arisen, and in one case only has a contractor taken legal proceedings against the Department, which action terminated favourably to the Department. I consider this fact much to the credit of the officers, and particularly so to Messrs. F. M. Smith and W. F. Burrow, who assist me in the administrative work of the office.

E. M. DEBURGH,
Assistant Engineer for Bridges.

Engineer-in-Chief for Public Works.

(IX.)

(IX.)

REPORT OF THE PRINCIPAL ASSISTANT ENGINEER FOR WATER CONSERVATION.

Department of Public Works, Sydney, 10 March, 1897.

As the duties of the Branch are chiefly concerned with the western rivers, the work in hand will be best described by dealing first with the principal rivers *seriatim*.

River Darling.

The question of the construction of locks and weirs in the River Darling had been repeatedly under consideration, and several different Governments had proposed to deal with the matter. As a large amount of information on this subject had been accumulated, it was decided by the Minister for Mines and Agriculture to call for tenders for a lock and weir at Bourke, that being a suitable place as a starting-point, and the estimate for the work being under £20,000. A tender under £19,000 was received, and the work was put in hand, but, as it did not proceed satisfactorily, the contract was cancelled, and the work was subsequently recommenced under the direct management of the Branch. Whilst the Bourke lock and weir was in progress, a scheme was prepared for a system of such works which would render the river permanently navigable from Bourke to about 40 miles upstream from Brewarrina. This was submitted to the Public Works Committee, but it was decided by that body that the works should not be carried out.

Gauge records for all important places on the River Darling from Mungindi to Wentworth are maintained, and discharge observations are taken as opportunity offers.

River Gwydir.

In the Gwydir District there is an area of about half a million acres of land of good quality, which is rendered almost valueless through being frequently under water. The preliminary surveys which were made some years ago by the Water Conservation Branch showed that there would be no difficulty in draining this land, and the question of dealing with it was referred to this Branch on the recommendation of the Lands Department. It was decided to undertake the detail surveys necessary for carrying out a drainage project, and these surveys were subsequently commenced.

Macquarie River.

Much attention has been given during the year to the utilisation of the waters of the Macquarie River. Works were undertaken near Warren to divert a portion of the surplus water into Gunningbar Creek, and these works were well advanced at the end of the year under review. The works referred to comprise—(1) a timber weir, which was constructed in the neck of a bend of the river; (2) a cutting from the river to the Gunningbar Creek; and (3) an earthen dam across the river, which diverts the flow either over the weir or through the cutting. As the Gunningbar Creek, after passing Warren, was lost on a swampy flat, it was necessary to make cuttings to carry the water from the defined creek above this flat to the channels which are found emerging from its lower side. One of these cuttings is 1¼ mile in length, and the other 2¼ miles, and they did important service during the first freshet which occurred after their completion.

A second weir, of a different type, was authorised during the year to be constructed at a distance of about 35 miles from Warren and 11 miles from Trangie, and this has been put in hand.

As there is a considerable area of Crown land near Narromine which is highly suitable for irrigation, the question of the practicability of providing water for this purpose was referred to this Branch on the recommendation of the Lands Department. The subject was thoroughly inquired into, with the result that it was proved that the proposed irrigation from the river by the aid of a weir was not practicable. Bores were then put down to ascertain whether a good underground supply of water was obtainable at a moderate depth, and it was proved that a moderate supply could be had, but that the circumstances would not warrant the adoption of a pumping scheme by the Government.

River Murrumbidgee.

During the year no new works were constructed on the Murrumbidgee by the Government, but a considerable outlay was incurred by the Hay Irrigation Trust in the supply and erection of a pumping plant and other works for carrying out the objects of the Hay Irrigation Act. These works were inspected and reported on by this Branch.

The Yanko Creek has been maintained in good order, and continues to be a highly valuable distributary for some of the surplus water of the Murrumbidgee.

River Murray.

On the application of the members of the Wentworth Irrigation Trust it was decided that this trust should be dissolved, and that the property and the powers of the trust, as well as the liabilities, should be taken over by the Government as provided for in the Act. This arrangement was carried out, and subsequently tenders were called for the supply of a pumping plant, and for the construction of a pump-well and engine house. Contracts for these works were let, and the works were entered on, and are now in progress

River Lachlan.

The question of diverting a supply of water from the River Lachlan into the Marowie Creek was inquired into, and the necessary surveys made to show the best course to adopt. Eventually it was decided to construct a weir and cutting to divert a portion of the waters of the Lachlan into the Middle Billabong, and to connect that channel with Marowie Creek. A contract for the weir and offtake channel was let during the year, and the work is still in the contractor's hands. A separate contract was let for the improvement of the Middle Billabong channel.

This Willandra weir and the channel of the Willandra Billabong have been maintained in good order, but repeated complaints have been received as regards the alleged interference with the flow of the water. These complaints have furnished further evidence of the necessity for a Water Rights Act. (An Act has been passed since then.)

The inlet channel and self-acting floodgate at Lake Cudgellico have been kept in good working order.

Water Supplies to Mining Settlements.

(*A*). *Wyalong.*—The construction of two tanks, one of 10,000 cubic yards, and the other of 12,000 cubic yards, which was entered on in the year 1894–95, was completed during the year now under review, and these, as well as the tanks previously resumed, were provided with pumps. As no heavy fall of rain occurred during the year 1895, the new tanks remained empty, and the supply in most of those previously in existence was exhausted. Before the approach of summer, inquiry had been made as to the possibility of supplementing the water supply by pumping from shafts. As a general rule the water in the shafts at Wyalong is brackish and unfit for use, but two shafts were found and taken possession of which yielded a moderate supply of fresh water. Each of these was provided with a pump and an oil engine, and by working them incessantly in the driest part of the summer a water famine was averted.

(*B*). *Reefton.*—The water supply of this mining settlement was provided for by the construction of a tank of 10,000 cubic yards capacity, which is provided with a pump. A thunderstorm with heavy rain occurred on the completion of the tank, and it has afforded an ample supply for all requirements since then.

(*C*). *Bywong.*—The construction of a tank for this settlement was approved, but it was found on inquiry that an ample supply could be obtained at a much smaller cost by the sinking of a well and erection of a pump. This arrangement was carried out and has met requirements.

(*D*). *Gilgunnia.*—A tank of 10,000 cubic yards capacity for the water supply of this mining township was sanctioned, and its construction is in progress.

(*E*). *Fifield.*—The case of this settlement is similar to that of Gilgunnia, and at this place also the construction of a tank of 8,000 cubic yards capacity is in progress.

Miscellaneous.

Among other matters dealt with was the clearing of the channel of the Minnamurra River, near Kiama, which was successfully carried out at a comparatively trifling cost.

Projects were prepared and recommended for irrigation at the Hawkesbury College, and for water supply to the mining settlement of Yalgogrin, but both works were postponed.

Among matters inquired into and reported on were the proposed drainage of Tom Thumb Lagoon, irrigation of a Government farm at Bathurst, the drainage of Manly and Curl Curl Lagoons, the question of constructing weirs instead of bridges on the Rivers Narran, Bree, and Culgoa, and the question of dealing with the Mulgoa Irrigation Scheme.

Towards the end of the official year, questions relating to drainage in the Araluen Valley, and to water supply for hydraulic sluicing near Major's Creek, were taken in hand and are being inquired into.

One new Drainage Union was constituted under the Drainage Promotion Act. This was the Miller's Forest Drainage Union, the land over which it holds jurisdiction being situated in the Hunter District.

A Water Rights Bill was introduced in Parliament by the Minister in November, 1895, and although its consideration was allowed to drop for the Session a considerable amount of time was necessarily taken up in preparing details in connection with it.

A large amount of trouble was occasioned to the Department and time consumed in defending two actions which were brought against the Minister in the Supreme Court. In the first of these the contractors for the Bourke lock and weir sued the Government for £26,000. This case was decided in favour of the Government on all counts. The second action was brought by an owner of land and tanks at Wyalong, and though the decision was against the Government, the amount of damages awarded was less than one-fourth of that claimed.

In connection with the proposed construction of a system of canals on the south side of the Murrumbidgee, with the headworks near Narrandera, the Minister approved of the despatch of circulars to all the landholders concerned. In these circulars the landholders were asked whether they wished to lease water rights from the Government for water supplied from the proposed system of canals, and if so, to state the extent of their requirements. The annual rate which the Government proposed to charge for a flow of 1 cubic foot per second delivered from the canals was stated in the circular, as was also the quantity of water which this would represent, calculated on the average of the preceding ten years. Favourable replies were received from a considerable number of the landholders, the quantity of water which they offered to take ranging in value from £30 to £600 per annum. The consideration of the matter was postponed on account of the necessity of passing an Act dealing with riparian rights before proceeding with works of an extensive character.

H. G. M'KINNEY,
Principal Assistant Engineer.

To the Engineer-in-Chief for Public Works.

(X.)

REPORT OF THE ENGINEER OF THE HUNTER DISTRICT WATER AND SEWERAGE BOARD.

BRIEF DESCRIPTION OF THE HUNTER DISTRICT WATER-WORKS AS THEY EXISTED WHEN THE BOARD TOOK CONTROL ON 1ST JULY, 1892, AND WORKS SUBSEQUENTLY EXECUTED TO 30TH JUNE, 1896.

THE supply of water for the Hunter District Water-works is taken from the Hunter River at a point about 1½ miles up stream from Belmore Bridge, West Maitland. All the water used is pumped. The pumping engines are situated above flood level on a rise about 44 chains back from the right bank of the river. At the pumping station are a settling tank of 1,390,500 gallons capacity, which receives the water pumped from the river; four filter beds, 100 feet by 100 feet each; a clear-water tank of 589,500 gallons capacity; and a storage reservoir of 172,408,100 gallons available capacity; the latter has been formed by constructing an earthen embankment with puddle core across an old lagoon. It contains a reserve supply of clear water which is resorted to when the river water is turbid, and is replenished by rainfall on its catchment area of 200 acres, and by water pumped up from the river.

Water is pumped into the settling tank, from which it descends to the filter beds; the filtered water is collected in the clear-water tanks.

The pumping plant consists of three independent Woolf compound beam pumping engines of about 150-horse power each. Each engine works two main pumps of the bucket and plunger type, one on each side of the beam centre.

Two engines are designed to force water to the summit reservoirs; the third to raise water from the river or the storage reservoir to the settling tank, or to raise water from the river to the storage reservoir as required. The boiler house contains five 50-horse power Lancashire boilers, two of which ordinarily supply sufficient steam for the engines.

The filtered water is pumped from the clear-water tank into two summit reservoirs—one at East Maitland and one at Buttai, which is on the top of a range about 5½ miles distant from the pumps.

East Maitland reservoir is supplied through a 10-inch rising main, and has a capacity of 463,430 gallons; it commands East Maitland, West Maitland, Morpeth, and neighbouring places. Buttai reservoir is supplied through a 15-inch rising main, and has a capacity of 1,051,010 gallons. The district commanded comprises the following places:—

City of Newcastle,	Waratah,	Lambton,
Carrington,	Merewether,	Wallsend,
Wickham,	Adamstown,	Plattsburg,
Hamilton,	New Lambton,	Minmi.

There are six district reservoirs which are supplied by gravitation from Buttai reservoir, and receive the water for distribution; their location and respective capacities are as follows:—

Minmi	62,209 gallons.	Hamilton	402,909 gallons.
Wallsend	452,472 „	Newcastle... ...	523,613 „
Lambton	402,610 „	Obelisk Hill ...	137,125 „

The gravitation main from Buttai reservoir to Newcastle is 15 inches diameter. On the hill at Newcastle there is a high-level tank which has a capacity of 20,000 gallons; it is supplied with water by a small duplex pumping engine placed on the roof of Newcastle reservoir.

The works, as described above, were constructed before the Hunter District Water Supply and Sewerage Board was formed and took control at 1st July, 1892. At that date the mileage of reticulation water mains laid in the Maitland District was 30 miles 1,599 yards, and in the Newcastle District 73 miles 1,603 yards, together making a total of 105 miles 1,442 yards. The reticulation of the city of Newcastle was done by the Municipal Council; with this exception the water works were constructed by the Public Works Department.

At the inception of the Board the number of assessments for water rates was 10,965, representing an approximate population of 54,825 persons contiguous to the water mains; the total number of houses actually connected to the mains was 3,018; the estimated number of inhabitants supplied being 15,090. The total population in Maitland and Newcastle Districts, according to the 1891 census, was 61,000; many of these, however, resided in houses beyond the reach of the water mains.

The general management of the whole works, except the Newcastle Reticulation, which was in the care of the City Council, was conducted by officers of the Harbours and Rivers Branch of the Public Works Department in conjunction with their other duties, and on the transfer of the works to the Board, officers were appointed to take over the water-works duties.

During the four years which have elapsed since the Board took control, new water mains have been laid to the extent of 25 miles 1,422 yards; the houses connected to the mains number 3228, estimated to contain 16,140 inmates, the respective totals at the commencement being thus increased to 131 miles 1,106 yards water main, 6,246 houses connected, and 31,230 persons supplied.

Some important works were carried out at the Pumping Station for improving the quality of the water. These works comprised alterations to the system previously in vogue for supplying water to the filter-beds, and in the working of the beds, and included the construction of a very efficient sand-washing apparatus. The results have been eminently satisfactory. The quality of the water showed a steady improvement, and on 24th June, 1896, the Government Analyst reported as follows on samples of filtered water forwarded to him during April and May:—"There is a marked improvement in the samples of filtered water submitted, those from the clear-water tank and the mains at Newcastle being especially good.

good. Their bright and clear sparkling appearance, almost without any tinge of colour, and the presence of so small a quantity of nitrogenous matter of any kind, point to a supply approaching perfection in these respects, as delivered at the mains." The following are the results of the analysis of the water referred to above :—

Description.		Expressed in grains per gallon.			
		Total Solid Residue dried at 220°	Chlorine as Chlorides.	Nitrogen as Nitrates and Nitrites.	Phosphates from Animal Impurity.
	1896.				
Clear-water tank	April...	31·36	8·00	Trace.....	·00
	May ...	37·10	9·80	,, ...	·00
Tap at Board's Office	April...	28·98	7·40	,, ...	·00
	May ...	36·64	9·50	,, ...	·00
Tap, Hydraulic Engine-house, Carrington	April...	27·00	7·40	,, ...	·00
	May ...	36·12	9·40	,, ...	·00

Description.		Expressed in parts per million.			
		Free Ammonia.	Albuminoid Ammonia.	Oxygen absorbed in 15 minutes.	Oxygen absorbed in 3 hours.
	1896.				
Clear-water tank	April	·00	·03	·40	·88
	May	·00	·04	·20	·35
Tap at Board's Office	April	·00	·02	·40	·88
	May	·00	·04	·20	·35
Tap, Hydraulic Engine-house	April	·00	·03	·35	·76
	May	·00	·20	·20	·35

Six samples of water are taken every month and forwarded to the Government Analyst, who reports upon them.

The discharge from the scour-pipe of the storage roservoir and the waste water from the works flow into a neighbouring lagoon which had no outlet, and it was found necessary to provide one by the construction of a drain 2 feet in diameter, to the Hunter River, a length of 2,574 feet. This work is in progress.

Improvements are being made to the pumping plant, comprising the substitution of a larger pump barrel at the crank end of beam of No. 1 and No. 2 engines and the addition of a third pump to No. 3 engine. This pump is double acting, and a new 20-inch suction pipe has been laid ready for it from the river.

A constant supply of water has been maintained throughout the Maitland and Newcastle Districts at a satisfactory pressure, notwithstanding the increase in the number of consumers and the extra demands for water caused by the drought of 1895–96. The following table shows the total water pumped into the mains during each of the past four and one half years, and the coal used at the Walka pumping station :—

Year.	Gallons of Water.	Coal Tons.
1892	164,190,727	970
1893	156,494,413	1,027
1894	171,605,926	1,171
1895	210,852,951	1,407
1896 to 30th June	117,127,240	716

The coal used includes the coal for pumping water into the storage reservoir, which work is intermittent; this accounts for the increased consumption of coal during 1893, although a saving in the quantity of water pumped into the mains was effected, compared with the previous year.

Soon after the Board took control, a thorough inspection of all water-service fittings was made in order to bring them into conformity with the newly-adopted regulations and by-laws for preventing waste of water and contamination of water in the Board's mains. The house service outside the city of Newcastle, with very few exceptions, had meters fixed and high pressure loose valve-cocks and taps, but within the city—which contains the only sewered area within the district, there being upwards of 500 water closets supplied from the water mains—low pressure and unsuitable fittings were found to be numerous. The inspection resulted in an appreciable saving of water.

The Metropolitan Board's standard fittings have been adopted for use in this district.

29th January, 1897.

J. B. HENSON,
Board Engineer.

Roads and Repairs of Bridges.

(XI.)

REPORT OF THE PRINCIPAL ASSISTANT ENGINEER FOR ROADS.

Sydney, 1 February, 1897.

I HAVE the honor to present, for the Minister's information, a report upon the work carried out by this branch, during the year ended 30th June, 1896, together with tabulated statements of the expenditure for the year, the lengths of roads and bridges of various classes directly or indirectly under the charge of the Department, and other statistical information.

From these returns it will be seen that the expenditure for the year on roads and bridges, including balances from previous years, was £776,400 7s. 9d.*

Of this sum £737,824 18s. 7d. was derived from Consolidated Revenue, and £38,575 9s. 2d. from Loans.

For purposes of comparison I give the expenditure of the three previous years, which was as follows:—1892, £889,632 13s. 11d.; 1893, £706,563 1s. 8d.; 1894–5 (eighteen months), £830,654 2s. 9d.; showing that the expenditure for 1895–6 was about an average one.

The expenditure on roads, &c., from Revenue fell £61,327 3s. 6d. short of the sum made available by Parliament; this amount was written off.

A sum of £161,410 2s. 10d. remained unexpended from Loan Votes, and was carried forward.

To give some idea of the work involved in administration at head office, it may be stated that 31,345 papers were registered and dealt with, 25,802 vouchers received and examined, and 4,822 contracts were let, amounting to £387,680.

Rents of district officers, ferrymen's quarters, &c., amounted to £1,442 2s. 6d., and cost of cleaning to £259 19s. 10d.

The ferries leased were forty-three in number. Forty-two ferries were subsidised, and ten were worked by the Department. The total revenue from all sources under this head was £5,074 13s. 2d., while the cost of working, &c., was £11,816 12s. 8d.

With reference to the working of the Roads and Bridges Branch generally, no road works calling for special remark have been carried out. The bridges are referred to in detail further on. Passing mention may, however, be made of the road which has been constructed at considerable cost through the Grand Arch, Jenolan Caves.

This work, whilst not in any way interfering with the natural beauty of the scenery, will be of great service to tourists in giving a good approach to the caves for both foot and vehicular traffic.

The construction of roads in approach to tourist and health resorts is a question which, during the year, has occupied the attention of the Department, and in this connection it might be stated that at the present time a survey is being made with a view to opening up a road from Cooma to Mount Kosciusko.

As showing that the construction of roads often creates traffic, it is interesting to note that the traffic upon the road, Tumut to Kiandra, has lately increased beyond all expectation. This road was constructed some three years since, at a cost of £12,000. At that time there appeared very little probability of any traffic arising to justify this large outlay. The number of tourists, however, has lately been very large. As an instance it may be stated that no less than seventy were snow-bound in the vicinity of the Yarrangobilly Caves, about three weeks ago. There is also a traffic arising in carting palings and fencing material from near the Caves to Cooma. This road opens up a route from the South-western country to Cooma and the coast, where previously the only route was *via* Goulburn and Queanbeyan. It is thus satisfactory to find that the large expenditure incurred in constructing this road has not been wasted, as it appeared to be, to some extent, the case at the time it was being carried out. It is also satisfactory to know that, in the construction of the road, due regard was had as to grades, and that it presents a piece of work 50 miles in length, second to none in the Colony, reflecting credit upon the officer (Mr. Fraser) who designed and relocated the greater part of the road, and carried out the works to completion.

Steps have been taken during the year to erect, for the public convenience, Finger Boards at all roads junctions where they had not already been placed, and to renovate, where necessary, boards already erected.

It will be readily understood that the demands from various quarters upon the resources of the Department have largely exceeded the money available for the year, and much labour and time has been expended by the local officers in investigating the claims received for assistance.

The reports of the local officers on the various applications have, in all cases, received careful consideration at head office, and every effort has been made to ascertain the relative importance of the various necessary works, and so expend the available funds to the greatest possible advantage.

Generally the year has been a good one for road work, the rainfall having been normal, and no floods of any magnitude having occurred.

The competition between road and rail continues, and many teams traverse the main roads of the Colony with heavy loads and narrow tires, and it is not surprising to find that a road, which was good enough for the local traffic, now gets much cut up, and constant attention, with a largely increased quantity of maintenance material, and frequent renewal of culverts are necessary.

It is to be hoped that the necessary remedial legislation on the question of width of tires will, before long, be carried into effect.

It is gratifying to know that our roads generally are in such a satisfactory condition as to call forth the commendation of His Excellency the Governor. At the fourth annual dinner of the Institution of Civil Engineers held recently, he made reference to the excellence of the roads of the Colony, which he said would compare favourably with those in any other part of the world. Summarising

* Note.—This amount includes the expenditure incurred in respect of new bridges, completed and in progress.

Summarising the figures given in the tabulated statement (*Appendix* "A") attached, it will be seen that there are 38,951 miles 76 chains of roads under the direct or indirect charge of the Department.

Of that length 27,131 miles 64 chains are on schedule, 1,103 miles 74 chains are subsidised, and 10,716 miles 18 chains are unclassified.

Of the total length 12,193 miles 2 chains are bush tracks practically untouched, leaving 26,758 miles 74 chains of cleared, formed, or metalled roads.

There are 2,772 bridges in the Colony, having 7,655 spans, with a total length of 260,519 feet, or 49 miles 27¼ chains. The culverts number 31,073, and have a total length of 461,578 feet, or 87 miles 33½ chains, and there are 14,316 causeways, measuring 345,785 feet, or 65 miles 39 chains.

There are 98 punts, 1 steam launch, 4 horse boats, 86 flood boats, and 111 other boats in use, also 9 punt slips for execution of repairs.

Ferrymen's, bridge caretakers', or other houses or buildings, the property of the Department, number 50.

During the year, 2,668 miles 36 chains of new roads were formed, metalled, or otherwise improved and 7 miles 36 chains of culverts, and 9 miles 22 chains of causeways, constructed. Also 7,079 rods of fencing were erected.

Five new punts and 14 boats were built during the year, and 55 punts and 73 boats overhauled and repaired.

The average number of men employed was 9,876, of whom 1,488 were employed directly by the Department, and 8,388 were contractors and their workmen.

The distance travelled by the District Officers, and their Assistants, Overseers, &c., in the execution of their duties, was 495,922 miles; 398,556 miles being by road and 97,436 miles by rail; the total cost under this head, being £4,427 1s. 7d.

With regard to repairs to bridges, the Assistant Engineer for Bridges reports as follows:—

"During the past year the matter has received special attention. There are in the charge of the Department, 2,772 bridges of 20 feet span and over, having 7,655 spans and a total length of 260,519 feet, and when the remote situation of many of these bridges is considered, it will be seen that the maintenace of them is a serious matter.

"A special sum of £39,500 was set apart for repairs and renewals for the year 1895–6, and though it was impracticable to complete all the works for which that sum was provided before the 30th of June, £21,106 was spent prior to that date, namely, £1,746 in renewals and £19,360 on repairs.

"During the year a system of stocking timber in Sydney was adopted, and this has been found to work very satisfactorily. In many districts, bridge timber is unobtainable, and it was the practice to order in Sydney or Newcastle from the contractor a supply of timber for the year; the contractor, however, did not stock any quantity of the class of timber required, which is not of ordinary marketable sizes, but repeated our order to the Northern Rivers, when we had to wait delivery, and great delay was occasioned. Under the new system tenders are invited for the supply of £1,500 to £2,000 worth of timber such as decking, girders, &c., which is delivered on a piece of ground at Cockatoo Island, having a water frontage, where every facility is provided for landing the timber—and whence it is issued as required. Apart from the great gain in convenience, this system has been found cheaper than that formerly adopted, for the firms tendering now know the exact quantity required, and can estimate its value accurately; they also turn over any money which is involved at once, and have no small orders to deliver, the result being a lowering of rates, to the direct benefit of the Department. The timber is also much improved by being stacked for a while before using.

"The most important repairs carried out during the year were those to Bourke Bridge, Darling River, at a cost of £3,386, and to Tamworth Bridge, Peel River, at a cost of £1,005. Though of different types, both these bridges had iron decks, formed of buckled plates carrying a roadway of tarred metal, and these decks failed under the largely increasing loads passing over the bridges. There is no doubt that, though the plates were light, they had ample strength for the loads they were called upon to sustain at the time the bridges were erected, but the improvement to the surface of the roads of late years, and the cutting down of grades have led to an enormous increase of the load carried per wheel by teams, and the consequent failure of the deck system of those bridges.

"As an instance of the loads referred to, a load of 17 tons on four wheels passed over the Bourke Bridge just before the repairs were undertaken, and such loads are now by no means uncommon. At Bourke and Tamworth, the whole deck system was remodelled, a timber deck being substituted for the iron and tarred metal, with heavy longitudinal stringers to distribute the load over several cross-girders. At Bourke, the cross-girders themselves, and the compression members of the lattice girders, had to be stiffened, and an improvement was made in the machinery for working the lift span by the substitution of an arrangement of wire ropes for the old and cumbrous chain gearing previously in use. The lift can now be readily operated by one man. The chief difficulty in executing these repairs has been the necessity for carrying the traffic on a narrow deck during progress, but this was done without accident in each case.

"A very marked improvement was effected during the year in the condition of the bridges generally, and attention is drawn to the great and growing necessity for providing a sum yearly for the maintenance and renewal of those structures,—the number of which increases every year—as a judicious constant expenditure in this direction is certainly the most economical way of dealing with the bridges. It is thought it will be found better to carry out these repairs by means of a few gangs under skilled foremen rather than by contract. In the case of contracts it is impossible to exactly estimate the work to be done, and such heavy extras result as to completely nullify any benefit resulting from competitive tendering."

The Assistant Engineer for Bridges draws attention to the advisableness, as settlement in the Colony advances, of replacing timber structures, so far as practicable, by those of a more permanent character, and thus reduce the annual cost of repairs and renewals. As the number of bridges increases, the difficulty of obtaining timber for their erection and renewal in the settled districts increases in proportion; and it is believed that in the more general adoption of permanent sub-structures of masonry or iron, the increase in the first cost will be more than outweighed by the subsequent saving arising from the extended life of the bridge and reduced cost of maintenance.

Before concluding this report, I feel that it is due to a hard-working body of men that I should express my sense of how much the country owes to the Local Roads Officers for the loyal manner in which they have carried out the duties entrusted to them, of expending the large sums of money provided for the construction and maintenance of the roads and bridges of the Colony.

Their duties are, in many cases, of an arduous nature, requiring not only devotion to these duties but the exercise of much discretion and business tact.

These officers have, with very few exceptions, given all this; and I have no hesitation in saying that, considering the very large area over which the expenditure had to be made, the various conflicting interests to be considered, and the necessity for the economical distribution of the funds placed at their disposal, no body of men could have given the country a better return for the money spent than have the officers of the Roads and Bridges Branch. These remarks apply not only to the more responsible officers in charge of districts, but to their assistants, who, in their more limited and less responsible positions, have equally contributed to bring about what I feel sure all who are in a position to judge will freely admit has, on the whole, been a satisfactory year's work.

PERCY SCARR,
Principal Assistant Engineer, Roads.

The Under Secretary and Commissioner for Roads.

(XII.)

RETURN of Expenditure on Public Works carried on by Roads and Bridges Branch, from 1st July, 1895, to 30th June, 1896.

Work and where situated.	Whether Constructing or under Repair.	Fund from which the Expense is defrayed.	When Commenced.	If Unfinished, amount of Expenditure to 30 June, 1896.	Amount expended from 1 July, 1895, to 30 June, 1896.
ROADS AND BRIDGES.				£ s. d.	£ s. d.
Aberdeen, up Narrow Passage, to Scrumlow	Maintenance, repair, and construction.	Consolidated Revenue.	1882	4,082 4 7	407 14 2
Aberdeen to St. Hillier's			1895	66 0 0	66 0 0
Attunga to Somerton			1887	864 3 7	115 7 3
Attunga to Attunga Springs			1895	19 0 0	19 0 0
Attunga to Hall's Creek			,,	85 13 0	85 13 0
Amosfield towards Stanthorpe			1894	2,490 19 10	148 18 6
Amosfield to Acacia Creek			1890	3,554 8 5	665 8 1
Art Gallery Road			1895	1,537 13 4	1,537 13 4
Acacia Creek, &c., to Tooloom			1895	419 17 10	410 8 10
Acacia Creek, *via* Korelah, to White Swamp			1888	2,475 10 9	383 10 6
Acacia Creek Bridge to New Korelah			1895	49 14 0	28 2 0
Acacia Creek Bridge to Queensland Border			,,	105 0 3	105 0 3
Alumny Creek, at Leonard's, to Grafton-Broadwater Road			,,	80 0 0	80 0 0
Armidale Eastern Plains Road to Smith's			,,	15 12 10	15 12 10
Armidale to Long Swamp			1887	717 19 7	110 0 10
Armidale to Mihi Creek			1879	3,511 17 5	184 5 2
Armidale to Grafton, *via* Hillgrove, to Perrett's			1864	98,135 8 9	917 16 1
Armidale to Yarrowick			1884	2,464 8 6	52 3 2
Armidale and Eastern Plains Road to Trevanna			1895	7 13 0	7 13 0
Armidale Road to Taylor's Arm			1894	1,647 0 7	543 5 3
Armidale and Eastern Plains Road towards Boolomimbah			1895	10 4 0	10 4 0
Armidale Road to Wabra Creek			1890	173 4 7	141 10 6
Armidale to Spring Mountain			1895	7 9 6	7 9 6
Armidale to Kangaroo Hills			1886	3,949 6 11	197 0 0
Armidale Road up Mulla Creek			1895	33 12 0	33 12 0
Armidale to Head of Hickey's Creek			1894	1,355 0 10	177 1 11
Armidale Road, *via* Bellbrook Ford, to M'Kenzie's Creek			1895	110 19 5	40 17 9
Armidale to Eastern Plains			1888	2,566 10 8	161 1 2
Armidale and Eastern Plains Road to Brusby's Creek			1895	36 8 0	10 5 0
Armidale to Gostwyck			1884	1,916 6 8	81 4 0
Armidale to Duval			1890	410 11 0	92 9 5
Armidale and Kelly's Plains to Bald Knob			1894	276 13 9	125 0 9
Armidale to Dowling's Falls			1895	24 19 9	24 19 9
Armidale to Castle Doyle			1886	1,082 0 2	70 17 2
Armidale to Timagog			1895	106 4 3	106 4 3
Armidale Road to Upper Five Day Creek			,,	49 15 0	49 15 0
Armidale Road to Towal Creek Station			,,	127 9 8	127 9 8
Armidale Road to Antimony Mines, up Mungay Creek			,,	165 0 0	165 0 0
Ash Island Public School Approach			,,	31 7 6	31 7 6
Ashlea, *via* Marlee, to Upper Dingo Creek			1892	1,013 19 3	259 5 8
Avisford to Maitland Border			1895	20 0 0	20 0 0
Adamstown to Lake Macquarie			1885	5,579 13 3	462 11 3
Arnold's to Appletree Flat			1874	18,729 14 3	775 3 5
Anderson's to Macleay Heads			1892	1,058 13 4	365 4 1
Anderson's to Unkyra Road			1895	52 8 0	52 8 0
Alstonville to Booyong Railway Station			,,	308 16 0	267 15 6
Alstonville, Booyong Road, to Teven Junction			,,	373 15 8	319 14 2
Alstonville, Booyong Road, to Napier's			,,	47 6 6	47 6 6
Approach to Pittwater Public School			,,	11 18 0	11 18 0
Approach to Recreation Ground Ogilvie-street, Denman			,,	12 11 6	12 11 6
Approach to Government Wharf at Cundletown			,,	24 19 6	24 19 6
Approach to Meadowbank Station			,,	55 15 3	55 15 3
Approach to Bellingen Wharf			,,	20 0 0	20 0 0
Approach to Foster Ferry			,,	3 0 0	3 0 0

Return of Expenditure on Public Works—*continued.*

Work and where situated.	Whether Constructing or under Repair.	Fund from which the Expense is defrayed.	When Commenced.	If Unfinished, amount of Expenditure to 30 June, 1896.	Amount Expended from 1 July, 1895, to 30 June, 1896.
ROADS AND BRIDGES—*continued.*				£ s. d.	£ s. d.
Adelong to Hillas' Creek			1895	225 2 6	225 2 6
Adelong to Main South Road at Williams's			1874	5,742 3 0	31 2 7
Adelong to Sharp's Creek			1891	173 15 0	30 0 0
Adelong to Tumberumba			1895	26 0 0	26 0 0
Adelong Crossing to Bago			1892	2,240 1 4	601 0 10
Adaminaby, *via* Eaglehawk, to Jindabyne			1888	694 1 7	263 3 7
Adaminaby to Dry Plains			1895	74 19 9	74 19 9
Albury to Urana			1872	27,410 12 1	1,147 4 11
Albury and Corowa Road to Urana			1874	20,490 11 2	685 8 5
Albury to Boomanamana			1864	74,430 5 2	1,583 13 0
Albury to Cookardina			1892	1,918 4 3	378 9 6
Albury to Jingellic			1895	3 12 9	3 12 9
Araluen to Moruya			1865	31,904 0 1	551 13 3
Argoon to Morundah			1895	31 0 0	31 0 0
Argyle Road to Burradoo			1894	201 16 4	121 16 4
Alick's Creek to Bloomhill			1892	129 13 8	36 11 6
Alick's Swamp Creek Embankment			1895	2 10 8	2 10 8
Awaba to Freeman's Waterholes			,,	242 18 1	242 18 1
Abbotsford to Bungay Creek			,,	12 0 0	12 0 0
Allen's to Gregra			,,	110 7 2	110 7 2
Byangum up Middle Arm			1894	314 18 10	158 18 10
Byangum to Dunbible Creek			1892	206 6 9	64 2 4
Burringbar to Moball			1888	1,187 13 0	160 12 11
Burringbar to Upper Burringbar			1894	186 6 3	106 12 0
Burringbar to Cudgera			1895	52 8 10	52 8 10
Billinudgell to Pocket (Pocket to Blindmouth)			1894	670 0 0	479 8 8
Bexhill to Woodlawn			1891	249 11 10	26 6 4
Bexhill to Monticollum			1884	7,041 9 4	704 15 8
Bexhill and Monticollum Road to Quondong Road			1895	24 6 10	24 6 10
Bexhill to Priddle's			1881	10,764 7 4	292 16 8
Bexhill to Numulgi School and Cross Selections			1890	535 2 4	165 10 0
Bexhill–Woodlawn Road to Cameron's			1895	60 3 6	60 3 6
Ballina District Roads			1893	781 17 4	26 5 0
Ballina–Tenterfield Road to Road Holli's to Bunalbo and Tooloom			1895	47 4 0	47 4 0
Ballina to Byron Bay, *via* Tintenbar			1883	16,272 17 11	886 4 5
Ballina–Tenterfield Road to Back Creek			1895	99 5 9	99 5 9
Ballina to Tenterfield			1891	35,603 14 6	6,155 12 2
Ballina, *via* North Creek, to Byron Bay			1887	3,741 4 7	565 13 2
Ballina, *via* Byron Bay, to Perry's			1895	28 15 0	28 15 0
Ballina–Byron Bay Road to Chilcott's			,,	31 17 0	31 17 0
Ballina Road to Lismore			,,	21 8 0	21 8 0
Beechwood to Rolland's Plains			1885	1,350 12 3	152 3 10
Boggy Creek to Cottee's	Maintenance, repair, and construction.	Consolidated Revenue.	1892	243 6 7	103 8 4
Boggy Creek to Myer's Selection			1895	14 3 3	14 3 3
Blakebrook to Dunoon			1890	555 3 7	42 9 7
Blakebrook to Petersen's			1894	284 9 9	73 6 6
Bogaldie towards Pilliga			1893	247 9 3	150 11 3
Brush Grove, *via* Bluff Point, to Maclean			1887	2,035 14 2	500 13 5
Brush Grove to Maclean's			1890	1,203 17 2	234 15 9
Barney Downs to Millera			1883	3,127 5 10	171 7 0
Bingera to Top Bingera			1895	89 18 0	63 11 0
Bingera–Moree Road to Horseshoe Bend			,,	29 19 0	29 19 0
Bingera to Warialda			1884	9,145 1 8	969 7 6
Bingera to Bora			1895	11 19 0	11 19 0
Bingera to Bundarra			1878	5,448 18 0	382 7 2
Bingera to Barraba			1891	7,338 17 8	1,862 2 0
Bingera to Moree			1878	12,266 15 8	26 15 0
Bingera, *via* Pallal, to Eulowrie			1888	1,114 13 2	145 4 6
Bingera, *via* Gineroi, to Yagobie			1895	231 15 7	231 15 7
Bingera to Narrabri			1880	17,131 14 9	171 14 2
Black Creek, *via* Pretty Gully, to Tooloom			1891	1,810 1 10	568 15 11
Black Mountain to Ben Lomond			1894	473 11 8	42 11 4
Barraba to Crow Mountain			1895	50 0 0	50 0 0
Barraba to Bundarra			1894	2,668 7 9	170 5 5
Barraba to Long Arm			1895	15 0 0	3 9 0
Barraba, *via* the Gap, to Horton River			1893	277 9 6	53 13 0
Barraba to Cornish Copper Mines			1895	50 0 0	50 0 0
Bendemeer Flat to Walcha Road			1894	100 0 0	50 0 6
Bendemeer to Hall's Creek			1895	68 15 3	68 15 3
Brookstead to Gara			1891	176 13 6	17 10 0
Bow to Idaville			1893	250 8 0	83 15 0
Bobbiwoa Creek to Rocky Creek			,,	703 12 7	158 19 0
Booralong towards Aberfoyle			1888	1,395 16 2	46 11 6
Branxton to Dalwood Bridge			1895	28 0 0	28 0 0
Branxton, *via* Elderslie, to Singleton and Gresford Road			,,	100 0 0	100 0 0
Barlow's Mill to Howard's			1894	104 14 0	60 0 0
Blaxland's Flat Roads			,,	293 18 10	172 16 10
Balalla to Bundarra			1890	1,004 7 2	282 10 0
Bendemeer, up George's Creek			1895	22 2 0	22 2 0
Ben Lomond, east side of railway, to Llangothlin			1894	69 0 0	50 0 0
Ben Lomond, *via* Hockey's and Tarrant's, to Guyra, Inverell Road			1895	51 8 11	51 8 11
Bellingen to Missabotti			1882	7,930 7 4	1,078 19 7
Bellingen to Bowra (widening cutting)			1895	168 0 0	168 0 0
Bellingen to Bowraville			,,	42 12 0	42 12 0
Boat Harbour to Cowlong			1887	1,774 14 5	233 14 7
Bawden's Bridge to Jackey's			1895	45 0 0	45 0 0

RETURN OF EXPENDITURE ON PUBLIC WORKS—*continued.*

Work and where situated.	Whether Constructing or under Repair.	Fund from which the Expense is defrayed.	When Commenced	If Unfinished, amount of Expenditure to 30 June, 1896.	Amount expended from 1 July, 1895, to 30 June, 1896.
				£ s. d.	£ s. d.
ROADS AND BRIDGES—*continued.*					
Big Creek to Dungog and Paterson	Maintenance, repair, and construction.	Consolidated Revenue.	1894	120 0 0	70 0 0
Baker's Creek to West Hillgrove			1895	40 0 0	40 0 0
Bowraville to Upper South Arm			1890	774 9 9	280 17 6
Bowraville to Upper North Arm			1879	5,014 19 7	416 1 1
Bowraville to Congarina			1882	4,139 19 4	429 10 2
Burril Creek to Krimbriki			1890	957 12 1	159 10 9
Borings, Moonbi River			1895	7 12 0	7 12 0
Bulladelah down the Myall			1891	374 1 10	84 7 0
Bulladelah to Forster			1878	9,369 5 9	820 0 7
Bulladelah to Larry's Flat			1892	2,577 7 2	675 10 0
Bulladelah to Coolongoolook			1895	66 14 0	66 14 0
Booral to Bulladelah			1876	10,383 16 8	1,024 16 0
Booral up Karuah River			1894	75 7 6	39 7 6
Bendolba to Wangat			1876	4,913 1 6	698 12 11
Bullock Wharf to Coolongoolook			1894	556 12 2	402 14 2
Bullock Island Railway Bridge (fencing)			1895	9 9 0	9 9 0
Blandford to Isis River			1882	2,576 0 10	179 16 4
Blandford, *via* Box Tree, to Timor			1895	158 0 6	139 2 5
Barrington to Nowendoc			1893	429 16 6	197 15 2
Barrington Bridge to Rocky Crossing			1895	40 0 0	40 0 0
Barrington to Cobark Road			1892	841 14 1	162 4 6
Breeza Plains, between Pine Ridge and Middle Island			1895	14 8 0	14 8 0
Baker's Creek to Armidale			1893	342 3 0	70 3 0
Bellbird Creek to Mountain View			1895	60 18 0	30 18 0
Bonshaw Road to Willangra Road			,,	9 10 0	9 10 0
Botany Wharf Foreshores			,,	425 15 9	425 15 9
Brandy Creek, *via* Goorangoola, to Dry Creek			,,	51 9 6	51 9 6
Barker's Lodge to Oakdale			,,	62 19 7	62 19 7
Balgowlah to Pittwater			,,	209 6 7	209 6 7
Balgowlah and French's Forest to Gordon			,,	66 13 4	66 13 4
Belltrees to Stewart's Brook			1889	2,653 6 7	471 10 3
Barrenjoey to M'Garr's Creek			1895	132 10 2	132 10 2
Bald Knob, *via* Dundee, to Emmaville			,,	204 10 7	204 10 7
Boolooroo Bridge, *via* New Road, to Goondiwindi			,,	893 17 3	893 17 3
Belah to Tannabah			,,	142 1 0	142 1 0
Binalong to Galong			,,	20 0 0	20 0 0
Black Mountain to Guyra			,,	55 2 4	55 2 4
Balalla to Kingstown			,,	50 0 0	50 0 0
Brewarrina main street			,,	9 0 0	9 0 0
Bridgewater-Ulundry Road to Cumnock Cemetery			,,	11 0 0	11 0 0
Bank Protection at Maclean			,,	19 0 0	19 0 0
Byalla to Dalton			,,	50 14 0	50 14 0
Bagdad Church towards Barrenjoey			,,	19 17 9	19 17 9
Bonshaw to Wallangra-Strathbogie Road			,,	83 13 9	83 13 9
Boyce's to Penshurst			,,	100 0 0	100 0 0
Brookstead to Gara			,,	19 6 8	19 6 8
Burns Bay Road			,,	73 2 7	73 2 7
Baulkham Hills to Round Corner at Dural			,,	9 16 0	9 16 0
Broadwater Creek Crossing			,,	8 10 0	8 10 0
Broadwater, towards Lawrence, at Reeves			,,	89 11 8	89 11 8
Burrumbuttock to Zweek's			,,	18 19 0	18 19 0
Blackman's Point to Ennis Ferry			,,	15 2 9	15 2 9
Bethungra to Gundagai			,,	95 14 0	95 14 0
Blackman's Point and Ennis Ferry Road to Walcha Road			,,	24 16 0	24 16 0
Benandra to Duras Lake			,,	40 0 0	40 0 0
Bim-Bimbil Main Road, near Mogo			,,	20 0 0	20 0 0
Bongongolong to Coolac			,,	15 16 4	15 16 4
Benson's Lane to Hawkesbury River			,,	50 8 10	50 8 10
Berrigan to Mulwalla			1891	513 2 10	193 2 4
Berrigan to Seven Oaks			1895	30 0 0	30 0 0
Berrigan to Savernake			,,	35 7 6	35 7 6
Berrigan to Cobram			,,	57 0 0	57 0 0
Berrigan to Murray Hut			1892	335 17 4	64 10 0
Berrigan to Tocumwall			1895	251 7 2	251 7 2
Bowral to the Briars			1892	562 4 4	238 2 3
Bowral to Kangaloon Road			1895	25 0 0	25 0 0
Bundanoon to Wingello Road			1888	1,268 10 0	173 11 9
Bundanoon to Koreela			1895	180 15 8	180 15 8
Bundanoon Railway Station to Gillies'			1894	307 15 5	25 1 1
Bundanoon to Goulburn			1895	18 0 0	18 0 0
Bulli, *via* Coal Cliff, to Blue Gum Forest			1882	4,101 13 1	515 2 9
Bulli Pass to Cataract River			1880	1,451 13 6	111 7 7
Burrawang to Robertson			1884	1,259 4 6	105 8 11
Berrima to Bowral			1882	2,222 12 10	149 15 1
Berrima, *via* Soapy Flat, to Joadja Creek			1890	852 15 1	167 18 5
Blenkinsopp's to Myra Vale			,,	905 13 0	257 11 9
Bevandale to Wheeo Post Office			1895	21 0 0	21 0 0
Bungonia to Windellama			,,	20 0 0	20 0 0
Binalong to Burrowa			1887	13,950 18 10	437 6 6
Binalong to Coppabella			1895	96 12 9	96 12 9
Binalong to Mylora			,,	13 0 0	13 0 0
Binalong to Galong			,,	30 0 0	30 0 0
Binalong to Cemetery			,,	11 16 0	11 16 0
Bungendore to Captain's Flat			1889	9,127 18 4	1,152 5 11
Bungendore to Doughboy Hill			1888	4,450 4 7	61 7 11
Bungendore to Black Range			1881	1,038 2 4	49 17 11

RETURN OF EXPENDITURE ON PUBLIC WORKS—*continued.*

Work, and where situated.	Whether Constructing or under Repair.	Fund from which the Expense is defrayed.	When Commenced.	If Unfinished, amount of Expenditure to 30 June, 1896.	Amount Expended from 1 July, 1895, to 30 June, 1896.
ROADS AND BRIDGES—*continued.*				£ s. d.	£ s. d.
Bungendore to Gundaroo			1893	400 9 9	97 15 0
Bungendore, Captain's Flat Road, to Neila Road			1895	3 0 0	3 0 0
Bookham to Illalong			1884	763 4 5	64 4 6
Bookham to Chidowla			1885	900 9 9	141 5 0
Bookham to Cooradigbee			1881	1,633 0 9	135 5 0
Bembooka to Green's Crossing			1895	15 0 0	15 0 0
Burrowa to Breakfast Creek			1892	807 2 1	267 4 10
Burrowa to Narrawa			,,	1,238 2 9	289 5 0
Burrowa to Kenya			1885	2,112 15 5	176 6 5
Burrowa to Cunningrah			1892	1,306 4 2	275 17 4
Bobs Range Road			1895	31 1 0	31 1 0
Barmedman to Wyalong			1894	400 0 0	34 0 6
Barmedman Relief Works			1895	1 5 4	1 5 4
Bredbo Station to Nimbo			1890	20,690 18 10	342 7 8
Braidwood to Animbo Road, at 8-mile post, to Tarringdon			1895	30 6 0	20 6 0
Braidwood to Nimbo			1893	1,114 0 6	269 19 0
Braidwood to Elrington			1872	5,286 13 3	232 13 11
Braidwood to Nerriga			,,	2,715 4 9	684 7 9
Braidwood to Queanbeyan			1890	3,646 16 3	743 13 11
Braidwood and Tarago Road, *via* Larbert, to Lower Boro and Tarago			1881	2,266 0 8	222 9 3
Braidwood to Sergeant's Point			,,	2,942 12 5	86 8 1
Braidwood, *via* Reidsdale, to Bell's Creek			1872	3,114 11 0	205 13 5
Braidwood, *via* Bell's Creek, to Araluen			1864	20,199 13 6	636 17 0
Braidwood to Nelligen (Clyde Road)			1863	29,277 2 6	1,035 14 2
Bodalla, *via* Eurobodalla, to Dignam's Creek			1893	1,310 13 7	778 18 0
Bodalla to Wagonga Heads			,,	908 4 3	456 18 10
Bateman's Bay Observation Hill			1895	50 0 0	50 0 0
Bega to Bembooka			1878	6,299 1 0	193 16 6
Bega, *via* Wapengui and Murrah, to Bermagui			1877	8,418 1 5	412 16 4
Bega to Wolumla			1874	10,963 12 9	134 6 2
Bega, *via* Jellat Jellat, to Tathra			1873	12,007 19 6	485 0 7
Bega District Roads			1891	2,061 4 2	70 0 0
Bega to Brogo (Old Road)			1890	895 3 0	77 5 10
Bega to Pambula			1895	120 3 4	120 3 4
Bega to Brianderry			,,	21 8 0	21 8 0
Bega to Nimitybelle			,,	290 17 5	290 17 5
Bombala to Delegate			1871	13,094 5 9	639 10 3
Bombala, *via* Buckalong and Gunningrath, to Bobundarah			1881	2,257 1 4	302 12 7
Bombala, *via* Mahratta and Mila, to Cragie			1892	574 18 4	188 14 2
Bombala to Buckley's Spring			1889	265 7 0	41 12 8
Bombala to Nimitybelle			1892	5,196 17 4	936 2 3
Bombala to Burrumbooka	Maintenance, repair, and construction.	Consolidated Revenue.	1895	33 14 0	13 6 1
Bombala-Delegate Road to Bombala Cemetery			,,	14 0 0	14 0 0
Bombala-Merimbula Road to Holt's Flat			,,	65 10 0	65 10 0
Bombala to Merimbula			1864	93,367 9 6	1,690 17 5
Bombala-Merimbula, &c., to Bombala Common			1895	15 14 0	15 14 0
Bombala-Delegate Road to Burrumbooka			,,	23 10 5	23 10 5
Bobundarah to Adaminiby			1880	3,722 13 9	164 4 0
Bibbenluke to M'Lachlan River			1887	2,226 12 6	12 18 1
Burrogate, towards Perico, to Towamba to Bondi			1895	44 15 0	44 15 0
Burrogate to Honeysuckle			1882	1,169 7 7	35 14 0
Buckley's Crossing to Jinenbuen			1889	263 11 7	40 3 3
Buckley's Crossing to Maffra			,,	228 2 4	7 11 0
Buckley's Crossing, *via* Bolocco, to Jindabyne			1883	2,508 15 11	261 19 5
Brown Mountain, *via* Kameruka, to Finger Post			1892	3,487 17 0	316 0 11
Berridale to Buckley's Crossing			1891	339 18 8	191 6 2
Billylingra, *via* the Gap, to Adaminiby			1890	1,859 1 7	190 11 7
Brungle Bridge to Gobarralong Ford			1888	1,692 7 8	350 17 5
Brungle, *via* Wyangle, to Toomorooma Road			1889	1,182 5 7	311 5 2
Broughton Vale Municipal Roads			1895	130 0 0	130 0 0
Billabong Creek Crossing			,,	5 9 4	5 9 4
Balranald to Swan Hill Ferry			1887	2,207 11 4	210 15 3
Balranald Municipal Roads			1895	100 0 0	100 0 0
Booligal to Hillston			1880	3,792 5 10	192 0 2
Booligal to Ivanhoe			1892	1,697 10 2	479 5 6
Bogalong to Marsden			1883	6,275 13 1	149 7 2
Berry to Barrengarry			1893	1,904 3 5	590 3 4
Berry to Brogher's Creek over Woodhill			1895	50 0 0	50 0 0
Broomian to Nelligen			1893	988 17 6	379 9 0
Bolocco to Popong			1895	43 4 4	18 9 4
Bermagui to Quaama			1890	778 0 5	136 17 7
Bermagui to Cooma			1895	38 8 2	38 8 2
Bermagui to Cobargo			,,	747 19 3	747 19 3
Bermagui to Tilba Tilba			,,	310 5 6	310 5 6
Bowe's Lane, Corowa			,,	132 5 8	132 5 8
Baulkham Hills to Dural			1894	785 4 11	226 8 0
Baulkham Hills and Toongabbee Road to Buckley's, &c.			1895	35 0 0	25 0 0
Blacktown, *via* Riverstone, to Box Hill			1873	3,910 17 7	95 19 6
Blacktown, *via* Seven Hills, to Windsor Road			1895	179 9 8	179 9 8
Bankstown to George's River			,,	60 0 0	60 0 0
Barham to Neimur Bridge			,,	116 10 0	116 10 0
Bingie to Dwyer's Creek			,,	26 10 0	26 10 0
Bond's Road, Saltpan Creek, to George's River			,,	285 0 0	175 0 0
Barrengarry to Barber's Creek Railway Station			,,	607 0 0	607 0 0
Barrengarry to Nowra			,,	382 3 3	382 3 3
Barrengarry and Nowra Road to Lumsdaine's Corner			,,	67 0 9	67 0 9

RETURN OF EXPENDITURE ON PUBLIC WORKS—*continued.*

Work, and where situated.	Whether Constructing or under Repair.	Fund from which the Expense is defrayed.	When Commenced.	If Unfinished, amount of Expenditure to 30 June, 1896.	Amount expended from 1 July, 1895, to 30 June, 1896.
ROADS AND BRIDGES—*continued.*				£ s. d.	£ s. d.
Bunters to Myra Vale			1895	189 12 0	189 12 0
Burragorang to Yarra Yarra			,,	40 0 0	40 0 0
Bringelly to Mulgoa Municipality			,,	14 19 0	14 19 0
Binda, *via* Junction Point, to Tuena			,,	184 8 8	184 8 8
Bowning to Binalong			,,	254 6 3	254 6 3
Bannister's to Gorman's, near Gullen			,,	89 19 9	89 19 9
Bomaderry Railway Station to Nowra Bridge			,,	67 11 0	67 11 0
Bergalia Westwards to Silver Mines Road			,,	20 14 4	20 14 4
Boggy's Lane, near Marulan, to Taralga Road			,,	13 19 9	13 19 9
Belmont Road to Dudley Road			,,	47 10 6	47 10 6
Bell's Line to Putty			1871	13,228 15 4	598 10 2
Bell's Line of Road at Enfield to Rieby's Grant			1893	204 19 6	80 6 0
Blaxland's Ridge, *via* Moran's Rock, to Upper Colo			1888	974 13 8	116 18 8
Bowenfels to Lidsdale			1890	1,149 3 10	224 10 9
Bowenfels to Stony Point			1895	185 4 4	167 7 4
Blackheath to Hat Hill			,,	53 2 9	48 19 3
Blackheath to Megalong			,,	393 0 11	393 0 11
Bathurst to Monkey Hill			1877	11,818 12 10	226 12 5
Bathurst to Swallow Creek			1893	528 5 6	210 18 0
Bathurst to Sofala			1871	29,324 3 5	53 11 0
Bathurst, *via* Blayney and Cowra, to Grenfell			1870	116,503 9 7	3,143 14 0
Bathurst, *via* George's Plains, to Burraga			1895	2,502 2 9	1,961 19 9
Bathurst to Bellevue			,,	146 1 8	104 16 6
Bathurst and O'Connell Road, &c., to Leeholme and Tarana Road			,,	32 4 0	32 4 0
Blayney, *via* Grahamstown, to Millthorpe			1883	3,233 14 4	450 2 9
Blayney to Neville			1877	10,982 18 2	413 13 11
Blayney to Forest Reefs			1880	4,510 7 5	223 18 6
Blayney to Guyong			1881	2,951 2 6	355 10 8
Blayney to Barry			1883	1,626 0 7	115 11 8
Blayney to Rockley			1895	512 11 1	411 6 9
Blayney Cemetery Road			,,	15 0 0	15 0 0
Bull Ridge to Isabella River			,,	209 17 3	169 9 3
Brundah towards Marengo			1890	859 17 5	106 18 6
Boree to Parkes			1870	42,517 17 0	53 3 10
Boree to Manildra			1895	89 4 0	89 4 0
Boring's Wallaby Rocks			1894	53 8 11	5 12 0
Byrock to Gongolgan			,,	35 7 0	28 10 0
Byrock to Brewarrina			1895	2 13 7	2 13 7
Byrock Streets			,,	107 12 2	107 12 2
Bourke to Barringun			1888	3,662 17 1	315 17 9
Bourke to North Bourke			1895	2,000 0 0	2,000 0 0
Bourke to Hungerford	Maintenance, repair, and construction.	Consolidated Revenue.	1885	6,929 8 11	327 9 1
Bourke to Wanaaring and Milparinka			,,	6,816 12 5	1,184 16 4
Bourke to Brewarrina			1895	17 0 0	17 0 0
Bogan Gate to Dandaloo			,,	99 16 0	99 16 0
Broken Hill to Menindie			1892	871 6 4	201 16 9
Broken Hill to Cobham			1887	2,627 16 4	145 0 10
Broken Back Bridge to Pennant Hills			1891	977 2 1	186 15 1
Brolgan Tank to Condobolin			1894	520 0 7	298 8 0
Bridgewater to Ulundry			1895	399 14 9	371 17 9
Ben Lomond, *via* East side of Railway, to Llangothlin			,,	26 3 1	26 3 1
Boggy Creek to Meaker's Selection			,,	30 14 6	30 14 6
Bank Protection, Clarence River			,,	92 6 9	92 6 9
Bevondale to Narrowa			,,	39 19 6	39 19 6
Boro to Long Swamp			,,	20 0 0	20 0 0
Balmain, over Iron Cove and Parramatta River Bridges, to Ryde			1893	2,484 1 11	727 7 4
Bankstown to Rookwood Station			1886	2,667 1 8	40 2 0
Bettington's Lane, Dundas			1891	174 10 0	48 0 0
Botany Road, Sydney, to Banks' Meadow			1890	10,371 8 3	1,813 9 1
Berowra to Cowan Creek			1894	81 10 3	0 2 9
Bunnerong Road			1891	1,610 7 3	406 5 0
Bushman's Dam, Parkes			1895	143 4 6	143 4 6
Bulga-Ellenboro Road			,,	37 13 6	37 13 6
Badgery's Crescent, Lawson			,,	10 0 0	10 0 0
Brewarrina to Eugowra			,,	75 11 7	75 11 7
Brewarrina to Yaroomin Road			,,	31 2 7	31 2 7
Beaconsfield to Little River			,,	54 14 4	54 14 4
Black Bog, off Guyong Road			,,	38 12 6	38 12 6
Booligal to Ivanhoe			,,	55 10 6	55 10 6
Boro to Fairy Meadow			,,	19 19 10	19 19 10
Boundary-street, Randwick			,,	429 0 0	429 0 0
Cassilis to Rotherwood			,,	148 0 0	148 0 0
Crabb's to Lloyd's			1894	247 15 7	161 10 10
Cowlong to Marome Creek			1890	1,582 15 9	385 1 2
Clunes-Cooper Shoot Road to Nashmar			1895	8 19 2	8 19 2
Clunes to Stagg's			1887	1,322 15 9	188 9 6
Clunes to Mayfield			1895	200 0 0	200 0 0
Clunes to McKenzie's			1890	845 13 9	106 3 5
Clunes to Gibson's			1895	33 1 5	33 1 5
Clunes to Cooper's Shoot			1887	6,845 8 6	579 11 8
Clunes to Stewart's			1895	58 6 9	58 6 9
Clunes-Cooper Shoot Road to Railway, at Johnson's			,,	59 14 0	59 14 0
Clunes to Corndale			,,	155 9 2	155 9 2
Casino to Mount Lindsay			1876	15,269 10 9	1,222 17 9
Casino to Tabulam			1884	15,673 8 5	2 10 0
Casino to Reynolds'			1894	35 4 6	19 5 0

RETURN OF EXPENDITURE ON PUBLIC WORKS—*continued.*

Work, and where situated.	Whether Constructing or under Repair.	Fund from which the Expense is defrayed.	When Commenced.	If Unfinished, amount of Expenditure to 30 June, 1896.	Amount expended from 1 July, 1895, to 30 June, 1896.
				£ s. d.	£ s. d.
ROADS AND BRIDGES—*continued.*					
Casino to Coraki			1886	5,761 5 5	1,032 14 6
Casino to Gundarimba			1884	2,124 3 11	25 14 4
Casino to Ellangowan			1890	1,914 8 7	394 14 5
Casino Coraki Road to South Codrington Post Office			1895	18 3 2	18 3 2
Casino-North Codrington Road to Tomki Public School			,,	121 0 5	121 0 5
Casino to North Codrington			1892	1,972 0 11	561 18 9
Casino to Myall Creek			1873	27,062 13 7	1,407 9 7
Corndale to Beardow's			1895	108 7 6	108 7 6
Coraki to Broadwater			1889	1,286 7 1	293 3 11
Coraki to Wyrallah			1888	1,861 16 5	73 19 4
Coraki to Tuckarimba			1892	427 2 10	126 0 0
Coraki to Myall Creek			,,	1,224 5 11	391 7 0
Coraki to Swan Bay			1893	325 17 6	92 19 5
Coraki, Tuckarimba Road to Frogwells			1895	11 16 9	11 16 9
Chatsworth to Half-way House			1890	4,420 7 8	827 2 0
Chatsworth and Half-way House to Beach Diggings			1895	18 10 0	18 10 0
Calabash Ridge to Calabash Bay			1894	95 0 0	55 0 0
Calabash Ridge Road, &c., towards Hutchinson's			1895	20 0 0	5 0 0
Calabash Ridge Road towards Chillcott's			,,	45 0 0	15 0 0
Copmanhurst to Coaldale			1890	1,084 10 5	10 0 0
Copmanhurst Road to Wharf			1895	6 5 0	6 5 0
Cardiff Relief Works			,,	140 12 3	90 12 8
Cockatoo Island Relief Works			,,	163 10 11	163 10 11
Carramana to Seeland's			1890	182 8 3	54 3 10
Carramana to Eatonswill			,,	470 19 8	231 16 2
Carramana, &c., to Junction Orara River			1895	22 0 0	22 0 0
Coff's Harbour to Sharp's			1890	8,446 17 5	1,170 0 8
Coolatai to Wallangra			1884	630 16 7	25 0 0
Cobbedah to Rocky Creek			1874	13,336 12 5	261 11 4
Cregan's, *via* Rosehill, to Rocky River			1886	667 4 2	26 0 0
Collarendabri to Narrabri			1893	479 15 6	222 6 10
Collarendabri to Angledool			1892	789 2 5	355 13 9
Coonamble to Tundaburne Creek			1895	165 7 1	110 7 5
Coonamble to Combogolong			1892	990 18 10	442 2 10
Coonamble towards Nedgerra Creek			1895	40 15 0	40 15 0
Coonamble to Pilliga			,,	40 0 0	40 0 0
Coonamble to Gilgandra			1891	2,321 4 10	755 11 4
Coonamble District Roads			1895	33 0 5	33 0 5
Coonamble towards Baradine			1894	239 16 4	83 3 4
Coonamble to Quambone			1895	30 0 0	30 0 0
Coonamble to Warren			1892	1,501 9 7	841 14 1
Coonamble towards Billaroy			1895	93 0 10	65 6 8
Coonamble to Dubbo	Maintenance, repair, and construction.	Consolidated Revenue.	1874	31,154 16 7	129 18 0
Congarini to Walsh's			1895	100 0 0	100 0 0
Congarini, up Taylor's Arm			1885	4,095 17 3	1,144 11 11
Congarini to Rolland's Plains			1894	4,681 17 0	2,052 14 1
Coast Road to Rolland's Plains			,,	236 5 7	150 6 1
Coast Road to Campbell's			1889	1,483 9 5	174 1 0
Coast Road to Perrett's			1894	3,092 8 3	1,734 17 1
Coast Road to Upper Bucca			1895	20 0 0	20 0 0
Coast Road to Sullivan's			,,	254 12 10	254 12 10
Coopernook, *via* Cattai Creek, to Harrington			1884	1,870 12 3	303 10 1
Cedar Party Road to Taree and Wingham			1891	799 9 8	150 13 10
Cedar Party Road to Nambucca Heads			1893	284 4 10	142 11 5
Cedar Party Road to Dimond's			1891	196 19 6	52 15 0
Cedar Party Creek up Killabakh Creek			1890	692 19 6	150 0 0
Cundle, *via* Lansdowne, to Jones' Island			1876	4,115 18 0	41 6 11
Crossing Paterson and Alleyn River			1895	19 10 0	19 10 0
Crossing Cameron's Creek			,,	27 14 0	27 14 0
Crossing Talbragar at Merotherie			,,	119 17 6	119 17 6
Crossing at Gordonville			,,	0 15 0	0 15 0
Crossing Pint Pot Creek			,,	19 19 6	19 19 6
Cameron's Crossing to Morill Creek			1891	187 4 7	63 13 6
Cessnock, *via* Mount View, to Millfield			,,	1,612 10 7	295 11 6
Cessnock and Allandale Road to Greta			1895	72 0 0	72 0 0
Cessnock to South Boundary of Josephson's			1884	2,211 13 4	78 18 6
Cooranbong and Mount Vincent Road to Awaba Railway Station			1891	689 12 3	69 16 1
Cooranbong to Dora Creek Platform			1887	766 13 3	112 4 1
Cooranbong to Freeman's Waterholes			1892	975 12 7	219 2 8
Cooranbong and Humphries' C.P. to top of Watagan Mountain			1893	567 14 7	429 16 8
Cooranbong to Humphries' C.P.			1895	311 13 4	311 13 4
Cooranbong and Humphries' C.P., Road to Pringle's			1894	149 18 0	84 10 0
Charlestown to Redhead			1889	2,000 13 4	122 19 8
Charlestown to Lake Macquarie			1894	223 11 8	187 11 8
Charlestown to Lake Macquarie at Warner's Estate			1895	64 0 0	64 0 0
Clarencetown to Dungog			1877	20,499 14 6	468 7 11
Clarencetown to Limeburner's Creek			1884	3,728 7 6	519 1 5
Coonabarrabran at Bomera			1891	2,252 8 11	252 7 1
Coonabarrabran to Wingidgeon			1895	254 0 0	23 0 0
Coonabarrabran to Goorianawa			1882	5,764 19 6	15 0 2
Coonabarrabran to Timor Rock			1895	45 0 0	40 15 0
Coonabarrabran to Mundooran			1891	5,388 11 9	1,249 15 5
Coonabarrabran to Malally			1887	5,216 7 11	951 16 2
Coonabarrabran to Black Stump			1892	2,281 2 0	499 1 2
Coonabarrabran *via* Madderty's to Ulamamba			1895	100 0 0	100 0 0
Coonabarrabran to Tenandra			,,	400 0 0	400 0 0

RETURN OF EXPENDITURE ON PUBLIC WORKS—*continued.*

Work, and where situated.	Whether constructing or under Repair.	Fund from which the Expense is defrayed.	When Commenced.	If Unfinished, amount of Expenditure to 30 June, 1896.	Amount expended from 1 July, 1895, to 30 June, 1896.
ROADS AND BRIDGES—*continued.*				£ s. d.	£ s. d.
Currabubula to Pillaway	Maintenance, repair, and construction.	Consolidated Revenue.	1891	493 14 0	104 6 7
Chandler Bridge to foot of Jeogla Mountain			1893	894 1 1	285 8 8
Chicester to Cobark			1895	25 0 0	25 0 0
Commandant Hill to Port Macquarie			1894	99 19 5	60 11 2
Coolah to Cassilis			1895	169 2 0	169 2 0
Chatham to Taree and Wingham Road			1891	138 19 2	18 0 0
Clarkson's Crossing to Glenorin			1895	50 0 0	50 0 0
Croki to Main Road			1894	72 19 3	58 4 3
Croki River Bank Protection			1895	24 0 0	24 0 0
Croki Punt to Main Road			,,	30 0 0	30 0 0
Cucumbarkup Brown Creek			,,	156 0 0	156 0 0
Clarence Creek Bank Protection			,,	84 6 5	84 6 5
Cochran's to Duncan's			1892	150 13 10	79 9 2
Cheer's Hill to Algomera Junction			1890	1,527 4 10	232 16 3
Currawang to Brimbemalla			1895	69 17 0	69 17 0
Cundle, *via* Savilles, to Coopernook			,,	286 8 2	286 8 2
Castle Rock Road			,,	49 2 8	49 2 8
Cowan Creek Road			,,	46 1 10	46 1 10
Cundletown School Approach			,,	26 11 1	26 11 1
Cooney to West Hillgrove			,,	76 9 0	76 9 0
Corinda to Quambone			,,	176 0 0	176 0 0
Carrington to Wickham			,,	134 13 1	134 13 1
Carroll to Currabubula			,,	93 7 4	93 7 4
Condong to Durenbar			,,	345 13 10	345 13 10
Court-street, Bundarra			,,	10 0 0	10 0 0
Cudgeon to Norrie's Head			,,	44 2 0	44 2 0
Carter's Gate to Palmer's Channel			,,	30 0 0	30 0 0
Coraki to Buckendoon			,,	77 5 10	77 5 10
Cowan Creek to Waterview			,,	44 16 8	44 16 8
Chiver's Bridge to West Kangaroobie			,,	50 7 0	50 7 0
Carne's Hill to Bringelly			1892	492 2 1	160 14 5
Campbelltown to Narellan			1889	697 14 1	80 11 3
Camden Municipality to Werombi			1893	365 18 4	71 17 3
Camden to The Oaks			1890	2,058 8 6	534 2 11
Clifton Railway Station to Public School			1895	30 0 0	30 0 0
Clyde Road			,,	13 10 0	13 10 0
Collector to Gundaroo			1890	577 3 3	39 15 0
Collector to Gunning			1878	3,826 17 3	111 5 0
Collector, *via* Currawang, to Tiranna			1882	5,151 13 0	259 15 11
Collector to Bredalbane			1881	2,523 4 1	23 7 1
Cotta Walla to Roslyn			1892	434 8 11	120 19 8
Crookwell to Mount Wayo			,,	3,249 19 4	847 3 2
Crookwell to Laggan and Binda			1883	1,010 4 9	65 11 9
Crookwell, *via* Grabben Gullen, to Gunning			1882	3,893 5 0	421 3 10
Crookwell, *via* Gullen and Laggan, to Taralga			1874	10,858 11 6	811 16 9
Crookwell, *via* Binda and Bigga, to the Abercrombie			1892	1,772 14 5	320 9 0
Crookwell Cemetery Road			1895	59 19 7	59 19 7
Crookwell to Gunning			,,	90 0 0	90 0 0
Captain's Flat to Norongo			1892	647 12 5	78 6 2
Captain's Flat to Cooma Road, at 24-mile post			1893	518 10 8	156 0 5
Cowra Road, near Rosebrook, towards Bredbo			1891	124 8 5	54 14 10
Cathcart Junction, *via* Wyndham, to Panbula			1875	28,438 15 11	1,190 2 2
Cathcart to Bibbenluke Junction			1888	1,374 19 2	50 4 9
Cragie to Delegate			1890	318 12 0	54 13 9
Cobargo to Wadbilliga			1888	3,188 14 11	243 6 4
Cobargo to Bermagui			1883	4,148 9 8	37 7 2
Candelo to Wyndham			1882	4,206 14 3	179 14 11
Cooma to Green Hills			1887	1,011 6 2	146 0 0
Cooma to Bobundarah			1880	4,423 2 8	254 17 7
Cooma to Jindabyne			1881	9,117 7 7	624 9 9
Cooma, *via* Rosebrook, to Cowra			1889	756 13 8	146 3 0
Cooma, *via* Tracey's, to Tom Grogan's Creek			,,	449 11 4	28 10 0
Cooma, *via* Mittagong, to Murrumbucca			,,	315 2 6	44 18 0
Cooma and Jindabyne Road to Buckley's Crossing			1878	4,562 4 7	186 11 7
Cooma, *via* Myalla, to Bobundarrah and Nimitybelle			1884	1,569 4 4	176 13 6
Cooma to Nimitybelle			1892	4,044 18 6	1,023 19 11
Cooma, *via* Jindabyne, to Kiandra			1879	17,750 16 1	857 9 7
Cooma, *via* the Peak, to Bolaro			1887	2,244 8 2	127 16 4
Cooma to Count-a-guinea, *via* Big Badger			1879	3,938 11 5	195 0 6
Cooma, *via* Dandalong to Kydra			1895	137 14 0	137 14 0
Cooma and Bolaro Road to Cooma and Murrumbucca Road, *via* Mawson's Mill			,,	36 0 0	36 0 0
Cooma District Roads			,,	441 1 6	441 1 6
Cooma, *via* Merton, to Mulwalla			,,	86 16 4	86 16 4
Cootamundra to Stockinbingal Bridge			1885	1,827 3 11	184 11 6
Cootamundra to Jugiong			1895	20 11 3	20 11 3
Cootamundra to West Jindalee			,,	186 6 6	125 11 3
Cootamundra to Junee			1892	888 7 5	304 9 6
Cootamundra to Binalong			,,	1,553 15 6	471 8 9
Cootamundra to Temora			1882	16,403 6 0	484 15 4
Cootamundra, *via* Kilrush, to Wallendbeen			1892	695 0 3	290 12 6
Cootamundra, *via* Ironbong, to Bethungra			1891	963 9 0	198 4 1
Cootamundra to Coolac			1875	7,065 10 6	488 17 6
Cootamundra to Berthong			1891	475 17 8	143 7 5
Cootamundra Municipal Roads			1895	20 14 7	20 14 7
Coolac to Gobarralong			1887	1,661 1 5	565 12 2

Return of Expenditure on Public Works—*continued.*

Work, and where situated.	Whether Constructing or under Repair.	Fund from which the Expense is defrayed.	When Commenced.	If Unfinished, amount of Expenditure to 30 June, 1896.	Amount expended from 1 July, 1895, to 30 June, 1896.
				£ s. d.	£ s. d.
ROADS AND BRIDGES—*continued.*					
Coolamon to Devlin's Siding Road			1894	91 10 0	43 10 0
Coolamon to Currawarna			,,	97 7 11	76 7 11
Coolamon to Cowabee			1892	1,160 18 3	231 2 9
Coolamon to Willandra			1895	108 18 0	108 18 0
Coolamon, *via* Berry Jerry, to Ariah			1894	95 0 0	7 2 6
Cranebob Creek to Upper Tarcutta			1890	631 6 4	128 16 3
Cudgellico to Murrin Bridge			1895	63 14 6	63 14 6
Carabost to Kyamba			1880	4,630 3 0	118 6 6
Centennial Park, Bowral			1895	50 0 0	50 0 0
Cullingar Road to Mulvey's Hall			,,	20 0 0	3 18 6
Conargo to Old Goree Bridge			1892	492 19 8	182 17 9
Culcairn to Germanton			1882	12,189 14 10	442 12 6
Culcairn to Walbundrie			1895	247 17 9	247 17 9
Corowa to Piney Range			1885	4,512 10 0	460 11 2
Corowa to Coreen and Jerilderie Road at Momalong			1892	2,404 12 7	685 2 2
Coonong towards Urana			1885	5,729 19 6	1,188 8 0
Clyde Road			1895	28 9 0	28 9 0
Carrathool to Hillston			1881	7,493 3 8	358 1 10
Camberwell to Goorangoola Road at Kermodes			1895	85 12 7	85 12 7
Cobbitty to Mattarai, Westward, and Vermont			,,	23 0 0	23 0 0
Campbell's Lane to Middle Arm			,,	20 9 0	20 9 0
Courabyra to Oberne			,,	66 3 7	66 3 7
Cuttings at the Range, White Swamp			,,	74 10 6	74 10 6
Candelo to Bembooka			,,	186 14 10	186 14 10
Condong to Palfrey's			,,	106 19 6	106 19 6
Cadgangarry to Upper Brogo			,,	66 13 0	66 13 0
Carter's to Goulburn and Nanawa Road			,,	49 9 0	49 9 0
Carey's to Gundarry			,,	21 6 0	21 6 0
Cullingar to Yass Road			,,	6 0 0	6 0 0
Camberwell North from Soper's			,,	97 15 0	97 15 0
Carathoul to Carathoul Ferry			,,	66 15 0	66 15 0
Cherry-tree Hill Deviation			,,	85 13 4	85 13 4
Crossing, Burragorang Creek near Cemetery (Bland to Goulburn)			,,	37 7 8	37 7 8
Crossing at Mittagong Sheep Wash			,,	35 0 0	35 0 0
Crossing, Molonglo River at Silver Hill			,,	5 0 0	5 0 0
Camberra Post Office to 7-mile post on Uriara Road			,,	16 8 0	16 8 0
Crossing, Dead Horse Creek			,,	25 9 6	25 9 6
Carragabal, *via* Bimbi, &c., to Burrengong			1892	1,243 7 1	80 0 0
Carragabal, *via* Bimbi and Thuddungra, to Clifton			1895	702 16 9	644 7 5
Cawdor to Westbrook			1894	61 19 0	39 0 0
Charleyong to Mayfield Junction			,,	119 6 6	71 18 5
Clarendon to Cornwallis	Maintenance, repair, and construction.	Consolidated Revenue.	1884	756 8 4	67 17 4
Churchill's Wharf, *via* Sackville Post Office, to Page's Ferry			1895	71 13 4	40 8 4
Caloola to Trunkey			1894	136 6 10	45 3 10
Caloola Road to Newbridge			1878	2,212 4 2	75 17 10
Cobborah to Gilgandra			1893	1,993 13 4	766 1 0
Cobborah to Denison Town			1895	151 9 9	123 0 0
Carcoar to Millthorpe and Cadia Road			,,	308 12 4	256 5 10
Carcoar to Flyer's Creek			1879	1,955 18 2	246 5 5
Carcoar to Hobby's Yards			1894	354 15 5	248 3 0
Cudgegong to Wollar			1891	1,573 17 3	531 17 5
Cudgegong to Piambong			1895	75 0 0	75 0 0
Cudgegong to Reedy Creek			1873	1,852 3 5	600 5 1
Cudgegong to Hill End			,,	27,298 10 3	558 0 9
Cudgegong to Rylstone			1883	4,281 18 5	422 11 0
Cudgegong Village to Rylstone			1885	3,247 10 6	325 19 5
Cudgegong to Home Rule			1881	1,615 5 10	135 0 5
Cudgegong to Denison Town			1893	4,543 5 1	1,848 3 4
Cowra, *via* Bennett's Springs, towards Burrowa			1886	2,043 16 8	81 4 8
Cowra to North Logan			1890	251 2 8	24 8 2
Cowra to Koorawatha			1875	6,792 6 7	23 18 6
Cowra to Hovell's Creek, *via* Darby's Falls			1883	2,763 2 1	320 9 0
Cowra, *via* Binni Creek, to Walli			1886	2,230 3 1	176 15 7
Cowra, *via* Goolagong, to Forbes			1878	4,805 15 5	1,007 9 11
Cowra to Canowindra			1880	4,678 16 7	683 9 8
Cowra to Breakfast Creek			1888	2,616 0 11	377 13 4
Cargo to Canowindra			1882	3,253 8 7	374 3 7
Cargo to Cudal			1883	3,087 14 5	296 12 2
Cargo and Orange Road to Kite's Swamp			1889	1,213 9 7	231 3 2
Canowindra to Eugowra			1876	6,234 16 0	206 18 7
Canowindra to Goolagong			1890	732 10 9	181 2 10
Cuttaburra Creek Crossing, Bourke, to Hungerford			1894	183 19 2	143 19 10
Cumnock to Balderogery			1888	1,404 7 4	317 17 2
Cullenbone, *via* Gulgong, to Denison Town			1893	2,797 10 4	102 8 7
Cullenbone to Cobborah			1890	8,676 6 10	1,832 17 6
Cobar to Sandy Creek			1893	325 10 8	128 3 0
Cobar to Wilcannia			1895	545 11 2	461 2 5
Cobar to Nyngan			1887	2,005 7 4	82 6 4
Cobar to Hillston			1889	2,168 5 2	412 16 3
Cobar to Louth			1893	283 7 6	207 0 0
Cobar to Bourke			1895	3,440 4 3	263 2 8
Cobar to Bourke at 14¾ mile, *via* Drysdale, to 25¼ mile			,,	100 0 0	100 0 0
Curra Creek to Balderogery			1880	9,798 7 3	306 2 7
Curra Creek to Arthurville			,,	3,026 17 3	224 8 2
Cudal to Berrigan Hall			1895	189 16 11	167 16 11
Carlingford Post Office to Rogan's Hill			1892	1,438 9 6	82 19 5

RETURN OF EXPENDITURE ON PUBLIC WORKS—*continued.*

Work, and where situated.	Whether Constructing or under Repair.	Fund from which the Expense is defrayed.	When Commenced.	If Unfinished, amount of Expenditure to 30 June, 1896.	Amount expended from 1 July, 1895, to 30 June, 1896.
ROADS AND BRIDGES—*continued.*				£ s. d.	£ s. d.
Centennial Park Road			1887	61,299 9 7	174 16 10
Cowan Creek Relief Works			1894	1,130 4 0	1,077 4 0
Copeland-street, Beecroft			1895	287 11 2	88 8 8
Coniac and Curracobark Road to Pignabaney Road			,,	60 0 0	60 0 0
Comleroy to Sackville Ferry			,,	101 8 6	101 8 6
Capertee to Glen Alice			,,	163 2 9	163 2 9
Callan Park Road			,,	828 11 10	174 15 6
Cox's to Rydal Road			,,	54 18 0	54 18 0
Crossing, Ward and Richmond Streets			,,	6 0 9	6 0 9
Catholic Chapel, Baulkham Hills, to Seven Hills Road			,,	21 1 3	21 1 3
Catholic Chapel, Baulkham Hills			,,	15 0 0	15 0 0
Cudal to Meranburn			,,	24 17 6	24 17 6
Crossing, Mount Evenden Road at Cheney's			,,	25 0 0	25 0 0
Crossing, Lachlan River at Goolagong			,,	59 19 1	59 19 1
Cullen Bullen to Carson's Siding			,,	110 4 0	110 4 0
Castle Hill to Windsor Road			,,	20 0 0	20 0 0
Creswick Road towards Chatswood, near Rooty Hill			,,	10 0 0	10 0 0
Cattai Creek Road at Glenoree to Wigginton's			,,	20 0 0	20 0 0
Dungowan, *via* Port Stevens Spur Road, to Swamp Oak			1893	793 9 9	95 8 6
Dungowan Creek, south bank of river, to Cadell's Station			1892	941 6 0	45 3 9
Dungowan Post Office to Mulla Creek			1894	45 10 0	14 14 0
Dora Creek to Morrissett			,,	60 0 0	4 13 0
Dutton's to Marome Creek			1890	997 16 4	122 17 6
Davistown to Gosford and Kincumber Road			1894	61 5 0	53 5 0
Deepwater to Torrington			1888	2,818 5 9	254 13 7
Darkwater Bridge up left bank Belmore River			,,	1,346 4 9	132 18 0
Darkwater Bridge up right bank Belmore River and Branch Road			1892	678 13 8	232 19 11
Dungog to Weismantles			1883	17,917 18 9	961 10 9
Dungog to Fosterton			1877	2,625 18 2	230 17 3
Dungog to Underbank			1892	6,825 8 0	655 17 11
Dunmore to Clarencetown			1887	8,278 3 9	370 15 [illegible]
Dunmore to Paterson Bridge			1880	3,176 4 2	194 5 8
Dunmore to Paterson Bridge encroachment, near Woodville			1895	369 13 9	300 0 0
Dumaresq Island Roads			1891	423 3 5	89 11 11
Duri, *via* Colly Blue, to Bomera			1894	1,507 15 5	712 12 4
Deep Creek to Busby's Flat			1890	1,256 17 4	229 15 9
Denman Road, *via* Saddler's Creek, to Jerry's Plains			1895	13 0 0	13 0 0
Darlington Point to Waddy			,,	23 4 0	23 4 0
Duval to Pearson's			,,	10 8 9	10 8 9
Denistown to Merrygoen			,,	57 1 0	57 1 0
Doran's up Mullumbimby Creek			,,	248 3 2	248 3 2
Dungay to Skinner's	Maintenance, repair, and construction.	Consolidated Revenue.	,,	292 11 0	292 11 0
Dungay Creek Branch Road			,,	60 0 0	60 0 0
Dalmorton to Chandler's Creek			,,	35 13 0	35 13 0
Doran's to Monticollum			,,	200 2 11	200 2 11
Darke's Forest to Heathcote Road			1892	403 7 2	99 5 3
Dalton to Narrawa			1882	4,186 16 4	172 3 0
Delegate to the Border, near Bendock			1887	639 15 2	63 11 5
Delegate, near Currawang, to Wollondilly			1891	877 7 6	168 11 8
Delegate and Rocky Range to Tombong			1895	25 0 0	25 0 0
Delegate to the Border, near Kerkanong			,,	38 10 3	38 10 3
Deniliquin to Urana			1874	21,360 18 0	936 13 5
Deniliquin to Colimo			1895	200 0 0	175 0 0
Deniliquin to Wakool Bridge			1892	1,270 13 8	250 16 6
Deniliquin to Wanganella			,,	1,394 12 9	507 14 8
Deniliquin to Moama			1891	985 4 8	211 2 0
Deniliquin to Moulamein			1892	1,334 9 9	357 11 1
Deniliquin, *via* Aratula, to Tocumwal			1893	793 7 7	184 0 10
Deniliquin to Boomanoomana			1895	534 14 5	534 14 5
Deniliquin, *via* Moonee Swamp, to Finly			,,	401 0 0	401 0 0
Devil's Den, *via* Gunbar, to Whealbar			1882	3,184 6 5	196 19 7
Doyle's Creek to Jerry's Plains			1895	19 12 0	19 12 0
Doughboy Hill to Bungendore			,,	97 13 2	97 13 2
Dam at Egan Creek, Wagga Wagga			,,	14 7 1	14 7 1
Deviation, Tharwa to Michelago, *via* Smith's			,,	20 0 0	20 0 0
Diamond Swamp to Tarana			1894	263 12 7	216 16 11
Duggan's to Oberon			1888	3,174 2 2	133 19 1
Dural, Galston Road to Fagan's, towards Carter's			1895	20 0 0	20 0 0
Dural to Pitt Town and Wiseman's Ferry			1893	225 7 4	22 1 0
Dubbo to Obley			1878	6,473 16 5	226 12 8
Dubbo, *via* Tomingley, to Peak Hill			1890	8,851 6 9	472 18 10
Dubbo to Cobborah			,,	3,604 16 4	787 12 4
Dubbo to Peak Hill			1895	293 18 5	293 18 5
Dubbo to Gilgandra			1891	5,604 2 5	734 11 10
Dairy Creek to Galley Swamp			1895	87 18 10	79 3 10
Drainage of Streets, Smithtown			,,	57 19 4	57 19 4
Dudley Road to Belmont Road			,,	7 0 0	7 0 0
Defence Road to Pittwater Road			1888	2,145 14 1	1 11 6
Dog Trap Road to Pheasant's Nest			1895	90 0 0	40 0 0
Dripstone to Newrea Bridge			,,	96 1 0	96 1 0
Darlington Point to Tubbo			,,	31 12 0	31 12 0
Daly's Jembaicumbene to Walsh's			,,	19 19 11	19 19 11
Darby's Falls to Graham			,,	104 5 0	104 5 0
Duck Creek to Alstonville Butter Factory			,,	9 16 0	9 16 0
Day-street, Daysdale (Jerilderie to Coreen)			,,	100 0 0	100 0 0
Donkin's Lane (Temora to Wyalong)			,,	3 18 6	3 18 6

RETURN OF EXPENDITURE ON PUBLIC WORKS—*continued.*

Work, and where situated.	Whether Constructing or under Repair.	Fund from which the Expense is defrayed.	When Commenced.	If Unfinished, amount of Expenditure to 30 June, 1896.	Amount expended from 1 July, 1895, to 30 June, 1896.
ROADS AND BRIDGES—*continued.*				£ s. d.	£ s. d.
Dalton to Fish River			1895	42 15 6	42 15 6
Darlington Point to Wadi			,,	10 0 0	10 0 0
Deep Gully Road			,,	28 1 9	28 1 9
Dyer's Corner to the Terrace			,,	29 13 2	29 13 2
Drinan's Gate to Gresford			,,	65 14 4	65 14 4
Dandaloo-street, Narromine			,,	192 12 0	192 12 0
Deviation, Rockley Common			,,	104 2 1	104 2 1
Duke's Springs to Ironmongie			,,	18 15 3	18 15 3
Duguid's Grange to Forest Reefs			,,	7 19 10	7 19 10
Drake to Long Gully			,,	59 0 0	59 0 0
Dorrigo Extension, Road through			,,	300 0 0	300 0 0
Darling Road, Wentworth			,,	75 0 0	75 0 0
Dungaree to Pyangle			,,	18 0 0	18 0 0
Duramana, *via* Peel, to Lime Kilns Road			,,	138 0 0	122 5 0
Eureka to Rosebank			1888	856 13 0	172 19 6
Eureka to Gay's			1891	188 15 11	38 8 0
Emmaville to Webb's			1885	1,254 4 7	29 11 0
Emmaville to Deepwater			1895	930 0 4	930 0 4
Emmaville to Strathbogie			1885	2,234 16 3	315 3 11
East Kempsey to Spencer's Creek and Branch Road			1877	6,419 3 10	854 0 9
East Kempsey to Verge's Swamp			1895	83 16 4	83 16 4
East Kempsey, *via* Dungay Bridge, to Sherwood			1880	3,105 8 0	179 18 11
East Kempsey to Coast at Crescent Heads			1889	1,589 11 7	408 1 4
Erina, *via* Kincumber, to Terrigal			1893	881 14 0	22 9 0
Ennis and Gowrie Road to Carney's and Branch to Somerville's Gate			1895	140 4 0	140 4 0
East Maitland to Freeman's Waterholes			1891	5,113 1 5	702 4 8
Erosion, Worland's Creek, Blandford			1895	269 13 5	29 3 9
East Frederickton Drain Repairs			,,	180 1 2	169 4 2
Ennis Road, Glen Esk, Upper Plains			,,	152 17 0	102 17 0
Elrington to Araluen			1870	3,147 1 4	108 5 10
Eurobodalla to Nerrigundah			1889	1,180 2 6	64 0 0
Eden to Sturt			1879	7,630 2 6	518 19 0
Eden to Pambula			1881	7,736 12 9	424 3 3
Eden, Pambula Road, to Mount Gahan			1895	8 15 0	8 15 0
Eden and Pambula Road to Back Creek			1891	728 17 3	110 5 8
Exeter to Yate's Seed Farm			1895	58 19 0	58 19 0
Exeter to Main South Road			,,	211 11 0	211 11 0
East Kangaloon to Waratah Factory			1893	207 12 6	50 0 6
Eureka to Binnaburra Railway Station			1895	100 0 0	100 0 0
Edith to Ginkin			,,	29 12 0	29 12 0
Engonia towards Leadnapper			,,	42 7 6	42 7 6
E. M'Guire's to Pitt Town Bottoms			1893	173 6 3	24 1 4
E. M'Guire's, *via* Clarke's, to Fisher's			1895	97 8 1	17 8 1
Enmore Road Wood-blocking	Maintenance, repair, and construction.	Consolidated Revenue.	,,	205 9 7	205 9 7
East Hill Road Deviation			,,	38 7 10	38 7 10
Essex Road, East Carlingford			,,	40 0 0	40 0 0
Eastern Road, Gordon			1889	1,096 9 9	56 4 0
Eastern Plains to Tenterden			1895	84 19 2	84 19 2
Eastern Plains towards Trevanna			,,	15 6 0	15 6 0
Eastern Side of Railway Line at Buxton			,,	25 0 0	25 0 0
Evan's Plains to Perth			,,	108 2 8	108 2 8
East Bank Orara River, Road up			,,	323 9 4	323 9 4
Eslie's to Four-mile Creek			,,	39 17 8	39 17 8
Eatonswill to Copmanhurst			,,	9 16 0	9 16 0
Ellalong to Wallaby Gully			,,	52 4 9	52 4 9
Emigrant Creek at Bishop's to Reserve 1,036			,,	29 18 9	29 18 9
Eight-mile to Puddle Dock			,,	38 10 6	38 10 6
Erosion, River Bank, Pelican Island			,,	46 0 0	46 0 0
Elsmore to Kangaroo Camp			,,	84 13 8	84 13 8
Eugowra to Bendogundra Railway Platform			,,	80 14 0	80 14 0
Farms near Broadwater at School towards Lawrence and Myall Creeks Road			,,	68 11 9	68 11 9
Farms near Broadwater towards Lawrence			,,	16 5 6	16 5 6
Fagen's Road at Black's to Calabash Road			,,	20 0 0	20 0 0
Fencing Springs at Newtown, Captain's Flat			,,	6 0 0	6 0 0
Flood Gates in Fraser's Lane			,,	15 0 0	15 0 0
Forest Road			,,	125 0 0	125 0 0
Fox's to M'Cormack's			1892	852 11 10	198 12 0
Fidden's Wharf Road			1893	60 1 0	12 10 0
Flagstone Creek to Acacia Creek			1895	24 18 8	6 15 2
Fernmount to Raleigh Mill			1894	130 7 2	75 18 6
Fernmount-street			1895	18 0 0	18 0 0
Flanagan's Swamp to Upper St. Leonards and Orandumby			1891	497 18 6	187 6 0
Flyer's Creek to Dorney			1884	3,567 13 10	975 13 2
Flyer's Creek to Forest Reefs			1895	91 7 0	91 7 0
Felltimber Creek Road			,,	332 8 7	80 7 0
Ford at Cameron's Falls			,,	114 0 0	114 0 0
Fairfield Road, widening			,,	168 10 7	11 5 7
Foot of Burragorang Mountain to Cox's River			1881	1,566 19 4	136 2 7
Foot of Burragorang Mountain up the Wollondilly River			1882	1,537 5 6	138 19 3
Fitzroy Falls, *via* Belmore Falls, to Rossgall Road			1890	2,924 10 10	181 14 3
Foxlow, *via* Carwoola, to Seven-mile post			,,	1,285 6 10	103 12 5
Fountaindale to Barrangarry, to King's and other farms			1895	21 0 0	11 0 0
Four-mile Tree to Charlton			1890	779 18 5	138 5 9
Forbes to Gunningbland Junction			1883	4,754 1 0	503 9 0
Forbes to South Condobolin			1882	11,395 4 3	532 15 1

RETURN OF EXPENDITURE ON PUBLIC WORKS—*continued.*

Work, and where situated.	Whether Constructing or under Repair.	Fund from which the Expense is defrayed.	When Commenced.	If Unfinished, amount of Expenditure to 30 June, 1896.	Amount expended from 1 July, 1895, to 30 June, 1896.
ROADS AND BRIDGES—*continued.*				£ s. d.	£ s. d.
Forbes to Condobolin			1879	11,478 13 11	255 16 11
Forbes to Grenfell			1895	2 3 10	2 3 10
Forbes, *via* Parkes and Alectown, to Peak Hill			1878	9,020 4 2	121 9 11
Fox Gully Road			1895	19 0 0	19 0 0
Favell's to Byng			1884	1,541 12 1	155 12 1
Field of Mars Road			1895	699 17 10	450 0 0
Foxlow-street, Captain's Flat			,,	98 2 0	98 2 0
Fox Valley to Thornleigh Station			1891	674 13 10	90 18 2
French's Forest to Pittwater Road, at Greendale and D.Y.			1890	1,085 11 5	111 12 6
Franklin Road, Pennant Hills			1895	20 0 0	20 0 0
Foster Ferry Approach			,,	22 0 0	22 0 0
Foot's Lane, Cowra, to Canowindra			,,	2 15 0	2 15 0
Foot's Lane, Canowindra			,,	91 18 10	91 18 10
Firefly Creek to Sawyer's			,,	43 17 9	43 17 9
Foot of Araluen to Upper Araluen			,,	35 0 0	35 0 0
Flick's to the Quarry			,,	77 0 2	77 0 2
Falcon-street, Guyra			,,	27 10 6	27 10 6
Granuaile to Hutchinson's			1889	2,565 15 1	343 19 9
Gundurimba to Marshall's			1892	468 16 11	194 4 2
Goonellabah, *via* Rous, to Wardell			1890	2,906 14 7	420 15 11
Goonellabah to Rous			1895	25 6 5	25 6 5
Grafton, *via* Glen Innes, to Inverell			1866	282,266 14 8	7,895 16 4
Grafton, *via* Southgate, to Broadwater			1894	2,126 3 8	1,231 2 7
Grafton to Flying Horse			1890	9,563 2 2	717 3 5
Grafton, Broadwater Road to the River			1895	28 15 6	28 15 6
Grafton and Armidale Road, at Tyringham Post Office, to Cockatoo Creek			,,	234 11 6	74 9 6
Grafton and Inverell Road to Glen Elgin Mines			,,	32 8 0	32 8 0
Grebert's to Solferino			1886	5,857 16 4	345 18 6
Gum Flat to Little Plain			1895	42 11 7	42 11 7
Glynn's to Nymboida			1890	367 17 9	18 18 0
Glen Innes to Red Range and Bear Hill			1895	118 19 11	277 1 1
Glen Innes, *via* Wellingrove, to King's Plains			1875	9,358 13 2	594 1 3
Glen Innes to Shannon Vale			1891	482 0 6	99 5 2
Glen Innes to Mount Mitchell			1888	1,073 9 7	135 15 2
Glen Innes District Roads			1894	224 6 0	107 2 6
Glen Innes–Inverell Road to farms on Beaufort Flat			1895	26 12 3	26 12 3
Glen Innes to Emmaville			1881	7,981 13 9	339 0 1
Glebe to Adamstown			1895	192 0 0	192 0 0
Glencoe to Ben Lomond Railway Station			1893	170 0 0	120 0 0
Glencoe Station to Mount Mitchell			1890	1,276 9 1	106 11 0
Guyra to Glencoe			1895	487 13 7	452 1 7
Guyra to Sandy Creek			1890	482 19 7	72 5 0
Guyra to Kangaroo Camp	Maintenance, repair, and construction.	Consolidated Revenue.	1893	2,621 17 1	792 12 0
Guyra to Oban and Kookabookra			1889	2,440 1 2	166 2 4
Glenwilliam to Banfield			1893	35 19 7	1 10 10
Great North Road to St. Albans			,,	752 9 8	771 4 9
Green Hills, *via* Sherwood, to Dungay Creek			1892	1,226 11 5	400 16 2
Green Hill Ferry to East Kempsey and Sherwood			1895	58 17 6	18 17 6
Gostwyck to New Park (Wallarobba Road)			1882	7,226 17 1	291 17 11
Gosford to the Blood Tree			1890	3,164 16 0	487 19 0
Gosford and Wyong Road to Wyoming Estate			1895	111 6 6	111 6 6
Gosford to Wyong Creek			1892	1,648 12 9	54 8 4
Glennie's, *via* Chillcott's Flat, to Camberwell and Goorangoola Road			1891	152 13 11	36 6 11
Gunnedah to Malally			1888	6,805 8 1	858 18 5
Gunnedah to Wandobah			1889	262 0 5	49 16 5
Gunnedah to Carroll North, bank of Namoi			1893	206 4 8	86 17 6
Gunnedah to Somerton			1890	1,741 16 10	352 8 5
Gunnedah to Boggabri			1894	249 15 11	160 17 10
Gloucester to Copeland			1880	5,052 17 11	540 17 8
Gloucester to Cobark			1885	3,036 3 9	509 3 1
Green's Lane to Hartford Gully			1891	221 5 4	88 11 2
Geraghty's to Bryant's			,,	628 4 2	85 4 5
Great North Road, Wiseman's Ferry, to Wollombi			1895	208 7 4	98 7 8
Great North Road to Cattai Creek			,,	10 0 0	10 0 0
Goorangoola Road to Carrow Brook			,,	224 1 7	118 3 9
Goorangoola Road to Bowman's Creek			,,	20 0 0	20 0 0
Great North Road, near Armidale, to Big Ridge			,,	21 18 8	21 18 8
Gorrick's Hill to Bull Ridge			,,	169 9 8	105 9 8
Gorrick's Hill, to Wilberforce Road, to Wallis Creek			,,	17 12 6	17 12 6
Ghinni Ghinni Road, across Dicken's Creek, to North Plains			,,	27 16 9	27 16 9
Great North Road to Lincoln's Creek			,,	76 17 1	76 17 1
Great North Road, at M'Dougall's Hill, to Jerry's Plains			,,	96 7 0	96 7 0
Gahra to Kunopia			,,	55 0 9	55 0 9
Gosford and Wyong Creek to Morrissett and Cooranbong			,,	1,452 11 5	1,452 11 5
Gosford and Cooranbong Road, up Ourimbah Creek			,,	189 14 0	189 14 0
Gosford and Cooranbong Road to Tuggerah Station (Goldie's Road)			,,	159 5 9	159 5 9
Gosford and Cooranbong Road to Tuggerah Lakes (Cobb's Road)			,,	140 4 8	140 4 8
Gosford and Cooranbong Road, *via* Wyee and Catherine Hill Bay, to Swansea			,,	409 16 10	409 16 10
Gosford to the Blood Tree Road to Somersley Waterfalls			,,	30 0 0	30 0 0
Gosford and Cooranbong Road, *via* Jilliby and Mandalong, to Gosford and Cooranbong Road			,,	367 11 10	367 11 10
Gosford and Cooranbong Road to Jilliby and Mandalong Road			,,	127 9 11	127 9 11
Gosford to Tuggerah Beach			,,	503 13 4	503 13 4
Gosford, *via* Kincumber, to Terrigal Haven			,,	272 3 3	272 3 3

RETURN OF EXPENDITURE ON PUBLIC WORKS—*continued.*

Work, and where situated.	Whether Constructing or under Repair.	Fund from which the Expense is defrayed.	When Commenced.	If Unfinished, amount of Expenditure to 30 June, 1896.	Amount expended from 1 July, 1895, to 30 June, 1896.
ROADS AND BRIDGES—*continued.*				£ s. d.	£ s. d.
Gordonville to McFadden's			1895	260 7 2	260 7 2
Green Ridge to Knight's Farm			,,	46 10 0	46 10 0
Great North Road, up Dry Creek			,,	92 14 10	92 14 10
Glenroy to Mundaroo			,,	12 4 0	12 4 0
Glenroy to Boggy Creek			,,	10 0 3	10 0 3
Geddes-street, Warialda			,,	131 1 9	131 1 9
Gragin to Inverell Road			,,	38 18 0	38 18 0
Gragin to Yetman Road, at 10-mile post			,,	33 16 0	33 16 0
Goodwood Island Roads			,,	29 19 6	29 19 6
Goonellebah, Rous Road, to Taylor's Creek			,,	32 17 1	32 17 1
Goulburn to Cooma			1874	128,617 7 4	2,257 4 9
Goulburn to Pomeroy			1880	5,196 6 3	255 5 7
Goulburn to Roslyn			1878	8,443 8 2	575 7 11
Goulburn to Mount Wayo			1892	1,580 11 3	401 9 10
Goulburn to Mount Wayo Road to Goulburn to Roslyn Road			1895	24 0 0	24 0 0
Goulburn to Mummel Bridge			1892	1,303 1 1	415 3 1
Goulburn to Bungonia			1874	7,302 13 5	269 7 11
Goulburn to Taralga			1888	9,248 18 10	920 18 5
Goulburn, *via* Boxer's Creek, to Main South Road			1887	379 16 5	69 2 10
Goulburn to Windellima			1876	9,509 1 4	375 9 5
Goulburn, Cooma Road, to Bredbo Nimbo Road			1895	15 9 0	15 9 0
Gunning to Berrybanglo			1891	445 18 7	39 8 0
Gunning to Gundaroo			1893	961 13 3	319 14 9
Gunning and Dalton Road to Burrowa			1892	1,954 17 2	526 11 8
Gininderra to Gundaroo			,,	246 1 5	18 18 0
Gininderra to Bungendore			1890	1,353 11 3	48 6 5
Galong, *via* Kalangar, towards Marengo			1892	704 16 2	274 4 7
Galong to Burrowa			1890	1,079 1 9	306 5 6
Gundagai to Bongongolong			1883	3,068 7 0	93 14 5
Ginninderra Creek Crossing			1895	48 19 6	48 19 6
Gundagai to Young			,,	34 5 1	34 5 1
Gundagai to Wantabadgery			1892	751 8 0	182 10 5
Gilmore Creek to Reilley's Crossing			1872	3,806 3 4	138 7 3
Glenroy to Mundaroo			1890	816 3 5	70 4 9
Germanton to Jingellic			1886	4,861 18 6	173 9 9
Germanton to Jingellic, between Spring Creek and Germanton			1895	9 2 0	9 2 0
Germanton to Cookardina			1883	2,090 10 6	200 1 6
Germanton to Culcairn			1895	12 8 0	12 8 0
Gerogery to Howlong			1881	11,803 12 8	459 16 9
Gerogery, *via* Jindera, to Bungowannah			1876	6,289 3 2	208 14 4
Grogan to Stockinbingal			1895	94 17 6	22 17 6
Great South Road, between Razorback and Picton	Maintenance, repair, and construction.	Consolidated Revenue.	,,	20 9 0	20 9 0
Gundaroo to Dairy Creek			,,	7 0 0	7 0 0
Gerogery Station to Walla Walla			1876	6,860 10 6	319 14 6
Germanton to Bowler's Gap			1895	309 1 2	309 1 2
Gipps Road, Wollongong			,,	100 0 0	100 0 0
Grattai to Sally's Flat			1888	3,614 0 3	507 0 10
Grenfell to Koorawatha			1895	50 0 0	5 0 0
Grenfell to Forbes			1887	3,386 5 2	279 1 8
Grenfell, *via* Weddin Gap, to Bimbi			1890	940 7 10	227 5 0
Grenfell to Goolagong			1885	3,422 3 8	176 0 10
Grenfell to Quondong			1890	556 1 7	21 12 7
Grenfell, *via* Bimbi, to William's Crossing			1882	5,228 4 8	136 7 6
Guntawang, *via* Wellington, to Goolma			1878	12,334 10 7	243 10 6
George's Plains to Caloola			1894	406 12 7	149 5 5
Goodooga to Brewarrina			1895	300 7 7	124 3 1
Glasson's Woolshed to Moorilda			,,	71 10 6	47 6 6
Gulgong *via* Barney's Reefs to Berriwa			,,	40 10 4	40 10 4
Glenbrook Railway Station to Great Western Road			,,	50 0 0	50 0 0
Gardener's Road			1892	5,578 15 1	115 7 7
Gladesville, *via* Gordon to Pittwater			1890	1,289 15 4	373 18 6
Granville to Main South Road (Woodville Road)			1889	1,744 7 4	116 9 4
Granville Municipal Roads			1895	72 0 0	72 0 0
Girilambone to Bogan Bridge			,,	6 0 0	6 0 0
Galston and Berowra Road to Calabash Ridge			,,	85 0 0	50 0 0
Galston and Fagan's Road, towards Mould's and Thomas' Selections			,,	124 0 0	94 0 0
Griffiths' to Trethorne's, at Galston			,,	24 9 0	4 9 0
Griffiths' to Bayfield			,,	10 0 0	10 0 0
Grong Grong to Devlin's Siding			,,	58 17 4	58 17 4
Grong Grong to Warri			,,	378 16 8	378 16 8
Grong Grong to Narrandera			,,	58 0 0	58 0 0
Gulgong *via* Barney's Reefs to Denisontown			,,	76 0 0	76 0 0
Garland's to Wangoola			,,	6 3 1	6 3 1
Gillespie's towards Robert's Creek Bridge			,,	27 19 4	27 19 4
Graman to Ottley's Creek			,,	92 15 0	92 15 0
Glen Crossing to the Gulf			,,	56 7 0	56 7 0
Gleeson's Wharf, Clyde River, to Mulwarree			,,	25 0 0	25 0 0
Harwood to Chatsworth			1883	1,482 15 8	68 18 11
Harwood, *via* Serpentine, to Chatsworth			1890	1,065 8 0	180 14 0
Harwood towards Meagher's			1895	23 3 11	23 3 11
Holey Flat to Stewart's River			1889	1,050 14 10	217 14 0
Humphries' C.P. to Cooranbong			1892	788 7 1	37 16 0
Harper's Hill to Allandale Railway Station			1879	712 11 0	42 7 8
Haven Road, Glenhaven			1895	80 0 0	20 0 0
Hyde's Bridge to Hastings River			,,	5 3 2	5 3 2
Howe's Valley to Wollombi and Singleton Road			1893	256 11 0	133 16 0

RETURN OF EXPENDITURE ON PUBLIC WORKS—*continued.*

Work, and where situated.	Whether Constructing or under Repair.	Fund from which the Expense is defrayed.	When Commenced.	If Unfinished, amount of Expenditure to 30 June, 1896.	Amount expended from 1 July, 1895, to 30 June, 1896.
				£ s. d.	£ s. d.
ROADS AND BRIDGES—*continued.*					
Hillgrove to Perrett's			1895	580 8 5	580 8 5
Hayden's to Watson's (West Nimbin Road)			1891	1,521 19 5	266 15 11
Hainsville, *via* Mullimbimbi, to Byron Bay			1894	1,686 18 8	627 1 6
Hartigan's, up North Arm			1895	257 17 9	179 12 3
Hexham to Williamstown			,,	272 11 6	272 11 6
Hinton to Mount Kanwary			1887	1,597 10 4	162 15 9
Hexham and Raymond Terrace to Limeburner's Creek			1884	6,145 14 5	900 1 4
Henty Station to Munyabla			1895	47 18 0	47 18 0
Hay to Narandera			,,	16 17 6	16 17 6
Hall to Walhallow			,,	34 4 2	34 4 2
High-street, Lawrence			,,	40 5 7	40 5 7
Harold-street, Bullahdelah			,,	4 8 0	4 8 0
Humula to Carabost			,,	38 12 0	38 12 0
Hawkins' Bog-hole			,,	29 18 10	29 18 10
Hay to Balranald			1887	10,400 8 0	415 5 0
Hillston to Roto			1895	180 3 3	115 8 6
Hillston to Cudgellico			,,	315 8 8	199 12 0
Helensburgh West to Heathcote, Bulli Pass Road			,,	25 6 2	25 6 2
Heathcote to top of Bulli Pass			1890	1,322 10 7	144 13 3
Hoskingtown to Harold's Cross			,,	462 12 5	74 18 0
Harden to Marengo			1895	97 14 0	97 14 0
Henty Station to Munyabla			1892	751 14 2	352 10 7
Humula, *via* Umbango, to Tarcutta			,,	490 12 8	98 6 6
Howlong to Walbundry			1883	4,668 18 6	160 0 7
Hay to Booligal			1879	11,847 16 5	579 2 7
Hay to Gunbar			1881	6,929 1 2	262 8 4
Hay to Wanganella			1892	736 5 0	154 17 4
Holt's Flat to Tantawanglo			1895	31 0 0	31 0 0
Hartley to Vale of Clwydd			1890	1,411 3 11	61 5 8
Hartley to Jenolan			1887	7,564 3 9	789 18 0
Hill End to Duramana			1890	1,174 3 10	189 0 7
Huntley Railway Station to Lucknow			1895	103 13 4	71 8 6
Hargraves to Wallerawaugh			,,	70 17 0	53 11 0
Halfway House, *via* Abattoirs, to "White Bay Hotel"			1885	3,643 3 0	467 8 8
Hornsby to Galston			1893	6,928 7 5	689 17 2
Hannah-street, Beecroft			1895	105 17 10	50 15 1
Inverell to Gum Flat			1889	1,882 19 6	363 7 2
Inverell, *via* Elsmore to, Glen Innes Road			1884	6,717 14 0	254 0 3
Inverell to Bundarra			1892	657 16 2	337 6 10
Inverell, *via* Tingha, to Kangaroo Camp			1893	1,472 6 10	278 0 5
Inverell, to Dinton Vale			1885	1,620 10 10	246 16 4
Inverell to King's Plains			,,	3,549 19 5	524 16 7
Inverell to Wallangra	Maintenance, repair, and construction.	Consolidated Revenue.	1878	18,393 7 4	1,520 1 5
Inverell to Reedy Creek			1880	25,338 11 9	187 5 2
Inverell to Warialda			1877	22,439 15 3	2,794 16 7
Inverell to Strathbogie			1894	1,851 15 2	1,209 1 3
Inverell to Texas			1878	13,405 19 1	933 18 2
Irishtown to Wollum Platform			1893	106 9 0	33 15 6
Ironbarks to Boolcarrol			1888	2,527 1 0	572 17 2
Illaroo to Lower Budgong			1894	505 7 6	287 5 0
Illawarra Municipal Roads			1895	158 0 0	158 0 0
Iron Cove Store			,,	0 5 7	0 5 7
Illaboo Railway Station to Eurongobilly			,,	50 0 0	50 0 0
Ingleburn, *via* Minto, to Campbelltown			,,	48 14 4	48 14 4
Junee to Cooba Creek Bridge			1891	545 6 9	115 17 4
Junee to Harefield			1895	29 2 6	29 2 6
Jesswolgan to Uralba			1891	513 16 7	128 2 0
Jericho, over Big Swamp			1890	820 17 4	150 3 11
John's River Wharf to Upper Stewart's River			,,	1,099 18 10	203 5 7
Jerry's Plains to Denman			1884	2,171 19 5	179 16 9
Johnson's Bridge to Moonbi Station			1892	289 7 6	68 15 10
Jilliby Jilliby to Little Jilliby			1895	327 16 8	252 16 8
Jilliby Road to Yarramalong Road			,,	30 0 0	30 0 0
Jugiong to Murrumburrah			1887	2,628 3 5	192 0 2
Jindabyne to Ingebyra			1892	281 7 11	98 2 3
Jingellic to Kancoban			,,	1,693 10 4	359 19 6
Jerilderie, *via* Yanko, to Goolgumbla			1891	912 18 10	101 0 0
Jerilderie to Tocumwal			1884	3,814 7 10	190 18 0
Jerilderie to Berrigan			1890	2,928 16 10	845 0 1
Jerilderie to Clear Hills			1894	564 7 3	296 6 0
Jerilderie to Coreen			1895	1,048 9 7	1,048 9 7
Jindera to Yamba			,,	129 13 8	43 9 5
Jindera to Walla Walla			1888	1,601 2 0	365 18 8
Jeralong Bridge to Jeralong Gap			1895	86 2 0	24 3 0
Jindabyne to Wollondilly			,,	31 9 3	31 9 3
Jones' Bridge to West Blowering			,,	153 3 3	153 3 3
Junction, Yard Crossing, to Lake Cudgellico			,,	91 19 0	91 19 0
Jumping Sandhill Paddock, Booligal to Ivanhoe			,,	392 0 0	392 0 0
Jamberoo Municipal Roads			,,	113 6 6	113 6 6
Junction, Letter-box Road, to Finger Board at Moorland			,,	21 19 10	21 19 10
Kynumboon to Nobby's Creek			1889	3,064 12 9	308 4 9
Kelly's, *via* Sharpe's, to Moouee			1890	6,316 0 2	2,238 9 4
Kempsey to foot of Jeogla Mountain			1894	5,039 7 4	2,988 18 11
Kempsey Borings			1895	1 1 0	1 1 0
Kelman's Gate to Branxton and Glendonbrook			,,	30 0 0	30 0 0
Kincumber to Green Point Wharf			1894	32 2 9	21 13 3

Return of Expenditure on Public Works—*continued.*

Work, and where situated.	Whether Constructing or under Repair.	Fund from which the Expense is defrayed.	When Commenced.	If Unfinished, amount of Expenditure to 30 June, 1896.	Amount expended from 1 July, 1895, to 30 June, 1896.
				£ s. d.	£ s. d.
ROADS AND BRIDGES—*continued.*					
Kincumber to Little Beach			1893	169 15 7	64 1 7
Krambach, *via* Patterson's, to West Wallamba			1894	157 9 0	35 9 4
Krambach to Kew (North Coast Road)			1893	6,070 19 5	1,957 13 11
Krambach to Port Macquarie			1895	22 0 0	22 0 0
Krambach, *via* Cucumbark, to Forster			1894	956 17 4	354 14 8
Krambach, &c., to Church and School, Koribakh Creek			1895	38 1 3	38 1 3
Krambach to Tuncurry			,,	585 16 9	585 16 9
Koree Island Roads			1890	205 7 3	25 0 0
Kangaroo Flat to Quirindi			1891	184 19 0	45 7 8
Kayuga, *via* Baxter's, to Aberdeen			1894	234 15 6	103 16 0
Kew to Rolland's Plains			1895	1,165 9 8	1,165 9 8
Kempsey to Verge's Swamp			,,	49 19 0	49 19 0
Katoomba to Jenolan Caves			,,	39 12 9	39 12 9
Kogarah and Winiora Road			,,	250 0 0	250 0 0
Kendall to the Cemetery			,,	28 15 6	28 15 6
Kiama District Flood Damages			,,	4 10 0	4 10 0
Kingswood to Luddenham Church			1892	1,427 2 11	1,200 0 0
Kangaroo Valley to Woodhill			1895	50 0 0	50 0 0
Kangaroo Valley to Nowra			1890	2,766 6 11	36 16 5
Kangaroo Valley, *via* Brogher's Creek, to Kangaroo Mount			1882	2,048 13 2	539 1 4
Kippielaw to Bialla			1888	1,895 19 1	327 17 10
Kippielaw, *via* Parkesbourne, to Bredalbane			1887	646 11 11	82 14 6
Kippielaw, Bredalbane Road, to Run of Water and Parkesbourne Road			1895	27 9 6	27 9 6
Kitty's Creek to Dog Trap Ford			1888	1,082 1 9	168 8 5
Kiandra Road, near Six-mile Post, to Middlingbank			,,	1,113 6 2	74 15 0
Kiandra Road, at 33 miles, to Bugtown			1895	21 5 0	21 5 0
Kialla Post Office to Middle Creek			,,	99 4 7	29 18 4
Kialla to Pejar			1894	84 7 0	26 18 0
Kanoona to Candelo			1895	98 19 5	98 19 5
Kamaruka to Bembooka			1895	154 12 3	154 12 3
Kiandra to Yarrangobilly Caves			,,	44 2 6	44 2 6
Kirkconnell to Sunny Corner			1890	901 6 0	119 17 9
Kelso and Palmer's Oakey, to River Turon			1887	10,858 8 1	625 8 0
Kurrajong, from Old School, to Hermitage			1893	95 0 8	46 19 10
Kelso to O'Connell			1876	9,701 2 3	234 8 5
Kelso to Kelloshiel			1895	112 5 1	38 3 4
Kelso to Monkey Hill			,,	1,778 4 1	1,547 8 3
Kelso and O'Connell Road, at Mr. John Lee's, to White Rock			,,	64 10 8	64 10 8
Kelloshiel and Gowan Road, at Osborne, towards Mount Rankin			,,	30 4 10	30 4 10
Kelloshiel to Gowan			1878	7,492 12 7	314 16 0
Kelloshiel and Little Forest Road to Mount Rankin (Osborne's Lane)			1895	8 15 0	8 15 0
Lismore to Nimbin	Maintenance,	Consoli-	,,	100 0 0	100 0 0
Lismore–Blue Knob Road to Thorburn's and Kelly's	repair, and	dated	,,	14 14 10	14 14 10
Lismore–Nightcap Road to Rosebank	construction.	Revenue.	,,	209 0 4	209 0 4
Lismore to Gundarimba			1891	437 13 9	170 13 3
Lismore District Roads			1887	4,773 0 10	43 2 6
Lismore to Blue Knob (Nimbin Road)			1883	20,463 11 7	1,460 17 10
Lismore towards Nightcap Road to Wotherspoon's			1895	150 0 0	150 0 0
Lismore to Tucki			1893	10,527 2 4	388 11 4
Lismore, *via* Nightcap, to Queensland Border			1875	57,988 3 0	357 19 10
Lismore to Beardow's			1894	415 15 0	194 17 8
Lismore to Possum Shoot			1880	23,557 15 2	684 3 11
Lismore–Nightcap Road, towards Rosebank			1895	0 13 4	0 13 4
Little Plain to Reedy Creek			1894	176 18 5	112 19 1
Little North Arm to Beach			1895	808 10 8	763 5 11
Lawrence to Myall Creek			1864	137,997 8 5	679 16 3
Lycester Creek Bridge to Campbell's			1887	2,708 13 4	221 18 7
Levenstrath, *via* Kangaroo Creek, to Green's			1890	934 17 1	221 14 3
Logan's House to Port Macquarie			1895	22 2 6	22 2 6
Letter-box Road			1892	290 16 9	9 17 6
Laris to Toohey's Mill			1886	3,020 2 9	155 0 9
Long Reach to Clybucca			1890	406 6 2	143 9 4
Long Reach to Rainbow Reach			1891	270 0 9	90 6 9
Laurieton to Upper Camden Haven			1892	1,305 10 2	539 12 1
Lambton to Charlestown			1883	2,860 9 4	109 5 0
Lambton and Charlestown Road to Cardiff Road			1894	104 17 1	10 3 11
Louth Ferry Approach			1895	3 0 0	3 0 0
Laguna to top Wattagan Mountain			1895	299 18 6	237 3 6
Lochinvar to Railway Station			1885	491 3 6	31 3 9
Lochinvar Road to South of Boyce's			1895	50 0 0	50 0 0
Limeburners' Creek to Krambach			1894	5,106 5 9	2,428 5 2
Little Plain to Bingera			,,	1,882 3 1	1,198 19 8
Lochinvar, *via* Luskintyre, to Dalwood			,,	201 17 0	81 19 0
Limestone Hill to Newell's Crossing			1895	250 5 0	250 5 0
Little Bumble, *via* Millie to Meroe			1890	3,161 5 7	54 5 8
Liddell to Jerry's Plains			1895	7 7 8	7 7 8
Light-house turn off towards Cattai Creek			,,	10 14 0	10 14 0
Law's to Small's			,,	34 3 0	34 3 0
Long Reach to Bull's Hollow			,,	14 16 0	14 16 0
Lansdowne Road to Letter-box Road			,,	53 0 0	53 0 0
Lansdowne Road, *via* Brimbin			,,	30 0 0	30 0 0
Little Nymboi Road			,,	14 7 7	14 7 7
Long's Corner to Canowindra			,,	57 10 7	57 10 7
Liverpool, *via* Holdsworthy's, to Eckersley's			1894	120 0 0	20 0 0
Lake Bathurst to Currawang			1891	240 2 9	49 19 4
Leighwood, *via* Golspie, to Stone Quarry			1887	752 1 0	127 10 2

Return of Expenditure on Public Works—*continued.*

Work, and where situated.	Whether Constructing or under Repair.	Fund from which the Expense is defrayed.	When Commenced.	If Unfinished, amount of Expenditure to 30 June, 1896.	Amount expended from 1 July, 1895, to 30 June, 1896.
				£ s. d.	£ s. d.
ROADS AND BRIDGES—*continued.*					
Laggan to Binda			1875	3,004 12 11	138 10 0
Laggan Road, *via* Strathaird, to Goulburn Road			1895	50 5 9	33 0 0
Laggan to Golspie			1892	386 4 10	133 15 10
Lower Tarcutta to Alfred Town			,,	1,500 5 7	429 12 4
Lochiel to Back Creek			1893	108 4 10	42 13 0
Larbert, *via* Reedy Creek, to Braidwood and Boro Road, at Hallett's			,,	135 18 3	32 7 8
Little Forest to Paddy's River			1894	1,295 5 8	125 3 11
Louth Streets			1895	57 19 0	57 19 0
Laggan to Golspie Road, &c., to Bolong			,,	12 6 0	12 6 0
Loftus and Hosking Streets, Temora			,,	300 0 0	300 0 0
Law's and McNaughton's Road, between			,,	9 19 2	9 19 2
Lane near Moama			,,	30 0 0	30 0 0
Lidsdale to Wolgan			1893	410 17 9	154 6 9
Little Hartley to Hartley Vale Platform			1885	3,068 17 5	225 15 6
Lowther to Gambenang			1890	527 6 3	21 16 6
Lucknow to Orange and Carcoar Road			1875	5,008 13 11	118 8 0
Lyndhurst, *via* Abercrombie, to Bigga			1879	8,545 7 10	606 2 4
Leeholme to Tarana and O'Connell			1872	3,925 15 5	122 4 0
Lucknow to Huntley			1895	103 12 7	103 12 7
Little Hartley to Lowther			,,	79 16 0	79 16 0
Lucknow to Spring Hill			1895	727 7 5	727 7 5
Lane Cove to Cowan Creek, at Bobbin Head			1884	1,076 8 1	230 3 0
Lane Cove, *via* Stony Creek, to Pittwater			1883	6,169 14 7	4 18 0
La Perouse to Little Bay (Sanatorium Road)			1884	996 1 7	99 19 0
Lugano to Como			1895	427 17 3	262 11 9
Limestone to Wallerawang Road			,,	24 15 9	24 15 9
Lower Portland to Leet's Vale			,,	150 0 0	150 0 0
Morven to Mullangandra			,,	73 0 0	73 0 0
Murwillumbah to Blue Knob			1894	2,044 6 10	771 10 3
Murwillumbah to Possum Shoot			,,	3,467 0 4	1,450 1 3
Murwillumbah to Cudgera			1892	1,731 13 1	585 2 1
Murwillumbah to Queensland Border			1891	2,321 1 9	411 5 3
Murwillumbah, *via* Tumbulgum, to Terranora			1880	3,370 17 1	781 13 5
Middle Creek Road			1895	56 3 0	16 3 0
Minmi Court-house, road to			1894	43 3 0	23 2 0
Minmi Relief Works			1895	75 12 0	75 12 0
Minmi to Thornton			1878	4,659 14 6	220 19 6
Mullumbimby up Main Arm, Brunswick			1890	1,332 5 4	401 2 4
Mullumbimby to Byron Bay			1895	88 6 2	88 6 2
Model Farm, Baulkham Hills, road through			1894	203 12 1	36 15 0
Maclean to Palmer's Channel			1890	845 10 4	120 9 1
Maclean to Murrayville	Maintenance, repair, and construction.	Consolidated Revenue.	1895	30 8 5	30 8 5
Merriwa to Cassilis			1891	5,479 18 7	911 19 0
Merriwa to Gilli Gilli			1895	17 17 6	17 17 6
Merriwa to Ringwood			,,	17 11 6	17 11 6
Moleville to Stockyard Creek			1889	536 17 9	64 7 6
Maybole to Ben Lomond Railway Station			1892	248 16 4	62 8 3
Moree, *via* Goonal, to Mogil Mogil			1887	5,764 8 2	411 8 7
Moree Road, *via* Reeves, to Pallal Road at Bangheet			1894	147 16 6	102 11 6
Moree to Terry Hie Hie			1892	1,184 2 0	166 14 0
Moree to Mungundi			1894	1,911 15 11	862 9 1
Moree to Bogamildi			1895	513 2 3	348 1 3
Moree towards Bingera and Ezzies'			,,	704 18 6	524 15 7
Moonee to Congarini (Coast Road)			1894	3,956 1 10	2,138 9 11
Marx Hill to Campbell's Crossing			1889	1,302 13 7	168 1 2
Mosquito Island Road			1894	129 19 2	80 0 0
McKenzie's Hill above Cowlong			1895	50 0 0	50 0 0
Mundooran to Tundabrine Creek			,,	690 12 10	675 13 1
Missabotti to Coast Road			1878	6,402 1 11	237 1 11
Myers' C.P. to Never Never Plains			1884	1,998 12 11	363 16 6
Marlee Road to Minns' and Gillogley's			1892	78 10 3	16 18 0
Main North Road near Uralla to Big Ridge			1895	60 1 6	60 1 6
Main North Road at Wallabadah towards McDonald's Station			,,	17 8 3	17 8 3
Main North Road to Carroll Creek			,,	9 2 0	9 2 0
Myocum to Tyagarah			1892	557 15 4	227 9 9
Mitchell's Island Roads			1887	1,881 9 1	314 5 4
Morrissett to Dora Creek Platform			1895	26 0 0	26 0 0
Mount Druitt Railway Station Approach			,,	49 19 11	46 19 11
Maitland Road, *via* Jilliby and Mandalong, to Morrissett			1893	1,674 13 3	236 6 7
Maitland and Paterson Road to Dalwood			1887	2,172 1 7	224 4 8
Maitland Road to Earl's C.P.			1894	72 17 8	12 17 8
Maitland and Dagworth Road along Wallis Creek			1887	737 13 2	73 13 7
Maitland Road to Junction of Jilliby and Mandalong Road			1893	185 15 10	1 5 6
Maitland Road to Government Reserve to Head of Ourimbah Creek			1892	1,209 12 10	265 18 0
Maitland Road at Ourimbah, to McDonald's			1895	168 9 8	157 7 8
Morpeth and Largs Road through Phœnix Park and Abbotsford to McClymont's Swamp			,,	50 0 0	50 0 0
Morpeth to Four-mile Creek			,,	50 0 0	50 0 0
Morpeth, *via* Hinton, to Dunmore and Clarencetown			1892	659 19 5	181 18 3
Morpeth Municipal Roads			1895	100 0 0	100 0 0
Muswellbrook to Ayrdale Factory			,,	22 4 1	22 4 1
Muswellbrook Bridge to Sandy Hollow			1888	4,652 11 0	399 15 7
Muswellbrook to Merriwa			1893	4,179 19 6	890 17 4
Moonan Brook to Glenrock			1895	70 0 0	70 0 0
Malally to Denison Town			1892	4,627 4 7	1,388 2 9
Malally to Boggabri			1895	94 2 10	94 2 10

Return of Expenditure on Public Works—*continued.*

Work, and where situated.	Whether Constructing or under Repair.	Fund from which the Expense is defrayed.	When Commenced.	If Unfinished, Amount of Expenditure to 30 June, 1896.	Amount expended from 1 July, 1895, to 30 June, 1896.
				£ s. d.	£ s. d.
ROADS AND BRIDGES—*continued.*					
Mail Station to Llangothlin Railway Station			1890	389 15 0	39 17 9
McIntosh's to Nymboida			,,	1,963 1 9	388 17 9
McIntyre's Flat to Puddle Dock			1880	717 19 6	37 15 10
Maidenhead to Bonshaw			1894	146 7 7	8 15 0
Macksville to Upper Warrell Creek			1886	534 18 7	87 1 0
Macksville to Macleay Heads			1885	1,191 3 5	182 3 5
Monticollum to Coorabel Creek			1895	2 2 0	2 2 0
Meehan's Crossing, *via* Limestone, to Maloney's			,,	175 5 10	175 5 10
Manilla to Somerton			1891	315 5 0	17 18 0
Manilla to Bundarra			1895	40 0 0	40 0 0
McIntosh's to Levenstrath			,,	21 8 6	21 8 6
McPherson's to King-street Wharf			,,	29 19 0	29 19 0
Mobbs' Hill to Rogan's Hill			,,	192 10 6	192 10 6
Mobbs Hill to Thorne's Grant			,,	67 15 0	67 15 0
McDonald's River up Webb's Creek			1893	201 3 2	105 5 6
Marshall Mount to Yalla Station			1895	50 0 0	50 0 0
Muswellbrook, *via* Dartbrook, to Scone			,,	131 7 10	131 7 10
Muswellbrook and Sandy Hollow Road, *via* Brogheda, to McTaggart's			,,	85 0 0	85 0 0
Moonan Brook to Glen Rock Deviation at Campbell's Pinch			,,	50 0 0	50 0 0
Moylan's to the Beach			,,	92 2 8	92 2 8
Moylan's to Big Badger			,,	50 0 0	50 0 0
Muswellbrook and Merriwa Road to Ayrdale Butter Factory			,,	37 15 11	37 15 11
McLean to Broom's Head			,,	48 11 0	48 11 0
McRae's Washaway Pitnacree Bridge to Dunmore Bridge			,,	368 19 8	368 19 8
Mowbray Crossing, Paterson Road			,,	15 0 0	15 0 0
Menangle to Great South Road			,,	38 1 0	38 1 0
Main South Road to Bullio			1890	1,424 14 3	604 4 5
Main South Road to Picton Lakes			1894	100 12 1	25 17 8
Main South Coast Road			1879	124,718 17 0	11,664 11 6
Mittagong to Argyle Road			,,	1,780 13 2	97 9 7
Moss Vale to Wallenderry (Meryla Road)			1882	7,407 16 3	1,001 12 9
Moss Vale towards Kiama			1890	5,678 8 11	987 16 8
Moss Vale District Roads			1893	800 18 11	100 0 0
Moss Vale to Barrengarry			1890	7,149 0 6	1,414 13 10
Moss Vale, *via* Berrima, to Mandemar			,,	1,514 9 3	507 18 1
Menangle to Stoney Creek			1892	395 11 10	105 15 0
Mount Wayo, *via* Tuena, to The Abercrombie			1881	32,347 10 3	860 2 11
Mummel Bridge, *via* Wheeo, to Narrawa			1892	2,234 8 3	471 4 4
Mulwalla to Savernake			1895	187 17 0	187 17 0
Marulan, *via* Windellama, to Oallen Crossing			1878	10,405 8 5	133 0 11
Marulan, *via* Long Reach, to Bannaby and Taralga			1892	2,301 2 3	585 19 1
Marulan Taralga Road, towards Bullio			1895	50 0 0	50 0 0
Murrumburrah, *via* Currawang, to Kingsvale	Maintenance, repair, and construction.	Consolidated Revenue.	1892	307 12 6	56 8 3
Monga to Major's Creek, Elrington			1871	6,593 12 2	117 12 5
Monga and Major's Creek to Luther's			1895	29 0 0	29 0 0
Major's Creek to Snowball			1880	5,225 18 0	270 13 2
Mogo to Tomakin			1887	815 1 0	40 5 7
Mogo to Mosquito Bay			1895	22 18 6	22 18 6
Merimbula to Jellat Jellat			1874	2,968 5 7	175 0 6
Mathoura to Bunaloo			1888	1,614 15 3	110 9 10
McKinnon's Store, Illaroo Road, to Brown Mountain			1895	91 3 10	78 16 4
Moulamein to Yanga			1892	1,012 11 1	135 11 9
Moama to Moulamein			1875	13,880 8 11	558 15 9
Moama to Thyra			1892	599 1 5	169 0 10
Moama to Deniliquin			1895	47 4 0	47 4 0
Murrumbateman to Gininderra			1893	425 18 6	189 7 6
Mittagang to Billyrumbuck			1891	109 3 8	9 15 6
Monteagle to Monteagle Platform			1895	179 3 9	64 18 9
Marengo, *via* Marengo Flat, to Koorawatha			,,	88 15 0	38 15 0
McDonald's Road			,,	35 14 0	27 10 0
Main South Road, Little Forest, to Arthursleigh			,,	812 2 8	812 2 8
Main South Road to Burrowa			,,	276 18 7	276 18 7
Mogo to Ryan's Creek Bridge			,,	169 14 2	169 14 2
Moree to Narrabri			1876	23,928 17 3	1,189 4 5
Mogil Mogil to Goondabloui			1895	99 5 0	99 5 0
Marulan to Barber's Creek			,,	31 6 6	31 6 6
Mulwala to Merton, 3 miles from Mulwala Swamp			,,	149 2 6	149 2 6
Moronglo Creek Crossing			,,	20 4 0	20 4 0
Moronglo to Neila Creek			,,	39 8 0	39 8 0
Main South Coast Road to Jervis Bay			,,	99 13 3	99 13 3
Mahonga to Corowa			,,	23 19 0	23 19 0
Murdering Sand Hill, Hay to Narandera			1895	23 0 0	23 0 0
Main South Road, near Berrima, to Balanglow			,,	50 0 0	50 0 0
Main West Road to Chatsworth, *via* Mt. Capicure (Wallgrove Road)			,,	104 4 5	59 1 0
Main West Road to South Creek			,,	114 3 4	74 0 10
Main West Road, Emu Plains to Lapstone Range			,,	70 14 10	39 12 10
Main West Road to Cross Roads, Cabramatta			1893	427 12 11	154 15 11
Main West Road, near Orange to Bloomfield Railway Station			1895	48 16 2	47 10 0
Main West Road at Collector towards Chatswood			,,	37 0 0	12 0 0
Main West Road at Fox under Hill to Seven Hill's Road			,,	40 0 0	40 0 0
Main West Road at Castle Hill to Government Reserve			,,	86 19 5	81 19 5
Main West Road, Diamond Swamp to Road Meadow Flat, to Tarana			,,	9 15 4	9 15 4
Mount Victoria to Bell's Platform			1885	2,460 11 4	67 2 10
Montgomery-street Mount Victoria			1895	8 8 0	8 8 0
Main Wallamba Road, through Dargaville's Crossing			,,	126 12 0	126 12 0
Mutton's Falls to O'Connell			1890	485 2 7	32 7 5

Return of Expenditure on Public Works—*continued.*

Work, and where situated.	Whether Constructing or under Repair.	Fund from which the Expense defrayed.	When Commenced.	Unfinished, Amount of Expenditure to 30 June, 1896.	Amount expended from 1 July, 1895, to 30 June, 1896.
				£ s. d.	£ s. d.
ROADS AND BRIDGES—*continued.*					
Marangaroo to Meadow Flat			1890	1,512 1 3	312 15 8
Meadow Flat to Sunny Corner			1891	1,219 16 6	248 13 5
Mount Lawson, *via* Judge's Creek, to Burraga			1880	8,513 6 10	72 3 0
Mitchell's Creek to Palmer's Oakey			1879	4,252 8 8	227 18 0
Mitchell's Creek to Spicer's Creek			1895	66 13 6	66 13 6
Millthorpe to Cadia			1878	8,370 1 8	289 2 11
Millthorpe to Lewis' Ponds			1890	1,321 1 5	195 5 10
Millthorpe, *via* Guyong, to Byng			1882	2,989 1 7	157 8 5
Monkey Hill to Hill End			1876	10,352 0 4	430 0 3
Mandurama to Galley Swamp			1881	2,521 10 7	109 3 0
Mandurama to Burnt Yards			1889	714 13 3	53 19 1
Mandurama to Canowindra			1873	16,254 6 2	163 19 7
Mandurama to Neville			1895	238 9 1	164 11 10
Mount McDonald to Grabine			1889	998 14 4	46 13 7
Matthew's to Brown's Creek			1885	2,175 2 9	518 15 9
Mullion Railway Station to Ophir			1894	196 12 1	137 12 1
Mullion Railway Station to Belgravia			1891	385 15 11	65 0 0
Molong to Norah Creek			1890	581 4 3	82 8 9
Molong and Norah Creek Road to Molong and Toogong Road			1895	103 0 9	101 17 9
Molong, *via* Boree and Big Flat, to Cargo			1889	1,571 1 4	214 16 9
Molong to Warne Station			1882	3,697 3 10	190 4 9
Molong to Toogong			1880	10,441 6 5	165 19 0
Mumbil Railway Station to Burrendong			1880	1,000 11 6	170 6 2
Mullion Creek to Calcula Marble Quarry			1895	45 18 6	9 10 6
Moorilda to Neville			1893	1,126 9 10	487 2 2
McGrath's Hill to Maroota			1890	2,940 2 7	266 12 10
Mudgee Road to Glen Alice			1895	108 10 0	108 10 0
Main West Road to Rooty Hill Station			,,	90 15 9	90 15 9
Main West Road to Eastern Creek			,,	232 13 11	232 13 11
Main West Road, Dubbo, *via* King's Lane and Bunglogumbi Gate, to Burrabadine			,,	180 0 0	180 0 0
Main Windsor Road to Toongabbie Road, over Hammer's Bridge			,,	9 0 0	9 0 0
Molong to Manildra			,,	286 4 7	286 4 7
Millthorpe to Wylie's Junction			,,	54 17 0	54 17 0
Manildra to Toogong			,,	76 10 3	76 10 3
Maryvale to Barton's Junction			,,	374 8 9	374 8 9
Moronglo Creek towards Burrowa			,,	321 4 2	321 4 2
Moorilda to Evan's Swamp			,,	28 16 0	28 16 0
Main West Road, at Dunkeld, to Bathurst and Swallow Creek Road			,,	42 14 0	42 14 0
Myers-street, Wilcannia			,,	112 16 0	112 16 0
Molong and Boree to Cargo Road, *via* Bowen Park Butter Factory, to Cargo and Cudal Road			,,	52 8 0	52 8 0
Middle Harbour to Chatswood	Maintenance, repair, and construction.	Consolidated Revenue.	1895	30 0 0	30 0 0
Milson's Point, *via* Lane Cove Road, to Peat's Ferry			1875	51,969 7 9	1,486 16 9
Manly, *via* Pittwater to McGarr's Creek			1884	1,745 9 10	40 0 0
Manly, *via* Pittwater to Barrenjoey			1879	15,381 6 4	828 11 7
Military Road from Benbuckler to Botany			1895	27 5 4	27 5 4
Military Road, St. Leonards			1885	9,770 18 11	399 15 3
Military Road, Randwick			1895	224 0 0	224 0 0
Missendon Road			1891	495 0 0	135 0 0
Malton-street, Beecroft			1895	35 14 0	5 17 0
Mayfield Road			,,	51 9 4	51 9 4
Miller's Forest Drainage			,,	67 10 0	67 10 0
Main Windsor Road to Outer Domain			,,	72 3 3	72 3 3
Mudgee Road to Piambong			,,	19 0 0	19 0 0
Main South Coast Road to Toolejoa Railway Station			,,	126 0 0	126 0 0
Maroota to Laughton Dale			,,	9 16 6	9 16 6
Molong, *via* Sandy Creek to Boree Creek			,,	57 6 7	57 6 7
Main West Road at Church to Rooty Hill Station, *via* Brown's			,,	10 0 0	10 0 0
Mila School to Dingin's Range			,,	30 6 0	30 6 0
Northern Road—Main			1857	623,546 5 9	8,139 12 3
Northern Road, at Rix's and Glennie's, to Goorangoola Road			1895	44 16 5	41 1 11
Newrybar to Hutchinson's			1891	307 14 6	105 14 2
Narrabri to Little Mountain			,,	1,030 0 7	0 4 6
Narrabri to Eulah and Bullawa Creeks			1888	2,645 12 4	141 4 2
Narrabri to Pilliga			1893	2,083 0 11	739 12 8
Narrabri to Boggabri, *via* Terriaro			1888	2,867 15 9	139 3 10
Narrabri to Terry Hie Hie			,,	2,913 17 8	217 9 0
North Arm Road, at McKay's, up Buckra, Bendini Creek, to Smith's Selection			1891	258 14 9	168 18 3
North Arm Ferry to Goodwood Ferry			1895	18 12 10	18 12 10
Newcastle, *via* Hamilton and Plattsburg, to Minmi			1884	6,456 17 9	724 1 6
Newcastle District Roads			1893	323 12 3	8 14 0
Nowendoc Road to Wingham Cemetery			1895	30 0 0	30 0 0
Nundle to Crawney			,,	136 14 3	48 12 1
Nambucca Ferry to Gumma Gumma			,,	35 3 6	35 0 0
Native Dog Hut Road			,,	50 1 8	11 18 8
North Codrington Wharf Road			,,	96 11 6	27 5 0
North Codrington to Buggy's			,,	14 5 0	14 5 0
Nine-mile Stroud Road to Swan Bay			,,	198 4 3	198 4 3
Nana Creek Village to the Battery			1895	41 0 0	41 0 0
Native Dog Hill Deviation (West Maitland to Cessnock)			,,	646 1 6	646 1 6
North Benarba, *via* Merriwa, to Kenopia			,,	18 18 0	18 18 0
Noble's Crossing, Karuah River			,,	50 0 0	50 0 0
Narellan to Luddenham			1892	1,826 0 6	294 13 0
Nowra to Yalwal			1881	4,807 8 8	453 16 1

RETURN OF EXPENDITURE ON PUBLIC WORKS—*continued.*

Work, and where situated.	Whether Constructing or under Repair.	Fund from which the Expense is defrayed.	When Commenced.	If Unfinished, amount of Expenditure to 30 June, 1896.	Amount expended from 1 July, 1895, to 30 June, 1896.
ROADS AND BRIDGES—*continued.*				£ s. d.	£ s. d.
Nowra to Nerriga	Maintenance, repair, and construction.	Consolidated Revenue.	1882	9,591 10 11	452 4 0
Nowra to Illaroo			1893	571 12 6	228 4 8
Nowra District Roads			1895	245 4 8	73 18 3
Nowra, *via* Nerriga, to the Jumps			,,	2 3 0	2 3 0
Narrawa Road, near Roche's, to junction of Pudman Road			1885	1,181 0 0	114 4 10
Nerriga to Tarago			1892	577 0 0	85 19 9
Numby, *via* Graham and Frogmore, to the Goulburn Road			,,	1,149 11 11	217 8 8
Numby, &c., to Burrowa			1895	20 0 0	20 0 0
Nelligen to Bateman's Bay			1884	946 6 2	54 1 8
Nelligen to Milton Road, at M'Millan's			1874	1,910 17 4	71 1 1
Narooma to Tilba			1893	1,013 0 6	417 18 6
Nimitybelle to the top of Brown Mountain			1892	2,130 17 2	969 1 7
Nimitybelle down Tom Grogan's Creek			1894	136 15 2	38 19 10
Nimitybelle towards Kydra			1895	182 2 11	181 7 11
Narrandera to Collinroobie			,,	139 16 4	139 16 4
Narrandera to Old Goree Bridge			1892	751 6 3	261 15 6
Narrandera to Yalgogrin			1895	164 19 9	164 19 9
Nagle's Swamp, Corowa			,,	61 7 0	17 7 0
Never Never Creek (road up)			,,	66 2 9	66 2 9
Nobb's Crossing			,,	6 0 10	6 0 10
Newbridge to Arthurtown and Abercrombie River			1887	16,082 14 10	621 19 4
Newbridge, past Public School and Church of England			1895	23 7 2	23 7 2
Newbridge and Caloola Road to Rockley			1889	1,656 6 5	62 4 0
Newbridge, Abercrombie Road, to Mackey Caves			1895	15 0 0	15 0 0
Nymagee to Refrigerating Works			,,	66 19 0	38 19 0
Nymagee to Melrose			1894	300 12 3	179 4 0
Nymagee to Hermidale			1890	1,570 13 1	556 16 7
Nymagee to Priory			1894	249 6 8	212 8 0
Nymagee to Budd's Gap			1895	80 0 0	80 0 0
Nymagee to Mount Boppy			,,	92 9 0	92 9 0
Nymagee Streets			,,	100 0 0	100 0 0
Nevertire to Coonamble			,,	5 0 0	5 0 0
Nevertire to Warren			1892	1,506 19 5	109 4 0
Nymbodia to Tyringham Post Office			1895	98 17 7	98 17 7
Narromine to the Bogan			,,	403 4 3	335 4 3
Newtown Railway Bridge to Undercliff Bridge			,,	1,090 8 0	468 3 0
Nelly's Glen, Katoomba			1895	1 3 8	1 3 8
Neill-street, Adelong			,,	25 0 0	25 0 0
Newburn to Rye Park			,,	50 0 0	50 0 0
Old Ballina Road			1889	427 12 4	104 2 8
Old Port Macquarie Road, up Right and Left Banks, Lansdown River			1890	1,171 0 9	468 0 5
Oxley Island Roads			1887	3,417 1 0	485 12 7
Old Inn to Booral Road			1889	1,616 4 11	238 12 4
Old Ourimbah to Tuggerah Lakes Platform (Goldie's Road)			1893	364 0 7	46 0 1
Old Moonbi to Moore Creek			1892	135 2 4	49 17 0
Owen's Wharf, up Left Bank Kinchela Creek			1889	743 9 0	55 14 9
Outlet Road to Dungay Creek			1894	129 15 10	79 16 0
Old Condong Road			1895	169 1 9	114 10 4
O'Keefe's to Freshford			,,	12 0 0	2 0 0
Ourimbah to Chittaway			,,	216 2 6	216 2 6
Old Hickey's Creek Road			,,	33 12 6	33 12 6
Old Armidale Road to Ferndale			,,	46 8 0	46 8 0
Oban to Kookabookra			,,	46 15 0	46 15 0
Old Maitland Road to head of Ourimbah Creek			,,	68 0 0	68 0 0
Oakes' to Foot of Mountain			1893	968 12 4	249 17 5
Oakes' to Werombi			,,	139 11 0	36 3 0
Oakes' to Yerringong			1895	100 0 0	100 0 0
Old Burra Road to Michelago			1886	1,493 3 10	117 18 8
Old Burra Road to Tenderry Vale			1895	21 10 0	21 10 0
Oakdale to Nattai Junction to Barker's Lodge			,,	352 9 1	3 0 0
Old Marulan to Oallen Ford			,,	269 2 11	269 2 11
Old Ironbark Road to Kerr's Creek Railway Station			,,	38 0 4	38 0 4
Old Junee Station to Merrulebale			,,	73 3 2	73 3 2
Oberon to Jenolan			1877	5,399 15 1	279 5 11
Oberon to Little River			,,	4,631 8 10	132 1 8
Oberon to Swatchfield			1895	309 19 1	309 19 1
O'Connell to Swatchfield			1879	5,029 0 3	527 9 4
O'Connell to South Apsley			1885	2,570 14 1	189 15 7
O'Connell to Oberon			1879	7,773 10 4	367 19 2
O'Connell to Leeholme to Tarana and O'Connell Road			1895	50 0 0	50 0 0
Orange to Pinnacle			1884	1,513 10 2	139 14 3
Orange to Ophir			1864	5,083 19 3	124 6 6
Orange to Ophir Road to Lewis Ponds			1895	52 13 0	31 19 0
Orange to Mullion			1880	1,636 17 3	148 10 7
Orange to Rifle Range			1895	99 8 0	97 4 10
Orange to Canoblas			1881	4,104 18 1	373 3 8
Orange to Cadia Gate			1880	5,727 3 8	212 18 7
Orange and Pinnacle Road, near Glenhuna, to Spurway's			1895	45 5 5	45 5 5
Orange and Cadia Road to Four-mile Creek			1889	1,364 0 2	125 8 8
Orange to Forbes			1886	97,444 2 2	2,502 7 11
Orange and Cargo Roads to Cudal			1891	478 8 1	154 15 0
Orange, *via* Treweek's, to Lewis Ponds			1893	299 14 6	123 2 2
Orange to Icely			1881	3,446 17 8	264 16 3
Orange to Forest Reefs			1871	17,175 9 3	186 12 10
Orange to Cargo			1888	3,428 14 7	396 15 10
Orange and Cargo Road to Boree			,,	730 3 9	117 10 7

RETURN OF EXPENDITURE ON PUBLIC WORKS—*continued.*

Work, and where situated.	Whether Constructing or under Repair.	Fund from which the Expense is defrayed.	When Commenced.	If Unfinished, amount of Expenditure to 30 June, 1896. £ s. d.	Amount expended from, 1 July, 1895, to 30 June, 1896. £ s. d.
ROADS AND BRIDGES—*continued.*					
Orange and Pinnacle Road to Renshaw's			1895	57 3 6	57 3 6
Orange and Cadia Gate to Selwood's			,,	167 14 2	167 14 2
Obley to Tomingley			,,	95 19 0	95 19 0
Old Canterbury Road, Petersham, to Ashfield			1889	1,493 13 7	272 4 7
Possum Shoot to Cooper's Shoot			1887	9,989 9 8	153 16 7
Possum Shoot to Brooklett			1892	980 13 7	206 14 3
Possum Brush to Forster Road			1891	741 9 7	174 3 4
Puddledock Road towards Springmount			1895	45 5 10	22 14 0
Pimlico to Wardell and Ballina Road			1889	424 19 4	138 14 8
Pimlico Road to Emigrant Creek Point			1890	236 1 8	54 7 10
Pokolbin Village Reserve to McDonald's			1887	633 5 2	47 5 6
Pokolbin Hill to Cessnock Road			1895	241 13 2	221 13 2
Pokolbin Hills to Mitchell's 60 acres			,,	50 0 0	50 0 0
Pokolbin Hills and Cessnock Road towards Singleton			,,	30 0 0	30 0 0
Punkalla to Noorooma Road			,,	15 7 0	15 7 0
Pearce's Corner to Park Road			,,	10 15 0	10 15 0
Palmer's Island Roads			1890	1,297 8 4	367 17 10
Palmer's Plain to South Gundarimba			1894	696 7 2	295 6 2
Pilliga to Walgett			1893	1,243 6 7	447 11 11
Pilliga, *via* Buglebone, to Eurie			1894	495 19 6	190 14 3
Punt Bridge, *via* Wamberal, to Tuggerah Lakes			1893	1,405 12 9	75 7 0
Punt Bridge to West Blowering			1895	392 3 0	382 4 0
Peterkin's Bridge, *via* Right Bank Warrel Creek, to Nambucca			1889	1,076 5 0	172 7 0
Paterson to Vacey			1895	195 9 4	195 9 4
Port Macquarie to Tacking Point			1886	671 11 10	59 9 3
Port Macquarie and Walcha Road to Cell's Creek Diggings			1895	60 0 0	60 0 0
Port Macquarie to Walcha			1872	48,641 13 3	1,716 10 5
Port Macquarie District, Erecting Mile Posts			1895	48 4 0	48 4 0
Pappenbarra Creek to Cowal			1888	1,973 8 8	484 8 11
Pint-pot Creek to Chandler River			1893	297 19 3	146 8 10
Pembroke-street, Carlingford			1895	65 6 2	15 6 8
Pearce's and Behan's to Eatonsville			,,	137 8 0	133 11 0
Protection River Bank Road, Waratah towards Maitland			,,	44 8 4	44 8 4
Pitnacree Bridge to Dunmore Bridge			,,	127 5 0	127 5 0
Protection River Bank, Croki			,,	21 0 0	21 0 0
Pambula Road Survey			,,	25 2 6	13 4 6
Pambula to Mount Gahan			,,	26 5 0	26 5 0
Pambula to Bald Hills			1890	165 9 0	30 0 0
Pambula to Merrimbula Junction			1867	4,389 2 0	205 2 2
Picton to Oakes			1874	17,201 1 2	518 9 5
Perico to Wog Wog			1889	1,019 0 4	45 14 9
Prahran, *via* Cowbed, to Snowy Plain			1890	1,325 13 6	309 18 6
Perth to Mount Evenden	Maintenance, repair, and construction.	Consolidated Revenue.	1895	162 19 8	145 2 8
Perth, *via* Charlton, to Rockley			,,	690 15 9	559 9 6
Piper's Flat Station to Meadow Flat and Mitchell's Creek			1886	2,365 6 1	17 10 0
Peel to Junction, Kelso and Sofala Road			1888	489 14 6	9 8 1
Phillips' to Solferino			1895	105 0 0	105 0 0
Parkes to Coradgery			1888	1,832 19 1	267 3 3
Parkes to Balderogery			1887	1,716 10 6	318 5 6
Parkes, *via* Alice Town, to Peak Mill			1895	1,104 17 11	1,104 17 11
Parkes to Condobolin			1884	9,546 8 5	630 3 4
Parkes to Manildra to Kissing Point Quarry			1895	380 5 7	380 5 7
Penrith, *via* Castlereagh, to Blacktown Road, at Larras Grant			1894	350 6 1	67 16 9
Penrith to Dr. Clarke's Bridge			,,	110 0 0	50 0 0
Portland Ferry, *via* Mitchell's, to Wiseman's Ferry			1895	119 13 3	72 16 3
Portland Ferry, *via* Hall's, to Sackville Ferry Road			,,	136 3 8	135 11 5
Parramatta and Toongabbee Road to Oak's Farm			,,	26 4 10	22 8 10
Parramatta, &c., to Wentworthville Railway Station			,,	2 11 9	2 11 9
Parramatta to Pennant Hills			1885	1,285 7 9	139 17 0
Parramatta to Ryde			1895	30 0 0	30 0 0
Parramatta, at East end of Broken Back Bridge, *via* Windsor and Richmond, to Richmond Bridge (portion Parramatta to Rouse Hill)			1889	5,781 7 4	1,102 3 7
Pearce's Corner to Pennant Hills			1884	2,729 10 11	324 18 6
Pearce's Corner to Brooklyn Railway Station			1894	776 1 3	292 13 0
Peat's Ferry to Berowra Creek			1885	632 7 1	53 2 0
Pipe Clay Creek (Fencing)			1895	112 4 0	65 14 0
Pennant Hills Road towards Tunks'			1895	30 0 0	30 0 0
Pennant Hills Road to Mould's Corner			1892	568 8 11	105 3 6
Pennant Hills to Carlingford			1895	30 0 0	30 0 0
Pennant Hills Road to Thornleigh Quarry			,,	20 13 2	20 13 2
Pennant Hills Road to Beecroft			,,	50 0 0	50 0 0
Piper's Flat to Sunny Corner			,,	46 6 6	46 6 6
Prospect Village to Blacktown Road			,,	105 4 2	105 4 2
Plumpton and South Creek Road and Golding's			,,	5 0 0	5 0 0
Petersham to Abattoirs			1886	5,046 11 0	508 19 1
Pittwater to Barrenjoey			,,	1,985 7 5	216 13 7
Park Road			1895	100 0 0	100 0 0
Page's Creek Road			,,	120 0 0	40 0 0
Quirindi to Gunnedah			1894	430 1 5	174 5 9
Quirindi, *via* Bundella, to Bomera			,,	5,047 16 10	1,170 1 2
Quirindi, up Jacob and Joseph Creeks			1879	1,264 15 11	184 14 11
Quirindi to Werris Creek			1891	152 17 0	60 13 0
Quirindi, towards Borah Creek			1894	138 17 11	106 1 4
Quilkie's, down Taylor's Arm, South Side			,,	263 14 11	222 15 0
Quipolly Platform to Lowe's Creek			1895	7 18 0	7 18 0
Quaama to Verona			,,	23 18 0	23 18 0

RETURN OF EXPENDITURE ON PUBLIC WORKS—*continued.*

Work, and where situated.	Whether Constructing or under Repair.	Fund from which the Expense is defrayed.	When Commenced	If Unfinished, amount of Expenditure to 30 June, 1896.	Amount expended from 1 July, 1895, to 30 June, 1896.
ROADS AND BRIDGES—*continued.*				£ s. d.	£ s. d.
Queen's Pinch to Raynor's	Maintenance, repair, and construction.	Consolidated Revenue.	1895	150 0 0	150 0 0
Quambone to Warren			1894	272 16 11	243 13 7
Queanbeyan to Uriarra Post Office			1881	2,889 4 4	213 1 6
Queanbeyan to Gundaroo			1874	25,381 5 4	186 13 4
Queanbeyan to Gudgenby			1891	699 0 11	128 11 8
Queanbeyan to Gininderra			1878	9,859 6 5	103 3 11
Queanbeyan District Roads			1894	127 16 6	32 10 0
River Bank Protection, Maclean			1895	83 3 0	83 3 0
River Bank Protection, Clarence River			"	1 4 6	1 4 6
River Bank Protection, Hay			"	0 10 11	0 10 11
Reddacliffe's to Brunswick River			1892	1,710 13 8	162 19 3
Red Range Road to Bear Hill			1894	411 19 11	358 14 7
Road along Railway Fence up Burringbar Creek			1895	29 10 4	29 10 4
Road between Taylor's and Alcorn's			"	9 2 0	9 2 0
Road between Rigney's and Griffin's			"	47 9 11	47 9 11
Rous Factory, *via* Beeson's, to Wardell Road			1890	1 739 8 6	155 15 9
Road up Left Bank, Wilson's River			1894	281 0 4	271 11 4
Road through Tomki Estate			1895	1 4 0	1 4 0
Red Hill to Kerr's			1892	997 9 0	723 1 11
Road through Tatham Paddock			1895	17 8 0	17 8 0
Raising Main Road between Newcastle, Wickham, Tighe's Hill, and Waratah Shoots			"	25 0 0	25 0 0
Rockvale to Kookabookra			1890	650 6 7	32 11 0
Rocky Creek to Terry Hie Hie			1892	725 14 5	186 17 11
Rothbury Public School, Allandale, road to			1894	90 0 0	40 0 0
Road from West Corner of M'Donald's to Cessnock			1895	30 5 8	30 5 8
Rossi's to Coggin's Old Pejar Road			1894	29 15 8	13 3 0
Rolland's Plains to Dungay Creek			1892	2,846 2 11	193 4 10
Rolland's Plains to Brill Brill			1894	57 0 0	47 0 0
Rolland's Plains to Ballingarra Wharf			1895	74 4 3	74 4 3
Rawden Island Roads			1885	1,004 11 1	92 8 11
Road up Taylor's Arm			1895	55 0 0	55 0 0
Raymond Terrace and Stroud Road to Saltash			1893	626 13 8	239 1 10
Raymond Terrace and Morpeth Road to Martin's Wharf			1891	496 3 9	43 5 3
Raymond Terrace and Stroud Road to Raymond Terrace and Seaham Road (Miskell's Road)			1890	157 9 10	17 7 4
Raymond Terrace and Stroud Road to Raymond Terrace and Clarencetown Road (Caswell's Road)			1891	261 0 2	48 18 5
Raymond Terrace by East side Williams River to Seaham			1884	2,754 2 0	459 0 0
Raymond Terrace to Morpeth			1891	3,795 12 7	311 7 11
Raymond Terrace and Morpeth Road to East Maitland			1894	206 3 10	66 3 10
Raymond Terrace Ferry Approach			1895	179 0 0	179 0 0
Raymond Terrace to Williamstown			1894	339 3 11	107 2 3
River-street, Cundletown			1895	68 5 10	20 5 4
Redbank to Merregoen			1894	114 1 0	11 2 0
Road East side of Railway at Buxton			1895	7 10 0	7 10 0
Roads on left bank, Macleay, Skillion Flat to Warneton			1894	572 8 7	297 11 2
Risley's to Monticollum			1892	1,232 17 9	390 13 9
Rutherford Road to Portions 107 and 108			1895	40 17 5	40 17 5
Rutherford to Scotch Corner			"	120 0 0	120 0 0
Rutherford to Scotch Corner, Road *via* Hillsborough and Luskintyre Road			"	88 0 0	88 0 0
Road to Thone Creek			"	201 13 8	201 13 8
Ridgeway's, *via* Monkerai, up Karuah River			"	211 11 6	211 11 6
Road through Warren to Savell's			"	64 10 7	64 10 7
Road through Paterson's			"	137 8 3	137 8 3
Road through Harbord Estate			"	38 12 4	38 12 4
Round Corner at Dural to Rouse Hill			1894	65 0 0	20 0 0
Round Corner at Dural to Wiseman's Ferry			1895	220 15 10	220 15 10
Road past Church, &c., Emu Plains			"	9 3 11	9 3 11
Ryan's to the Border			"	145 12 4	145 12 4
Rouchel Store to Stoney Creek			"	29 3 2	29 3 2
Road up Middle Creek			"	144 0 0	144 0 0
Rob Roy to Reedy Creek			"	180 0 0	180 0 0
Road up South Branch, Orara River			"	114 0 0	114 0 0
Road up Right Bank, German Creek			"	60 0 0	60 0 0
Rocky River Road to Armidale			"	44 12 4	44 12 4
Road between Law's and Small's			"	23 0 0	23 0 0
Removal of Bridge, Hexham Island, to Mainland			"	193 10 0	193 10 0
Recreation Reserve, Ogilvie-street, Denman			"	13 6 6	13 6 6
Railway Crescent, Beecroft			"	54 0 1	54 0 1
Road along Railway Crossing and Burringbar Creek			"	52 9 7	52 9 7
Ryandah Flat, Llangothlin, to Ben Lomond Railway Station			"	24 9 6	24 9 6
Rawdonville to Curra Cobark Road			"	50 0 0	50 0 0
Robertson, *via* Macquarie Pass, to Glenquarry			1890	2,379 0 4	946 9 7
Robertson to the Cemetery			1895	46 0 0	46 0 0
Robertson to Bowral			1874	18,040 0 10	1,377 1 10
Richlands to Wearborough Creek			1803	171 12 0	55 18 6
Richlands to Wombeyan Caves			1887	1,047 5 9	149 4 11
Rock Station, *via* French's Park, to Green's Gunyah			1894	363 19 4	207 4 6
Riley's Crossing to Batlow			1892	546 10 8	148 9 0
Runnymede to Buckenboura			1894	131 1 0	56 1 0
Rookwood Municipal Roads			1895	50 0 0	50 0 0
Rock Station to Urana			1883	10,810 12 1	443 14 7
Rosewood, *via* Humula, to Kyamba			1891	1,192 12 11	285 14 10
Rosewood to Jonathan Gully			1895	10 8 6	10 8 6

RETURN OF EXPENDITURE ON PUBLIC WORKS—*continued.*

Work, and where situated.	Whether Constructing or under Repair.	Fund from which the Expense is defrayed.	When commenced.	If Unfinished, amount of Expenditure to 30 June, 1896.	Amount expended from 1 July, 1895, to 30 June, 1896.
				£ s. d.	£ s. d.
ROADS AND BRIDGES—*continued.*					
Run of Water to Lake George			1891	638 11 6	49 12 6
Run of Water to Winderradeen			1895	183 12 5	183 12 5
Run of Water to Parkesbourne			1887	492 8 6	58 0 0
Road off Rooty Hill and Blacktown Road at Nursery towards South Creek			1895	10 0 0	10 0 0
Road to Public Wharf from Road Gosford, *via* Kincumber, to Terrigal Haven			,,	10 0 0	10 0 0
Rouse Hill to Schofield's Platform			1888	868 3 2	105 14 6
Road at New Hospital, Warialda			1895	52 13 0	52 13 0
Road to Cambewarra North from Soper's			,,	49 14 9	49 14 9
Road to Simpson's Ridge School			,,	29 5 0	29 5 0
Road north and south side Carnsdale Railway Station			,,	123 12 2	123 12 2
Richmond Bridge to King's Road			1888	7,885 7 4	659 19 7
Rooty Hill Station to Blacktown Road			1895	100 0 0	100 0 0
Rydal to Hampton			1894	2 103 16 0	174 2 8
Rockley to Trunkey			1874	5,457 16 11	192 13 5
Rockley to Swallow Nest			1880	2,612 1 5	89 16 9
Road up Darling River, Wentworth			1895	75 0 0	75 0 0
Rylstone to Bylong			1886	2,967 5 9	195 3 6
Rylstone, *via* Bogie, to Glen Alice			1895	218 10 5	108 16 6
Rylstone to Norongo			,,	9 2 0	9 2 0
Road from Railway Bridge, past Public School, to Church of England, Newbridge			,,	6 3 4	6 3 4
Road past Callan Park Asylum			,,	105 0 0	42 0 0
Road to Callan Park Bay			,,	11 14 9	11 14 9
Randwick Toll-gate to La Perouse			1893	1,664 0 9	1,112 5 6
Randwick and Coogee Roads			,,	2,750 0 0	1,000 0 0
Removing Rocks at Cockatoo			1895	94 12 1	94 12 1
Roads within limits of Hurstville, Rockdale, Canterbury, &c.			1894	3,671 0 0	1,709 0 0
Reedy Flat to Orange and Cadia Road			1895	50 3 0	50 3 0
Rocky Point Road			1894	300 0 0	50 0 0
Roslyn Road to Chain of Ponds			1895	43 18 8	43 18 8
Reidsdale to Warrumbucca			,,	12 15 0	12 15 0
Rhine Falls to Dry Plain			,,	59 2 0	59 2 0
Railway Platform, near 248 miles, to Cowra Reefs			,,	149 19 0	149 19 0
Road off Cobar Road to Henstock			,,	20 0 0	20 0 0
Road along South Boundary of Beaconsfield (M'Kinley's Lane)			,,	39 0 0	39 0 0
Road from Parramatta, Toongabbee Road, to Wentworthville Railway Station			,,	2 5 10	2 5 10
Road to King's and other's Farms			,,	6 0 0	6 0 0
Railway Crossing at Glenrock to West Arm	Maintenance, repair, and construction.	Consolidated Revenue.	,,	15 15 0	15 15 0
Railway Crossing to Cowra Reefs			,,	100 0 0	100 0 0
Redbourneberry Bridge to Scott's Flat			,,	32 0 0	32 0 0
South Lismore to Wyrallah			1887	3,385 7 4	829 13 0
South Lismore, Wyrallah Road, to South Gundarimba, Wharf Road			1895	20 0 0	20 0 0
South Lismore, &c., to Whitney's			,,	10 10 10	10 10 10
Swan Bay to New Italy			1890	1,426 17 11	179 3 2
Southgate to Flood Reserve			1894	100 6 8	19 0 0
Shark Creek Road			,,	78 17 0	44 16 8
South Grafton, Moonee Road, to Ulmarra, Corinda Road			1895	74 18 3	74 18 3
South Grafton to Ulmarra			1886	9,121 8 8	167 19 8
South Grafton to Perrett's			1890	12,353 18 7	2,338 16 7
South Grafton to Rushforth			1888	736 11 7	156 1 6
South Grafton to Moonee			1892	4,554 7 0	1,630 2 6
South Bank, Orara River, Road up			1895	155 12 6	155 12 6
Stoney Pinch up Stockyard Creek			1894	337 1 11	310 2 6
Stoney Pinch to Smith's Creek			1890	255 8 9	45 17 5
Stoney Creek to Murray's Flat			1895	12 9 0	12 9 0
Stoney Creek to Morton's Creek			1892	217 1 11	101 3 2
Salisbury Plains to Kentucky			1887	739 15 2	38 10 11
Stroud Road, *via* Major's Creek, to Thalaba and Dungog Road			1895	35 0 0	35 0 0
Stroud Road Deviation			,,	150 0 0	150 0 0
Stroud to Dungog			1876	6,139 10 8	618 0 1
Stroud Road to New Wharf			1891	410 7 6	173 18 7
Stroud, up Mill Creek			1895	41 7 5	41 7 5
Stewart Town to Monkerawa Road			,,	60 0 0	60 0 0
Stockton to Saltash			1894	2,093 15 6	1,033 7 10
Seven Oaks to Trial Bay			1882	13,615 2 2	801 2 10
Saltash to Nelson's Bay			1894	225 7 0	125 19 0
Sandy Creek to Mount Vincent			1892	697 9 8	230 16 7
Sandy Creek to Millfield			1893	311 7 6	225 3 6
Sandy Creek to Cooranbong Borings			1895	1 2 6	1 2 6
Sandy Hollow to Weddin Creek			1894	77 9 0	51 17 0
Scone, Merriwa Road, up Middle Creek			1893	289 6 0	41 19 3
Scone, *via* Dartbrook and Kayuga, to Muswellbrook			1894	290 11 10	51 16 5
Scone to Denison Diggings			1879	7,739 0 6	1,028 12 8
Scone to Bunnan			1877	7,626 17 10	469 6 4
Scone and Denison Diggings Road to Hunter River at Brushy Hill			1895	37 17 0	37 17 0
Scotch Creek Road			1891	534 8 5	29 14 0
Scrub to Snake Valley			1895	82 4 0	82 4 0
Singleton, *via* Warkworth, to Jerry's Plains			1890	1,727 9 4	297 13 7
Singleton to Cooper's Flat			1884	5,294 14 11	369 13 6
Sandy Hill to Boorook			1888	584 18 2	33 11 6
Sherbrook to Wabro Creek and Willi Willi			1894	434 5 1	292 9 7
Stonehenge to Graham's Valley			,,	103 3 10	40 3 6
Swan River towards Strathbogie Road			1895	24 5 0	24 5 0

RETURN OF EXPENDITURE ON PUBLIC WORKS—*continued.*

Work, and where situated.	Whether Constructing or under Repair.	Fund from which the Expense is defrayed	When commenced	If Unfinished, amount of Expenditure to 30 June, 1896	Amount expended from 1 July, 1895, to 30 June, 1896.
ROADS AND BRIDGES—*continued.*				£ s. d.	£ s. d.
Synnott's to Funnell's (Jiggi Creek Road)			1888	2,706 15 10	221 9 6
Sedgefield, *via* Glendon Bridge, to Gresford Road			1894	38 3 0	28 7 0
Sharp's, up East Bank Orara River			,,	423 15 5	422 0 5
Saddler's Creek Road			1895	78 19 10	78 19 10
South-west Side Guyra Lagoon to Guyra Railway Station			,,	39 11 2	39 11 2
Stock Route, Brush to Merriwa			,,	2 11 0	2 11 0
Seventeen-Mile Post to Long Point			,,	32 0 0	32 0 0
Solway's to Gineroi			,,	79 19 6	79 19 6
Sidebottom Creek to Old Bar Road			,,	92 11 0	92 11 0
Stockinbingal to Grogan			,,	45 0 0	45 0 0
Swan Creek Bridge to Riverbank			,,	24 0 0	24 0 0
Scabbing Flat Road			,,	39 9 9	39 9 9
Sutton Forest to Main South Road			1887	771 8 2	95 4 3
Sutton Forest to Bundanoon			1882	2,788 18 11	605 9 3
Sergeant's Point, *via* Charley's Forest, to Wog Wog			1894	353 13 2	209 0 8
Sergeant's Point to Clyde Road			1887	764 15 5	40 7 3
Southern Road, Main			1857	695,857 1 3	8,261 3 3
South Creek to Luddenham			1894	464 8 0	265 1 10
Show Ground Road, Castle Hill, to Cemetery			,,	140 0 0	60 0 0
Sugarloaf Creek to Bancroft Road			1895	50 0 0	50 0 0
Saunders' Corner, &c., to Kenthurst			,,	45 2 0	45 2 0
Scott's Creek, Cassilis			,,	60 7 0	60 7 0
Stanhope Road, *via* Tangorin, to Singleton and Gresford Road			,,	64 0 0	64 0 0
Stanhope and Maitland Road up Lamb's Valley towards Paterson			,,	50 0 0	50 0 0
Shellharbour Municipal Roads			,,	100 0 0	100 0 0
Sackville Public School to Beston Reach			,,	11 9 6	11 9 6
Sofala to Rylstone			1878	8,670 13 7	302 3 3
Spring Terrace to Long Swamp			1887	1,675 9 1	252 16 7
Spring Terrace to Forest Reefs			1883	1,658 10 6	132 9 4
Spring Hill Station to Orange and Cadia Road			1879	2,493 13 10	174 18 2
Spring Hill to Long Swamp			1887	1,536 15 11	413 7 3
South Head Roads			1888	33,102 10 0	3,750 0 0
Sydney to Bank's Meadow			1894	287 17 3	175 11 7
Sydney, *via* Dam at Cook's River, to Half-way House			1876	87,055 4 2	3,202 3 5
Stanmore Road from Enmore Road to Canterbury Trust Road			1894	1,275 0 0	825 0 0
St. Mary's to Blacktown Road *via* Llandilo			1895	180 3 7	180 3 7
St. Mary's to Orphan School Road			,,	100 0 0	100 0 0
Swallow Creek to Ophir			,,	8 15 0	8 15 0
Shadforth to Spring Hill			,,	81 0 0	81 0 0
Station-street, Mount Victoria			,,	80 0 2	80 0 2
Sturt-street, Howlong			,,	59 14 10	59 14 10
Saucy Creek to Bondi			,,	42 13 0	42 13 0
Sunny Corner to Cemetery Road	Maintenance, repair, and construction.	Consolidated Revenue.	,,	28 6 9	28 6 9
Sewer Road, Botany			,,	229 17 11	229 17 11
Seventeen Mile Post to Long Point			,,	6 3 7	6 3 7
South West Corner of Hett's portion towards Yerong			,,	45 5 7	45 5 7
St. Clemmets Church, Camberwell (Road to)			,,	10 0 0	10 0 0
South Head Road at Watson's Bay to Military Reserve Gates			,,	66 0 0	66 0 0
Seaham Punt by East side Williams River, &c.			,,	60 0 0	60 0 0
Stewart Town to Golden Gully			,,	60 8 8	60 8 8
Severn River to Strathbogie			,,	25 18 0	25 18 0
Smithtown-street drainage			,,	39 13 0	39 13 0
Smithtown to Dairy Factory			,,	10 0 0	10 0 0
Sandy Flat Railway Station to Mangleson's			,,	27 0 0	27 0 0
Toohey's Mill to Hogan's			1892	807 18 7	313 12 7
Trial Bay, towards Smoky Cape			1893	59 10 4	31 12 1
Trial Bay to South West Rocks			1895	68 8 0	68 8 0
Two-mile Creek to Newrybar			1889	334 3 10	135 12 0
Tumbulgum to Tweed Heads			1894	458 8 4	297 5 8
Teleglierry to Masters			1893	138 7 0	55 8 0
Tabulam to Myall Creek			1892	2,631 11 3	580 9 2
Thorburn to English's			,,	348 17 1	127 7 5
Thorburn to Kelly's			1891	348 7 0	57 12 9
Tuckı to Munro's Wharf			1894	150 14 0	76 18 2
Tuckı to Rous			1891	1,084 2 2	469 13 11
Tuckombil to Rous			1894	174 2 0	94 2 7
Tintenbar to Brooklett			1889	1,814 11 11	192 10 6
Tintenbar to Priddles			1895	204 11 0	204 11 0
Tintenbar to Alstonville			1883	4,930 9 11	392 2 9
Tintenbar to Toohey's Mill			1884	2,341 9 4	195 3 11
Tenterfield to Scrub, *via* Steinbrook			1888	974 9 5	47 11 0
Tenterfield to Scrub			1885	1,571 19 0	69 17 0
Tenterfield to Mingoola			1894	784 19 1	89 6 6
Tenterfield to Wallangra			1888	1,965 7 2	148 4 6
Tenterfield to Bonshaw			1878	10,222 6 8	577 16 8
Tenterfield Municipal Boundary to Carroll Creek			1895	7 0 0	7 0 0
Tenterfield to Swamp Oak Creek			1894	123 8 11	109 10 5
Tent Hill to Table land			1888	1,535 7 1	108 17 0
Tent Hill Torrington Road at the Glen Crossing to the Gulf			1895	15 10 0	15 10 0
Tubbamurra to Llangothlin Railway Station			1894	68 8 0	50 8 0
Tingha, *via* Stanmfer and Elsmore, to main road, Glen Innes to Inverell			1888	2,717 18 1	417 0 0
Tinonee Road to Failford			1894	406 16 0	240 5 0
Tinonee to Old Bar Reserve			1895	9 2 0	9 2 0
Tinonee to Farquhar Inlet			1883	1,637 10 4	121 16 0
Tinonee to Wingham Ferry			1876	2,851 14 6	122 7 2
Tinonee Saw Mills and N C S.N. Company's Wharf (Road to)			1895	26 10 0	26 10 0
Tinonee to Killawarra			1892	352 14 10	50 0 0

Return of Expenditure on Public Works—*continued.*

Work, and where situated.	Whether Constructing or under Repairs.	Fund from which the Expense is defrayed.	When commenced.	If Unfinished, amount of Expenditure to 30 June, 1896.	Amount expended from 1 July, 1895, to 30 June, 1896.
ROADS AND BRIDGES—*continued.*				£ s. d.	£ s. d.
Tinonee to Bootawah			1895	123 18 5	123 18 5
Taree District Roads			1893	1,304 2 8	245 1 6
Taree towards Tuncurry			1883	3,373 4 4	442 3 3
Taree to Wingham			1892	1,034 17 4	252 11 2
Taree to Old Recreation Ground at Chatham			1895	20 0 0	20 0 0
Trangie to Gin Gin			1894	159 0 0	66 0 0
Trangie to Collie			1895	142 0 0	142 0 0
Trangie to Nevertire			,,	52 0 0	52 0 0
Twelve-mile, Stroud Road, to Sawyer's Point			1892	668 16 0	209 9 8
Top Bingera Road			1895	36 12 0	36 12 0
Teralba to Cockle Creek			,,	39 2 3	39 2 3
Tamworth to Nundle			1878	23,075 11 2	651 11 5
Tamworth to the Forest			1883	564 13 3	19 0 6
Tamworth to Barraba			1891	12,170 15 5	1,595 18 6
Tamworth, *via* Moore Creek, to Attunga			1878	1,943 16 10	188 1 10
Tamworth to Somerton			1891	2,406 11 3	119 17 4
Teven Road to Strathbogie			1895	4 12 6	4 12 6
Teven to Ferry, south side			1894	223 9 7	132 19 7
Tooloom Station to Kangaroo Flat			1895	51 0 8	51 0 8
Tatham to Myrtle Creek			1891	570 19 7	270 6 9
Tatham to Knight's Farm			1894	67 1 0	17 8 6
Tallanganda Crossing up Jerrabut Gully			,,	133 17 8	106 17 8
Tyagarah to Boyle's			1895	275 1 6	275 1 6
Trustee Road up Lagoon Grass			,,	30 0 0	30 0 0
Tweed and Brunswick Road up Burringbar Creek			,,	18 0 0	18 0 0
Tweed and Brunswick Road, *via* Mullimbimby, to Byron Bay			1890	1,298 17 3	57 15 10
Topfier's to Dufficey's			1895	24 15 0	24 15 0
Turramurra to Bobbin Head			,,	235 7 0	235 7 0
Tea Gardens to Alicetown			,,	40 0 0	40 0 0
Terambil to East Maitland Reserve			,,	120 0 0	120 0 0
Taylor's Arm up Baker's Creek			,,	173 1 6	173 1 6
Thirlmere to Bargo River			1892	382 0 4	105 6 7
Thirlmere Railway Gates to the Cemetery			1895	13 2 6	13 2 6
Tomerong to Jervis Bay			1886	1,732 12 8	219 14 10
Tait's Hotel to Lumsden's Corner			1888	1,037 15 9	38 13 11
Towrang to Greenwich Park, towards Cadingee			1895	0 2 0	0 2 0
Towrang, *via* Lockyersleigh, to Paddy's River			1892	331 10 6	80 8 6
Towrang, *via* Greenwich Park, to Long Reach			,,	2,726 17 2	208 8 7
Towrang, &c., to Greenwich Park			1895	68 4 6	68 4 6
Taralga to Rockwell			1891	2,160 9 1	334 12 1
Taralga to Bummaroo Ford			1895	11 16 0	11 16 0
Taralga to Paling Yards			1894	210 0 0	76 13 9
Taralga, *via* Curraweela, to Bummaroo	Maintenance, repair, and construction.	Consolidated Revenue.	1885	1,503 19 2	175 18 2
Taemas Bridge to Brindabella			1891	1,906 6 10	294 9 8
Turlingah to Nerrigundah			1895	31 2 0	31 2 0
Turlingah to Tuross Heads			,,	17 0 0	17 0 0
Tarago to Braidwood			1866	87,317 10 2	1,139 1 6
Termeil Post-office to Milton			1891	1,052 0 11	125 7 6
Termeil to Bewley Point			1895	64 0 0	64 0 0
Towamba to New Buildings			1894	1,075 5 4	50 2 9
Towamba to Bondi			1887	1,872 18 5	46 4 0
Tilba Tilba to Mount Dromedary			1894	50 0 0	10 0 0
Turon River, at Wallaby Rocks			1895	1 10 0	1 10 0
Travelling Stock Route, at Wilson's, to Temora-Junee Road			,,	0 5 8	0 5 8
Tharwa to Tidbinbilly			1890	344 18 4	26 19 11
Tharwa to Michelago, near Smith's			1895	20 0 0	20 0 0
Tarrabanda to Gocup			,,	67 19 10	67 19 10
Thirroul to Public School			,,	17 11 6	17 11 6
Tumut, *via* the Plains, to Jones' Bridge			1891	869 16 7	167 1 6
Tumut, *via* Piper's, up Bembowlie Creek			1894	171 14 8	152 2 8
Tumut to Kiandra			1873	12,775 13 0	905 10 11
Tumut, *via* Brungle, to Gundagai			1870	6,209 10 11	1,453 8 6
Tumut to Adelong			1868	14,234 13 8	463 13 7
Tumut to Tomorroma			1891	848 14 11	223 4 10
Tumut to Lac-ma-lac			1871	2,858 17 2	243 10 5
Tumut to Gundagai			1864	27,214 18 10	1,388 7 10
Temora to Wyalong			1887	10,114 3 4	6,749 19 2
Temora to Junee Junction			1888	2,171 11 3	111 10 3
Temora to Mandamar			1894	629 5 8	445 19 5
Temora to Barmedman			1895	22 12 11	22 12 11
Tumbarumba to Courabyra			1893	366 0 11	117 8 0
Tumbarumba, *via* Tooma, to Welaregang			1878	17,471 18 9	381 3 6
Tumbarumba to Paddy's River Waterhole			1894	52 9 3	6 16 0
Tumbarumba to Bago			1890	1,918 12 5	303 13 6
Tumbarumba to Upper Burra			1894	123 19 0	67 18 0
Tumbarumba-Courabyra Road to Oberne			1895	12 11 0	12 11 0
Tumbarumba to Jingellic			1882	14,013 2 1	421 7 8
Tumbarumba to Little Billabong			1876	23,953 13 9	1,254 8 2
Tumbarumba to Yarrangobilly Caves			1893	306 5 0	239 5 0
Tumbarumba to Newtown			1895	8 9 4	8 9 4
Tocumwal to Berrigan			1889	789 10 5	49 10 5
Tooma to Tumbarumba, "Ball's Head Cutting"			1895	88 0 10	88 0 10
Tomalong to Delegate			1894	138 17 6	22 17 6
Thompson's Crossing to Jerrawa			1895	93 15 0	93 15 0
Thompson's Creek to Portland			1894	200 2 0	113 11 2
Tambar Springs, Merrigula			1895	25 0 0	25 0 0

RETURN OF EXPENDITURE ON PUBLIC WORKS—*continued.*

Work, and where situated.	Whether Constructing or under Repair.	Fund from which the Expense is defrayed.	When commenced.	If Unfinished, amount of Expenditure to 30 June, 1896.	Amount expended from 1 July, 1895, to 30 June, 1896.
ROADS AND BRIDGES—*continued.*				£ s. d.	£ s. d.
Tathra to Tanjar			1895	38 5 0	38 5 0
Tuena Road to Sherwood			1893	218 16 2	88 13 0
Toongabbee Creek, Windsor Road, to Kellyville			1894	17 10 0	7 10 0
Toongabbee Road			,,	71 3 6	11 3 0
Twelve-Mile Post to Harold's Cross			,,	69 0 4	20 0 0
Tarana to Oberon			1888	3,372 12 9	480 15 5
Tarana towards Rydal			1895	162 10 10	162 10 10
Tallawang Road to "Goodiman Inn"			1893	325 9 11	115 4 2
Treweeks to Lewis Ponds			1895	129 14 0	129 14 0
Tallywalka towards Cobar			,,	9 7 6	9 7 6
Tuggeranong to Bulga Creek			,,	7 17 6	7 17 6
Tarpolly to Carroll			,,	30 0 0	30 0 0
Trehorn's to Small's			,,	10 0 0	10 0 0
Taylor's Arm (Road up)			,,	145 0 0	145 0 0
Ulmarra to Yamba			1893	3,080 7 5	1,100 15 2
Ulmarra to Corindi			1887	1,440 4 1	221 7 4
Ulmarra Yambla Road to High Crown Land at Stout's			1895	30 0 0	30 0 0
Uralla to Bundarra			,,	29 2 0	29 2 0
Uralla, *via* Bundarra, to Inverell			1879	20,865 13 7	439 4 10
Uralla Municipal Roads			1895	25 0 0	25 0 0
Uralla to Nilon's			1894	65 12 0	8 5 0
Uralla, *via* Balala, to Kingstown			1881	3,341 9 9	130 16 0
Uralla Rockwood Road to Uralla Walcha Road			1895	9 5 0	9 5 0
Uralla, *via* Gostwycke, to Rockwood			1894	170 2 4	43 7 0
"Union Inn," Rutherford, to Melville Ford			1885	760 12 2	38 12 4
Union Church to Southgate Wharf			1889	2,358 10 2	121 17 9
Underbank to Upper Williams			1893	270 14 0	100 0 0
Umbango, *via* Oberne, to Tarcutta			,,	698 8 10	104 4 6
Ulundry to Obley			1894	82 0 0	54 14 0
Urana to Boree Creek			,,	43 1 4	30 0 0
Uralba to Dillon's			1895	8 15 0	2 15 0
Upper South Arm Road to C. Moody's Selection			1894	388 12 6	380 1 6
Upper Dartbrook and Sparke's Creek Road			1895	188 14 6	188 14 6
Upper Lansdowne Road to Syden's Crossing			,,	318 14 6	318 14 6
Upper South Creek to Byron Bay Road			1895	53 19 0	53 19 0
Upper Road to Eastwood			1892	866 0 0	115 0 0
Upper Bankstown or Park Road			1895	60 0 0	60 0 0
Upper Bankstown to Rookwood			,,	60 0 0	60 0 0
Upper Tuross Road			,,	8 6 0	8 6 0
Upper to Lower Turner's Flat			,,	36 11 11	36 11 11
Upper Williams to Upper Alleyn River			,,	50 0 0	50 0 0
Upper Picton to Windmill Hill			,,	12 8 0	12 8 0
Upper Bucca Creek, Road at	Maintenance, repair, and construction.	Consolidated Revenue.	,,	30 0 0	30 0 0
Upper Hastings to Upper Manning			,,	50 0 0	50 0 0
Upper Karaak Flat to Wingham-Nowendoc Road			,,	30 0 0	30 0 0
Upper to Lower Coldstream			,,	89 10 6	89 10 6
Upper Stewart's River Road to Banks of Stewart's River			,,	57 4 9	57 4 9
Victoria Road			1893	524 18 0	25 0 0
Violet Dale up Dumaresq Creek			1894	162 4 11	67 12 11
Vittoria to Milthorpe			1895	150 0 0	150 0 0
Wallaby Rocks Borings			1894	82 11 5	34 14 6
Woodfordleigh to Tynedale			1895	727 2 9	51 19 2
Wyrallah to Rous			1888	8,662 19 10	339 2 11
Wee Talaba, *via* Angledool, to Goodooga			1893	239 6 3	85 10 1
Wardell, Rous Road, to Alstonville			1891	843 7 2	123 12 4
Wardell to Rous			1895	580 13 3	580 13 3
Wardell to Emigrant Creek Bridge			1890	1,188 9 4	220 14 5
Woodlawn to Bexhill			1895	34 18 2	34 18 2
Wardell to Burns' Point Ferry			1890	1,290 17 3	274 11 9
Wardell, Rous Road, to Rous Cemetery			1895	17 15 5	17 15 5
Wardell to the Beach			1891	508 4 2	128 18 11
Wardell Road to south-west corner of Bell's			1895	29 8 0	29 8 0
Woodburn to Bungawalbyn Ferry			1892	960 1 5	78 12 6
Woodburn to Wardell			1881	8,571 8 0	435 2 7
Woodburn to Evan's River Heads			1895	49 2 0	49 2 0
Woodburn District Roads			1893	714 7 8	9 3 0
Woodburn to Tucki			1891	2,453 1 11	448 1 4
Woodburn to Coraki			1895	6 8 0	6 8 0
Woodburn to Halfway House			1880	15,889 7 2	846 15 6
Woodburn Crossing to Bexhill Road			1894	30 0 0	0 10 6
Woodburn to Dungarubba			1891	1,243 9 6	288 4 11
Woodburn to the Gap (Iluka Road)			1893	336 5 5	189 1 8
Waterview to Ramornie			1891	204 3 3	34 18 0
West Branch, Orara River, to Buchanan's			,,	829 2 2	276 4 2
Warialda to Bogamildi			1894	384 3 5	239 14 7
Warialda to Yetman			1876	9,209 6 8	271 15 6
Warialda to Gunyerwaraldi			1879	5,308 0 2	494 2 4
Warialda, *via* Gragin, to Reedy Creek			1886	966 14 6	142 19 8
Warialda, *via* Ezzie's, to Moree			1876	25,368 8 4	377 1 9
Wilson's Downfall to Rivertree			1887	4,678 17 7	271 5 6
Wellingrove to Strathbogie and Bonshaw			1889	1,931 11 5	443 16 11
Wandsworth to "Old Ben Lomond Inn"			1888	1,143 4 2	145 10 6
Wallangra to Strathbogie			1894	173 14 0	59 2 0
Wallangra to Boggabilla			1895	243 18 5	243 18 5
Walgett to Combogolong			1892	554 11 11	125 11 2
Walgett Road, at Wee Waa, to Pian Creek			1894	292 12 9	270 17 9

RETURN OF EXPENDITURE ON PUBLIC WORKS—*continued.*

Work, and where situated.	Whether Constructing or under Repairs.	Fund from which the Expense is defrayed.	When commenced	If Unfinished, amount of Expenditure to 30 June, 1896. £ s. d.	Amount expended from 1 July, 1895, to 30 June, 1896 £ s. d.
ROADS AND BRIDGES—*continued.*					
Walgett, *via* Goodooga, to Brenda	Maintenance, repairs, and construction.	Consolidated Revenue.	1893	1,402 19 0	513 9 8
Walgett to Mogil Mogil			1889	1,654 11 1	349 11 1
Walgett towards Brewarrina			1894	160 8 0	140 6 9
Walcha Road to Walcha			,,	720 17 5	354 16 10
Walcha to Surveyor's Creek			1895	19 19 6	19 19 6
Walcha to Emu Creek			1893	189 3 4	109 3 4
Walcha Railway Station to Glen Morrison			1881	3,254 1 10	239 7 10
Walcha to Eulo, *via* Glen Morrison			1892	741 8 7	101 5 5
Walcha to Aberbaldie			,,	237 6 5	6 11 5
Wingham Wharf Approach			1895	1 8 7	1 8 7
Wingham, up Cedar Party Creek			1882	2,498 13 2	298 1 11
Wingham and Nowendoc Road to Karaak Flat			1884	668 13 4	55 12 10
Wingham Bobbin Head Road, &c., to Gracie's			1895	30 0 0	30 0 0
Wingham, *via* Brimbin, to Lansdown			1885	743 11 0	42 17 8
Wingham to Nowendoc			1883	16,545 11 11	1,009 9 8
Wingham, *via* Ashlea, to Kelvin Grove			1876	3,538 18 2	246 6 7
Wingham, *via* Bungay, to Bo Bo Creek			1895	38 7 6	38 7 6
Wilson's River, *via* Bar Scrub, to Walcha			1877	3,339 9 7	298 5 0
Wauchope to Beechwood			1890	328 9 5	92 4 11
Wauchope to Heron's Creek			1892	1 534 4 2	455 12 8
Warren's Lane			1891	247 5 4	45 14 1
Wyee Platform to Old Maitland Road			1890	837 13 0	111 10 0
Wyee Station, *via* Catherine Hill Bay, to Swansea			1894	572 4 9	215 18 7
Washaway at Denman, Muswellbrook, to Merriwa			,,	93 10 0	93 10 0
Wyong, *via* Tuggerah Lakes Platform, to Water Reserve No 76			1892	749 7 2	94 13 9
Wyong to Yarramalong			1890	3,406 10 11	1,054 10 4
Wyong to Morrissett			1892	1,472 15 6	22 15 6
Warkworth to Putty			1879	10,268 1 3	966 6 0
Wollombi to Cessnock			1893	2,685 19 6	1,061 6 9
Wollombi to Broke			1892	1,291 17 2	544 10 5
Woy Woy to Blackwall			1894	62 11 6	55 11 10
Wollombi Road up Allandale Road			1895	50 0 0	50 0 0
Wollombi Road to Ellalong			,,	95 7 0	94 16 6
Wollombi to Congewai			1890	1,551 9 9	389 14 1
Wollombi up Yango Creek			1892	594 14 5	110 8 1
Wiseman's Ferry Road, at Middle Dural, to Kenthurst			1894	20 0 0	10 0 0
Wickham Roads			,,	495 9 11	231 9 11
Wallsend to Gosford Road, at Cooranbong			1878	11,559 5 9	775 9 7
Wallsend to Sandgate Cemetery			1884	279 16 3	123 16 8
Wallsend to Lake Macquarie			,,	647 18 7	206 19 9
West Wallsend Relief Works			1895	262 7 6	262 7 6
West Maitland to Dunmore			1883	3,806 13 6	216 0 11
West Maitland to Mulbring Creek			1894	100 0 0	100 0 0
West Maitland to Cessnock			1892	2,228 10 5	575 7 6
West Maitland, *via* Louth Park, to East Maitland			1894	150 0 0	50 0 0
Waratah towards Maitland			1882	13,753 16 6	638 6 7
West Maitland Relief Works			1895	232 3 4	232 3 4
Willow Tree to Quirindi			1894	381 0 9	206 14 4
Wiseman's Ferry to Wollombi			1895	501 9 1	501 9 1
Wallabadah to Quirindi			1878	5,377 16 3	364 2 10
Wallabadah to Nundle and Swamp Oak			1882	6,266 8 10	295 8 3
Whiteman's Bridge to Eatonswill			1895	18 11 0	18 11 0
Woolamon to Cadell			1892	123 3 1	23 14 3
Wardell to Emigrant Creek at Newport to Riverback			1895	7 10 0	7 10 0
Werris Creek Gap to Railway Station			1892	100 5 7	30 8 6
Werris Creek, *via* Currabubula, to Tamworth			1880	8,215 5 6	135 15 3
Warneton to Aldavilla			1895	79 16 11	79 16 11
Walker-street, North Sydney			,,	450 0 0	450 0 0
Walcha to Nowendoc			1879	5,062 12 11	213 5 2
Wharf-street, St. Alban's			1895	19 9 0	19 9 0
Walcha to Uralla			1877	4,822 10 5	55 7 6
Wapengui to Bingera			1895	38 0 0	38 0 0
Warrilda to Gineroi			,,	49 18 8	49 18 8
West Hillgrove to Baker's Creek			,,	22 0 0	22 0 0
Wollombi, up Maron Creek			,,	7 7 0	7 7 0
Webster's to Floods			,,	243 8 4	243 8 4
Waterfall to Otford Hill			1890	1,254 7 3	228 5 5
Wheeo towards Crookwell			1884	4,448 9 4	197 19 5
Wheeo to Binda			1877	2,453 11 5	84 10 8
Wheeo Post Office to Gunning			1888	1,445 16 0	174 4 8
Wallen's Gap, *via* Ballalaba, to Oranmer			1875	1,845 10 4	106 4 11
Waroo, *via* Boambolo, to Cavan Gap			1891	675 12 11	220 12 7
Wyndham to Burrogate			1892	198 12 0	60 0 0
Wolumla, *via* Lithgow Flat, to Candelo and Wyndham Road			1879	1,574 9 2	84 12 5
Wolumla Junction to Tantawanglo			1872	47,658 19 5	15 0 0
Wolumla to Chalk Hills			1895	14 14 0	14 14 0
Wallaga Lake to Bermagui			1887	267 2 2	3 15 2
Wendowie, up east bank Gilmore Creek			1891	584 9 10	126 0 6
Wendowie School, up west bank Gilmore Creek			1894	154 0 8	39 0 0
Wagga Wagga to Gillenbah			1892	2,390 4 8	862 5 11
Wagga Wagga to Gregadoo			1891	950 0 7	273 9 6
Wagga Wagga to Coolamon			1892	768 16 2	204 13 9
Wagga Wagga to Wantabadgery			,,	764 7 7	163 4 0
Wagga Wagga to Cookardina			,,	1,254 9 10	100 5 8
Wagga Wagga, *via* Sandy Creek, to Rock Station			1893	473 5 6	271 10 4
Wagga Wagga to Kyamba			1881	12,158 1 7	718 14 2

RETURN OF EXPENDITURE ON PUBLIC WORKS—*continued.*

Work, and where situated.	Whether Constructing or under Repairs.	Fund from which the Expense is defrayed.	When commenced.	If Unfinished, amount of Expenditure to 30 June, 1896.	Amount expended from 1 July, 1895, to 30 June, 1896.
ROADS AND BRIDGES—*continued.*				£ s. d.	£ s. d.
Wagga Wagga to Narrandera	Maintenance, repair, and construction.	Consolidated Revenue.	1864	16,228 1 9	313 1 3
Wagga Wagga to Junee			1892	418 2 5	145 17 3
Wagga Wagga-Narrandera Road to Grong Grong Railway Station			1894	110 5 10	40 19 1
Walla Walla to Henty			1895	15 0 0	15 0 0
Widdin to Walla			1894	75 0 0	50 0 0
Whitton Station to Cudgellico			1892	6,516 10 5	1,369 19 10
Wombat, *via* Kingsvale, to Young Municipal Boundary			1894	155 2 0	101 17 0
Wombat to Wallendbeen			„	97 9 4	64 5 4
Wallendbeen to Stockinbingal			„	314 0 0	276 18 6
Welaregang to Tintaldra			„	112 10 6	58 0 1
Wentworth to South Australian Border			1885	1,373 13 6	10 0 0
Wentworth Railway Station—approach			1895	35 0 0	35 0 0
Wolumla to Yurammi			„	47 6 0	47 6 0
Wollar to Barragun			„	43 0 0	43 0 0
Wolumla to Candelo and Wyndham Road			„	4 13 6	4 13 6
West Botany-street			„	100 0 0	100 0 0
Walla Walla Township to Walla Walla West Public School			„	117 0 0	117 0 0
Woodville Road			„	150 0 0	150 0 0
Wilson's to Temora Road			„	10 19 0	10 19 0
Wollongong Municipal Roads			„	100 0 0	100 0 0
Wollongong, *via* Mt. Keira, to 13-mile peg			„	17 19 3	17 19 3
Wentworth Falls to Burragorang			„	836 19 5	836 19 5
Woola Woola Roads			„	73 0 0	73 0 0
Wells' Selection to Wallangra-Strathbogie Road			1895	12 12 0	12 12 0
West Portland to Comleroy Road			1888	742 4 0	112 15 10
Windsor Road to Sneath's			1894	30 0 0	15 0 0
Windsor to Bull Ridge			1895	136 0 0	136 0 0
Windsor, *via* Sackville, to Wiseman's Ferry			1883	10,039 8 5	614 19 4
Windsor Road, at Rous Hill, to Rook's Farm			1895	10 0 0	10 0 0
Windsor to North Dural, between Pitt Town and Cattai			„	102 13 2	102 13 2
Wiseman's Ferry to Singleton's Mill			1889	520 6 5	108 1 10
Windeyer to Queen's Pinch			1892	733 4 11	212 8 6
Wallerawang to Mudgee			1857	170,976 17 3	1,537 18 5
Wallerawang to Rydal			1893	291 19 11	56 19 10
Walli to Woodstock			1888	1,372 4 10	316 4 2
Woodstock to Canowindra			1891	1,918 0 7	600 17 6
Woodstock to Mt. M'Donald			1883	5,661 10 5	405 16 1
Wall's Junction to Botobolar			1884	1,583 1 11	171 7 6
Wellington to Ulundry			1894	740 2 8	516 6 9
Wellington to Dubbo			1895	321 11 1	321 11 1
Wellington to Woolamon			1890	1,863 11 7	121 11 3
Wellington to Cobborah			1882	5,601 8 5	813 11 8
Wellington to Mumbil and Burrendong Road			1880	5,720 5 11	127 11 4
Wilcannia to Ivanhoe			1892	1,841 2 3	482 11 2
Wilcannia to Wentworth			1888	2,709 18 7	345 11 8
Wilcannia to Wompah			1892	2,343 10 1	760 19 11
Wilcannia to Cockburn			1890	3,057 0 10	226 11 6
Western Road—Main			1857	608,413 4 1	8,260 5 9
Wellington to Ponto			1891	1,281 18 8	397 0 11
White Bay Hotel, &c., to Iron Cove			1894	1,356 14 4	710 4 8
Wilberforce to Pitt Town			1895	20 10 3	20 10 3
Wellington to Goolma			„	473 11 3	473 11 3
Wilcannia to Wanaaring			„	75 4 9	75 4 9
Wentworth to Balranald			„	4 3 0	4 3 0
Wellington to Balderogery			„	27 0 0	27 0 0
Wall's to Bowning			„	16 7 6	16 7 6
Warne to Mumble			„	41 12 10	41 12 10
Whitney's Road			„	27 5 10	27 5 10
Welsh's to Maloney's			„	30 0 0	30 0 0
Waiting-shed, South Bank, Manning River			„	15 14 6	15 14 6
Warialda-Yetman Road, near 10-mile post			„	16 4 0	16 4 0
Wollomombi to Kilcoy			„	46 13 8	46 13 8
Wall's Lane			„	27 8 0	9 5 6
Wanganderry, down Burrangong Mountain			„	50 0 0	50 0 0
Warne to Yahoo			„	50 0 0	50 0 0
Woodryche's, at Kenthurst, *via* Cushbert's, to Rous Hill			„	20 0 0	20 0 0
Wallaroo Creek to Clarence and Dungog Road			„	40 0 0	40 0 0
Wilberforce to Argyle Reach			„	50 0 0	50 0 0
Wilberforce to Buttsworth Wharf			„	35 0 0	35 0 0
Widening Carrington Main Road			„	15 10 6	15 10 6
Yarrowford to Ranger's Valley			1881	2,324 17 0	69 2 10
Young Wallsend to West Wallsend			1892	399 15 6	12 12 2
Young Wallsend to Minmi			1890	1,839 15 5	282 17 0
Yarraman to Black Creek			1891	229 17 2	170 14 10
Yass to Fairfield Bridge			1895	5,904 3 3	110 2 0
Yass, *via* Jerriwa, to Dalton			1894	423 5 0	195 6 5
Yass to Woolgarlo			1875	4,008 6 3	212 14 4
Yass to Dalton and Burrowa Road			1890	423 2 11	62 2 7
Yass to Black Range			1885	292 13 4	44 15 6
Yass, *via* Wee Jasper, to Rye Park			1894	80 0 6	30 0 0
Yass, *via* Wee Jasper, to Tumut			1892	1,656 18 4	781 4 9
Yass to near Gundaroo			1882	9,304 19 10	140 14 11
Yass, *via* Wargeila towards Rye Park			1895	30 8 6	30 8 6
Yass to near Gundaroo to Road Yass to Fairfield Bridge, *via* Towal School			„	37 0 0	37 0 0
Young to Koorawatha			1892	248 1 5	124 7 6

RETURN OF EXPENDITURE ON PUBLIC WORKS—*continued.*

Work, and where situated.	Whether Constructing or under Repairs.	Fund from which the Expense is defrayed.	When commenced	If Unfinished, amount of Expenditure to 30 June, 1896.	Amount expended from 1 July, 1895, to 30 June, 1896.
				£ s. d.	£ s. d.
ROADS AND BRIDGES—*continued.*					
Young, *via* Moppity, to Burrowa and Cunningrah Road			1880	1,678 3 10	229 7 2
Young to Murrumburrah			1889	2,034 2 9	90 10 9
Young to Jerrybang and Bumbaldry			1892	443 19 1	216 13 0
Young, *via* Morangarell, to Marsden			1887	6,091 6 9	608 14 0
Young to Burrowa			1876	13,565 18 1	312 11 2
Young to Temora			1883	8,709 6 6	346 15 0
Young to Grenfell			1888	7,241 4 3	651 15 11
Young and Temora Road to Burrangong Claim, near Young			1895	67 12 6	67 12 6
Young Butter Factory to Spring Creek			,,	44 18 0	44 18 0
Young and Murrumburrah Road, near Wombat, towards Wallendbeen			,,	39 19 9	39 19 9
Yambla Station to Jingellic			1892	3,856 3 0	981 4 7
Yerong Station to Urangeline			1888	2,519 13 10	538 14 5
Yerong Creek to Mangoplah			1894	69 5 10	45 5 10
Yathong Siding to Narromine			,,	80 0 0	8 0 0
Yathong Siding to Myall Plains			1895	155 7 6	155 7 6
Yarra Gap to Jingellic Bridge			,,	190 8 0	190 8 0
Yetman to Texas			,,	44 16 0	44 16 0
Yarramundi, *via* Enfield, to Wilberforce and Pitt Town Road			1883	2,066 0 3	204 11 9
Yarrunga to Sheepwash, with branch to Emu Factory			1895	275 18 6	275 18 6
SUNDRIES.					
Advertising Account			,,		140 15 3
Admiralty Store, Fitting up			,,		44 15 3
Compensation to A. J. Single			,,		100 0 0
Compensation for Land resumed at Nithsdale			,,		28 9 8
Centennial Park Relief Work			,,		1,005 9 2
Centennial Park Roads			,,		595 1 3
Church and School Lands, Randwick			,,		13,066 17 7
Cobar Water Supply			,,		0 7 6
Expenses of Punts			,,		11,615 3 5
Gratuity to Family of late A. M. M'Eachern			,,		50 0 0
Incidental Expenses			,,		23,205 15 8
Lighting Belmore Bridge			,,		90 0 0
Post Office Resumptions, New Street			,,		260 0 0
Salaries, Retrenched Officers			,,		2,014 15 8
Salaries, Temporary Officers			,,		29,380 16 7
Salary of Secretary Metropolitan Board of Water Supply and Sewerage, retrenched			,,		300 0 0
Testing Machine, "Little Giant"			,,	300 0 0	50 0 0
AMOUNT issued to TRUSTEES.					
As per Schedule D 4, Minor Roads under Trustees	Maintenance, repair, and construction.	Consolidated Revenue.	,,		19,285 0 0
AMOUNTS issued to Municipalities for Maintenance of MINOR ROADS within their Limits.					
Aberdeen			,,		17 0 0
Albury			,,		108 5 6
Adamstown			,,		18 17 1
Auburn			,,		5 5 0
Armidale			,,		26 0 0
Braidwood			,,		158 5 0
Burrowa			,,		238 10 0
Balranald			,,		34 0 0
Bombala			,,		66 5 0
Bega			,,		138 9 0
Bathurst			,,		55 15 0
Blayney			,,		81 5 0
Bourke			,,		18 0 0
Bowral			,,		107 5 0
Berry			,,		61 10 0
Bankstown			,,		9 18 0
Broken Hill			,,		10 0 0
Ballina			,,		206 0 0
Bingera			,,		117 0 0
Cooma			,,		333 10 0
Cootamundra			,,		104 0 0
Cudgegong			,,		956 0 0
Cowra			,,		135 15 0
Condobolin			,,		214 15 0
Camden			,,		187 15 0
Cabramatta and Canley Vale			,,		66 10 0
Campbelltown			,,		41 0 0
Coraki			,,		189 0 0
Casino			,,		528 5 0
Coonamble			,,		115 10 0
Cobar			,,		64 6 8
Cudal			,,		153 15 0
Castlereagh			,,		9 0 0
Deniliquin			,,		209 10 1
Dubbo			,,		45 0 0
Dungog			,,		256 10 0
Forbes			,,		450 12 1
Granville			,,		81 10 0
Gosford			,,		122 10 0
Glen Innes			,,		110 4 2
Goulburn			,,		166 0 3

Return of Expenditure on Public Works—*continued.*

Work, and where situated	Whether Constructing or under Repairs.	Fund from which the Expense is defrayed.	When commenced.	If Unfinished, amount of Expenditure to 30 June, 1896.	Amount expended from 1 July, 1895, to 30 June, 1896.
				£ s. d	£ s. d.
Minor Roads—*continued.*					
Grenfell	Maintenance, repair, and construction.	Consolidated Revenue.	1895		23 10 0
Gulgong			"		513 0 0
Grafton			"		193 15 0
Greta			"		18 5 0
Gunnedah			"		91 12 3
Hillston			"		107 15 0
Hill End			"		18 10 0
Hay			"		106 0 0
Inverell			"		772 3 0
Illawarra, North			"		17 0 0
Junee			"		49 10 0
Jerilderie			"		307 15 0
Kempsey			"		292 15 0
Lithgow			"		176 5 0
Lambton			"		16 0 0
Lismore			"		786 5 0
Liverpool			"		9 5 0
Maitland, West			"		79 5 0
Maitland, East			"		147 10 0
Moss Vale			"		559 15 0
Manly			"		22 0 0
Mittagong			"		52 0 0
Morpeth			"		20 10 0
Moama			"		90 6 0
Molong			"		130 0 0
Moree			"		81 15 0
Muswellbrook			"		10 15 0
Maclean			"		125 0 0
Murrumburrah			"		51 15 0
Merewether			"		13 1 1
Moruya			"		17 15 0
Mudgee			"		34 7 6
Nowra			"		162 10 0
Narrabri			"		44 0 0
Narandera			"		5 0 0
New Lambton			"		76 15 0
Orange, East			"		18 15 0
Orange			"		42 10 0
Penrith			"		21 8 7
Parkes			"		290 11 3
Plattsburg			"		46 0 0
Port Macquarie			"		160 15 0
Peak Hill			"		130 5 0
Parramatta			"		36 0 0
Prospect and Sherwood			"		2 10 0
Queanbeyan			"		60 10 0
Quirindi			"		81 0 0
Richmond			"		19 10 0
Raymond Terrace			"		60 15 0
Rookwood			"		53 5 0
St. Mary's			"		169 19 8
Scone			"		20 0 0
Singleton			"		6 0 0
Singleton, South			"		7 10 0
Smithfield and Fairfield			"		31 19 8
Tumut			"		91 15 0
Tamworth			"		270 3 11
Temora			"		151 15 0
Tenterfield			"		121 10 0
Ulmarra			"		620 10 0
Uralla			"		12 15 0
Ulladulla			"		41 5 0
Waratah			"		20 0 0
Wallsend			"		39 10 0
Wollongong			"		1 10 0
Windsor			"		27 15 0
Wagga Wagga			"		87 15 0
Wallendbeen			"		244 0 0
Wilcannia			"		25 0 0
Wentworth			"		10 11 3
Wingham			"		120 12 7
Walcha			"		238 0 0
Warren			"		38 0 0
Yass			"		213 15 0
Young			"		59 10 0
PUNTS.					
Punt, Blackman's Point			"		41 18 6
" Croki—approaches			"		65 0 0
" Darling River, Bourke			"		256 9 6
" George's River, Lugano			"		230 5 0
" Hinton (New Engines)			"		154 0 0
" Lower Ash Island			"		31 19 3
" Luskintyre (Boat)			"		15 10 0
" Laurieton, Camden Haven			"		181 15 2
" Mouth of Bega River—approaches			"		37 18 0

RETURN OF EXPENDITURE ON PUBLIC WORKS—*continued.*

Work, and where situated.	Whether Constructing or under Repairs.	Fund from which the Expense is defrayed.	When commenced.	If Unfinished, amount of Expenditure to 30 June, 1896.	Amount expended from 1 July, 1895, to 30 June, 1896.
				£ s. d.	£ s. d.
PUNTS—*continued.*					
Punt, Spit Ferry Middle Harbour—approaches			1895		96 17 6
„ Sawyer's Point Ferry			„		44 0 8
„ Tinonee—approaches			„		116 15 7
„ Taree (Waiting-shed)			„		4 5 9
„ Wyong—approaches			„		39 10 0
CAUSEWAYS.					
Causeway, Barmedman Creek			„		95 7 0
„ Baerami Creek			„		44 2 0
„ Devlin's Creek, Beecroft to Carlingford Railway Station			„		3 5 9
„ Widdin Creek			„		98 17 0
CULVERTS.					
Culvert, Ash Island			„		4 17 0
„ Botany Road			„		42 18 3
„ Bond's Road			„		42 10 6
„ Burril Creek			„		25 0 0
„ Barber's Creek			„		68 10 0
„ Beach-street, Coogee			„		339 6 10
„ Coopernook Cemetery Road			„		9 19 9
„ Clyde Road			„		15 10 0
„ Cedar Party Creek at Barnes' Crossing			„		31 0 0
„ Ford's Bridge Embankment			„		76 1 0
„ Freshwater Creek			„		64 15 0
„ Junction Yards Crossing, at Lake Cudgellico			„		130 0 0
„ Long's Corner, Canowindra			„		20 2 8
„ Llandilo to Blacktown			„		41 16 8
„ Middle Creek Embankment			„		70 11 0
„ Moorilda to Evans' Swamp			„		16 0 0
„ M'Kinnon's Store to Brown Mountain			„		143 14 0
„ Nincoola Lagoon, Guyra to Sandy Creek			„		40 16 9
„ North and South of Austimer			„		8 1 0
„ Nerunga-street, Moama			„		50 0 0
„ Pola Creek, Kempsey			„		64 17 6
„ Pultney-street, Taree			„		100 0 0
„ Roache's Creek, Hay Road			„		5 0 0
„ Salmond's Drain			„		138 15 9
„ Sharks' Creek			„		69 13 10
„ Tuross River			„		26 14 0
„ Town of Forster			„		13 12 6
„ Tarrant's, Narrabri to Eulah			„		3 10 0
„ Vogt's Gully			„		117 17 9
FOOTBRIDGES.					
Footbridge, Bullock Island	Maintenance, repairs, and construction.	Consolidated Revenue.	„		85 8 7
„ Goolargandra			„		10 0 0
„ Lett River, Hartley Vale			„		2 1 0
„ Swallow and Lewis Creeks			„		59 17 0
„ Wilson's Downfall			„		24 18 5
CONSTRUCTION AND REPAIR OF BRIDGES.					
Albury			„		486 8 11
Armidale			„		626 10 11
Bourke			„		586 2 8
Blayney			„		119 15 3
Bega			„		447 7 3
Ballina			„		447 7 3
Bombala			„		466 2 5
Braidwood			„		244 19 4
Bathurst			„		407 13 7
Bellingen			„		580 11 1
Coonabarrabran			„		68 0 2
Campbelltown			„		44 5 1
Cowra			„		217 11 4
Casino			„		70 4 0
Crookwell			„		224 8 7
Cootamundra			„		159 12 9
Cobar			„		1 4 0
Coonamble			„		401 0 4
Cooma			„		209 9 6
Dubbo			„		693 13 0
Deniliquin			„		458 14 7
Forbes			„		506 0 5
Grafton			„		257 2 7
Gosford			„		238 11 3
Goulburn			„		637 18 11
Glen Innes			„		331 13 7
Hay			„		545 16 4
Inverell			„		110 2 5
Kiama			„		349 17 11
Kempsey			„		979 5 9
Lismore			„		404 5 4
Lithgow			„		513 9 2
Maclean			„		425 12 5
Moruya			„		255 5 6
Murwillumbah			„		183 18 10
Maitland			„		1,433 15 8

Return of Expenditure on Public Works—*continued.*

Work, and where situated.	Whether Constructing or under Repair.	Fund from which the Expense is defrayed.	When commenced.	If Finished, actual amount of Expenditure.	If Unfinished, amount of Expenditure to 30 June, 1896.	Amount expended from 1 July, 1895, to 30 June, 1896.
BRIDGES—*continued.*				£ s. d.	£ s. d.	£ s. d.
Muswellbrook			1895	.....	.....	1,070 6 9
Moree			,,	.....	.....	238 5 3
Mudgee			,,	.....	.....	225 6 1
Moss Vale			,,	.....	.....	661 2 2
Metropolitan			,,	.....	.....	1,292 13 3
Narrabri			,,	.....	.....	237 16 10
Newcastle			,,	.....	.....	509 13 11
Orange			,,	.....	.....	531 6 10
Parramatta			,,	.....	.....	528 2 9
Port Macquarie			,,	.....	.....	104 3 3
Queanbeyan			,,	.....	.....	99 1 8
Quirindi			,,	.....	.....	750 19 1
Richmond			,,	.....	.....	671 16 5
St. Leonards			,,	.....	.....	482 0 0
Stroud			,,	.....	.....	841 12 8
Tumut			,,	.....	.....	934 15 1
Taree			,,	.....	.....	500 0 8
Tamworth			,,	.....	.....	157 3 9
Tenterfield			,,	.....	.....	468 9 3
Tumberumba			,,	.....	.....	330 9 2
Wollombi			,,	.....	.....	126 6 4
Walgett			,,	.....	.....	535 18 5
Warialda			,,	.....	.....	227 7 11
Wilcannia			,,	.....	.....	223 16 5
Woodburn			,,	.....	.....	11 1 0
Wagga			,,	.....	.....	247 15 10
Yass			,,	.....	.....	56 4 9
Young			,,	.....	.....	186 15 10
Bridge, Algomera Creek	Maintenance, repair, and construction.	Consolidated Revenue.	,,	175 0 0	.....	175 0 0
,, Albion Drain			,,	201 17 6	.....	201 17 6
,, Adelaide Camp, No. 1			,,	108 7 0	.....	108 7 0
,, Anvil Creek			1894	542 7 7	.....	439 1 6
,, Bogan River, Buddabadah			1895	927 19 6	.....	927 19 6
,, Buffalo Creek—painting			,,	22 16 1	.....	22 16 1
,, Bolivia Creek, Main North Road			,,	192 2 2	.....	192 2 2
,, Broker's—Bowraville to Upper South Arm			,,	40 6 8	.....	40 6 8
,, Barham's, over Creek at Tomerong			,,	106 18 2	.....	106 18 2
,, Brickfield Creek, Kingswood			,,	105 8 1	.....	105 8 1
,, Brooker's Creek, Robertson to Glengarry			,,	305 12 10	.....	305 12 10
,, Bath Creek			,,	242 9 2	.....	242 9 2
,, Buckinall Creek			,,	125 18 2	.....	125 18 2
,, Bunter's Creek			,,	175 0 0	.....	175 0 0
,, Bawden—repairs			1894	407 16 11	.....	49 12 0
,, Black Gulley, Inverell			,,	330 12 6	.....	217 12 6
,, Barnes' Gully, Tamworth			1895	390 14 0	.....	390 14 0
,, Barnes' Creek, Stroud			,,	249 8 0	.....	249 8 0
,, Booral, over Karuah River—repairs			1894	655 18 7	.....	617 4 7
,, Cockfighters' Creek, Warkworth—repairs			,,	15 8 0	.....	5 6 8
,, Christopher Creek, South Grafton			1895	100 0 0	.....	100 0 0
,, Cobborah, Talbragar River			,,	653 10 8	.....	653 10 8
,, Church-street, East Maitland to Freeman's Waterholes			,,	193 5 4	.....	193 5 4
,, Camden Haven			1894	117 2 10	.....	66 15 2
,, Christmas Creek			1895	398 15 0	.....	398 15 0
,, Cattai Creek			1894	484 11 3	.....	124 5 2
,, Cooney's Creek			1895	456 3 0	.....	456 3 0
,, Cherry's Creek			,,	365 12 2	.....	365 12 2
,, Crowther Creek, at Koorawatha			,,	659 5 2	.....	659 5 2
,, Candelo			,,	243 11 9	.....	243 11 9
,, Comatawa Creek			,,	156 0 8	.....	156 0 8
,, Calf Creek			,,	266 15 9	.....	266 15 9
,, Charity Creek, St. Leonards			,,	80 15 0	.....	80 15 0
,, Croaker's Creek			,,	181 9 10	.....	181 9 10
,, Denison, Bathurst—re-decking			1894	1,361 7 8	.....	25 3 0
,, Dawson River			1895	575 13 6	.....	575 13 6
,, Deepwater			,,	275 2 10	.....	275 2 10
,, Dingo Creek, Cameron's Crossing			,,	474 6 8	.....	474 6 8
,, Double Creek—Old Brogo Road			,,	480 1 4	.....	480 1 4
,, Dunmore—repairs			1894	980 9 6	.....	459 15 5
,, Duncan's Creek			1895	397 16 6	.....	397 16 6
,, Deep Creek, near Wingham			,,	263 12 10	.....	263 12 10
,, Engonia, Warrego River—approach			,,	372 18 0	.....	372 18 0
,, Emigrant Creek—repairs			1894	739 3 6	.....	516 0 5
,, Fitzroy, Goulburn—painting			,,	175 19 11	.....	64 13 10
,, Five Mile Creek			1895	159 9 7	.....	159 9 7
,, Ford's Bridge, Byewash			1894	225 8 8	.....	127 4 8
,, Great Ana Branch, Darling River			1895	1,352 13 3	.....	1,352 13 3
,, Gunnidgera, Wee Waa to Pian Creek			,,	334 4 0	.....	334 4 0
,, Governor's Hill, Goulburn			1894	150 0 0	.....	97 11 11
,, Glebe Island—repairs			1893	4,972 2 5	.....	650 9 11
,, Gowrie-street, Singleton			1894	431 15 1	.....	0 10 10
,, Hunter River, at Singleton			,,	1,540 10 2	.....	170 8 3
,, Hillston—re-decking			1895	161 16 1	.....	161 16 1

RETURN OF EXPENDITURE ON PUBLIC WORKS—*continued.*

Work, and where situated.	Whether Constructing or under Repair.	Fund from which the Expense is defrayed	When commenced.	If Finished, actual amount of Expenditure.	If Unfinished, amount of Expenditure to 30 June, 1896.	Amount expended from 1 July, 1895, to 30 June, 1896.
BRIDGES—*continued.*				£ s. d.	£ s. d.	£ s. d.
Bridge, Hodge's Creek	Maintenance, repair, and construction.	Consolidated Revenue.	1895	449 8 8		449 8 8
„ Horse Creek			„	153 0 2		153 0 2
„ Harper's Hill Creek, Luskintyre to Greta			„	196 14 6		196 14 6
„ Jembaicumbene, and fencing			1894	1,436 2 3		86 11 3
„ Jellingro Creek			1895	237 15 6		237 15 6
„ Kyamba Creek			„	337 14 0		337 14 0
„ Limestone Creek, Cowra			„	182 16 8		182 16 8
„ Limestone Creek, at Wandsworth			„	486 11 11		486 11 11
„ Lowe's Creek			„	139 19 7		139 19 7
„ Little Plains River, Bombala			„	1,608 10 0		1,608 10 0
„ Little River, Sergeant's Point			1893	1,038 16 2		30 0 0
„ Little River, Balderogery			1895	271 3 3		271 3 3
„ Long Swamp			„	185 10 0		185 10 0
„ Lagoon, Forbes			1893	307 13 4		253 0 0
„ Mandurama Creek			1895	204 18 4		204 18 4
„ Merrigal			„	246 0 3		246 0 3
„ Murrumbidgee, at Taemas			„	131 5 1		131 5 1
„ Mulwarrie			1894	1,254 13 9		2 19 0
„ Moore's, Druitt Town			1892	549 0 5		486 1 5
„ M'Donald River, 3rd and 4th Crossing			1895	728 1 6		728 1 6
„ Merri Merri Creek			„	433 11 9		433 11 9
„ Mountain Creek, at Wanklin's			„	145 7 6		145 7 6
„ Middle Creek, Inverell to Kangaroo Camp			„	98 0 0		98 0 0
„ Middle Creek, Bowenfels			„	125 6 6		125 6 6
„ Muswellbrook			1894	260 19 0		119 10 3
„ Murray River, at Echuca			„	240 15 6		87 12 1
„ Namoi River, Gunnedah			„	332 10 5		265 11 7
„ Nine-mile Box Creek			1895	220 15 9		220 15 9
„ Nine-mile Creek, Raymond Terrace, &c.			„	131 4 4		131 4 4
„ Nowra—repairs			„	245 16 0		245 16 0
„ Narrowgut, Hunter River			„	99 17 4		99 17 4
„ Native Dog Gully			„	75 12 0		75 12 0
„ Orara River, Geergarrow Crossing			1894	360 15 4		291 15 4
„ Orara River—painting			1895	276 10 2		276 10 2
„ Orara River, Coutts' Crossing			„	900 0 0		900 0 0
„ O. B. X. Creek, at 17-mile			1893	214 15 3		14 18 1
„ Pian Creek, near Wee Waa			1895	448 2 0		448 2 0
„ Peel River, Nundle			1894	1,096 9 6		1,076 5 6
„ Pyrmont—repairs			1893	10,315 4 8		1,315 4 9
„ Phillip's Creek			1895	205 11 8		205 11 8
„ Reedy Creek, Bathurst			„	239 17 3		239 17 3
„ Raymond's Creek			„	63 10 0		63 10 0
„ Redbourneberry—repairs			1894	1,157 15 4		2 6 2
„ Read's Creek, Ballina to Tenterfield			1895	239 8 2		239 8 2
„ Sherwood—approach			„	136 0 0		136 0 0
„ Shoal Creek			„	251 15 3		251 15 3
„ Shannon Brook, Tenterfield			„	220 5 0		220 5 0
„ Sandy Creek, Doughboy Hill			1893	865 0 0		23 12 1
„ Sandy Creek, Caramana			1894	111 19 5		98 16 11
„ Sandy Hollow			1895	270 1 7		201 17 11
„ South Arm, Bellingen			„	218 2 0		218 2 0
„ Seven-mile Creek			„	104 7 0		104 7 0
„ Serpentine—repairs			894	172 1 6		37 2 6
„ Swansea—repairs and maintenance			1895	167 19 0		167 19 0
„ Saltpan Creek, No. 1			„	248 5 9		248 5 9
„ Saltpan Creek, No. 2			„	240 13 5		240 13 5
„ Snowy River, Buckley's Crossing			1894	200 5 1		117 1 2
„ Scott's Creek			„	305 18 4		216 14 4
„ Tamworth—repairs			„	1,004 16 10		962 4 7
„ Tuggeranong Creek			1895	218 19 5		218 19 5
„ Titate Creek			„	285 18 9		285 18 9
„ Turragulla Creek			„	506 3 11		506 3 11
„ Tallawadgah Creek			„	114 11 1		114 11 1
„ Tumblebar			„	313 16 0		313 16 0
„ Tocumwal—maintenance			„	120 4 0		120 4 0
„ Tyndale's Gully (right-hand bank)			„	129 6 0		129 6 0
„ Tuckombil Creek—repairs			1894	199 19 11		80 0 0
„ Ti Tree Creek			1895	460 19 8		460 19 8
„ Tent Hill, Emmaville to Deepwater			„	269 13 8		269 13 8
„ Throsby Creek			1893	191 11 4		12 10 0
„ Tozer-street, West Kempsey			1895	141 6 7		141 6 7
„ Vale Creek			1890	3,885 18 8		2 15 6
„ Wilson's Creek			1895	226 8 5		226 8 5
„ Werri Berri Creek			„	63 0 0		63 0 0
„ Wallis Creek, at Buchanan's			1894	221 17 6		211 8 6
„ Willandra Creek			1895	258 2 0		258 2 0
„ Williams River, Wollombi to Broke			„	468 2 5		468 2 5
„ Williams River, Wollombi Brook			1894	288 7 0		27 17 8
„ Williams River, at Banfield (Dillon's)			„	946 12 0		408 8 0
„ Williams Creek, Demliquin to Tocumwal			1895	271 1 11		271 1 11
„ Wollondilly, Goulburn—painting			„	209 1 9		153 1 3
„ Wentworth Falls			„	164 4 7		164 4 7
„ Wentworth—repairs			„	226 11 2		226 11 2
„ Whymoul Creek			„	197 14 10		197 14 10
„ Wagga—old bridge repairs			1894	198 4 4		92 18 5

RETURN OF EXPENDITURE ON PUBLIC WORKS—*continued.*

Work, and where situated.	Whether Constructing or under Repair.	Fund from which the Expense is defrayed.	When Commenced.	If Finished, actual amount of Expenditure.	If Unfinished, amount of Expenditure to 30 June, 1896.	Amount expended from 1 July, 1895, to 30 June, 1896.
BRIDGES—*continued.*				£ s. d.	£ s. d.	£ s. d.
Bridge, Wiseman's Creek	Maintenance, repair, and construction.	Consolidated Revenue.	1895	103 17 3	.....	103 17 3
„ Wilber Creek			„	117 2 0	.....	117 2 0
„ Warkworth			1834	170 7 6	.....	18 13 0
„ Wintervale Creek ..			„	118 3 3	.....	41 0 9
„ Waterworks, Botany—widening approach			„	563 6 1	.....	201 12 11
„ Yowie, Bundy Creek			1895	40 0 0	.....	40 0 0
„ Yass—painting			„	182 19 3	.....	180 16 3
„ Zig Zag Creek, Inverell			„	36 0 0	.....	36 0 0
„ Allen's Creek (Compensation)			1894	.....	223 5 9	24 5 8
„ Belmore—repairs			1895	.....	5 6 3	5 6 3
„ Bombala-street			„	.....	41 13 6	41 13 6
„ Barwon, Brewarrina—repairs			1892	.....	728 1 4	139 12 4
„ Bullenbong Creek, Rock to Green's Gunyah			1895	.....	133 10 0	133 10 0
„ Blaxland's Creek			„	.....	88 7 2	88 7 2
„ Balranald			1893	.....	911 2 2	223 2 8
„ Burrowa Creek, Burrowa			1894	.....	206 12 1	202 12 1
„ Broadwater			1895	.....	110 3 11	110 3 11
„ Bungarribee			„	.....	118 13 5	118 13 5
„ Benambra			„	.....	116 5 2	116 5 2
„ Beckett's Creek			„	.....	3 7 9	3 7 9
„ Bundarra			„	.....	133 10 0	133 10 0
„ Black Bob's Creek			„	.....	210 4 6	210 4 6
„ Belford Creek			„	.....	195 0 0	195 0 0
„ Berowra			1894	.....	35 16 3	34 6 3
„ Baronne Creek			1895	.....	72 0 0	72 0 0
„ Brickmaker's Creek, Scott-street			„	.....	25 0 0	25 0 0
„ Barber's Creek			„	.....	330 7 3	330 7 3
„ Belabula River, Carcoar			„	.....	231 3 4	231 3 4
„ Bourke			1894	.....	3,580 16 1	3,151 14 9
„ Belongil Creek			1895	.....	35 0 0	35 0 0
„ Bingera—approaches			„	.....	50 0 0	50 0 0
„ Black Creek, Tenterfield to Tabulam			„	.....	111 9 0	111 9 0
„ Boomerang Creek			„	.....	49 14 0	49 14 0
„ Barrington			„	.....	3 3 9	3 3 9
„ Carrington—fencing			„	.....	38 19 1	38 19 1
„ Coogee, opposite Sea-wall—repairs			„	.....	77 7 10	77 7 10
„ Carora Creek			„	.....	134 5 0	134 5 0
„ Collarendabri			„	.....	10 18 4	10 18 4
„ Chittaway			„	.....	24 0 0	24 0 0
„ Curban Creek			„	.....	28 0 0	28 0 0
„ Curreki Creek			„	.....	32 12 4	32 12 4
„ Cuttaburra Creek			1894	.....	3,760 4 2	3,748 3 6
„ Cooper's Creek, Bega to Bembooka			1895	.....	284 19 0	284 19 0
„ Cameron's Gully			„	.....	95 10 0	95 10 0
„ Cockburn—approaches			1894	.....	10 8 11	4 8 4
„ Curl Curl Lagoon			1895	.....	58 10 2	58 10 2
„ Cowra—maintenance			„	.....	54 5 0	54 5 0
„ Cungegong			„	.....	53 6 0	53 6 0
„ Cosgrove Creek			„	.....	147 18 9	147 18 9
„ Coopernook—maintenance			„	.....	91 19 10	91 19 10
„ Cudgegong River			„	.....	399 12 1	399 12 1
„ Charity Creek, Taree			„	.....	157 0 0	157 0 0
„ Cedar Party Creek, at Barnes' Crossing			„	.....	99 0 0	99 0 0
„ Campbell's River—approach			„	.....	101 7 8	101 7 8
„ Chambigne Creek			1894	.....	889 3 0	65 9 0
„ Cabramatta Creek			1895	.....	58 12 2	58 12 2
„ Deep and Black Creeks, Pokolbin			„	.....	83 4 0	83 4 0
„ Dingo Creek, at Tetsell's			„	.....	114 17 2	114 17 2
„ Double Creek, Main South Coast Road			„	.....	1,245 1 11	1,245 1 11
„ Durham-street—fencing			„	.....	57 0 0	57 0 0
„ Day's Creek			„	.....	30 0 0	30 0 0
„ Dundee			„	.....	65 15 5	65 15 5
„ Doctor's Creek			„	.....	1 5 0	1 5 0
„ Duck River, Main West Road			„	.....	0 2 2	0 2 2
„ Erina Creek—repairs			1892	.....	408 0 9	62 9 11
„ Elderslie			1895	.....	1 6 0	1 6 0
„ Farmer's Creek, Lithgow			„	.....	54 10 0	54 10 0
„ Flat Rock Gully			„	.....	98 0 0	98 0 0
„ Fox under the Hill			„	.....	0 2 2	0 2 2
„ Freshwater Creek			„	.....	74 15 0	74 15 0
„ Ford's Bridge, in approach			„	.....	343 19 4	343 19 4
„ Gundagai			„	.....	52 0 0	52 0 0
„ George's River, at Freres			„	.....	191 18 8	191 18 8
„ George's River, at National Park			„	.....	0 5 0	0 5 0
„ Glennie's Creek, at Fallbrook			„	.....	0 17 6	0 17 6
„ Gullies, near Deep Creek			„	.....	86 3 0	86 3 0
„ Goonoo Goonoo Creek			1893	.....	57 17 5	27 18 2
„ Hammer's Creek			1895	.....	1 1 10	1 1 10
„ Hyndman's Creek			„	.....	65 0 0	65 0 0
„ Hay—repairs			1891	.....	2,247 2 0	1,011 8 4
„ Hickey's Plain Creek			1895	.....	336 5 0	336 5 0
„ Herriott's Creek			„	.....	45 4 7	45 4 7
„ Hawksview—repairs			„	.....	2 10 9	2 10 9

RETURN OF EXPENDITURE ON PUBLIC WORKS—*continued.*

Work, and where situated.	Whether Constructing or under Repair.	Fund from which the Expense is defrayed.	When Commenced.	If Finished, actual amount of Expenditure.	If Unfinished, amount of Expenditure to 30 June, 1896.	Amount expended from 1 July, 1895, to 30 June, 1896.
BRIDGES—*continued.*				£ s. d.	£ s. d.	£ s. d.
Bridge, Hanson—repairs	Maintenance, repair, and construction.	Consolidated Revenue.	1895	.....	0 1 6	0 1 6
„ Iron Cove—repairs			„	.....	48 2 11	48 2 11
„ Inverell			„	.....	10 4 9	10 4 9
„ Inglewood			„	.....	1 2 6	1 2 6
„ Jerrabat Gulla			„	.....	200 16 4	200 16 4
„ King's Falls			„	.....	0 2 6	0 2 6
„ Kiora			„	.....	12 0 0	12 0 0
„ Little Barber's Creek			„	.....	50 0 0	50 0 0
„ Lewis Creek			„	.....	91 16 6	91 16 6
„ Lane Cove and Parramatta—repairs			„	.....	1,857 18 3	1,857 18 3
„ Lamb's Creek			„	.....	260 14 9	260 14 9
„ Little Jilliby Creek			1894	.....	76 14 6	16 15 0
„ Lacey's Crossing			1895	.....	38 9 2	38 9 2
„ Luskintyre, Hunter River—approach			„	.....	34 3 10	34 3 10
„ Mulwala—repairs			1894	.....	62 8 0	4 10 0
„ Mollesmain Flat			1895	.....	56 15 0	56 15 0
„ Mombah River—borings			„	.....	2 8 4	2 8 4
„ Mill Creek			„	.....	13 18 10	13 18 10
„ Mooki River, Walhallow			„	.....	144 0 0	144 0 0
„ Mattaganah Creek			„	.....	295 16 0	295 16 0
„ Marengo Creek			„	.....	460 5 7	460 5 7
„ Mehi River			„	.....	14 3 0	14 3 0
„ Murray River, Jingellic			1894	.....	217 4 2	182 13 5
„ Narrabri Creek			„	.....	371 1 8	95 18 7
„ Narrabeen Lagoon			1895	.....	11 0 0	11 0 0
„ Narrawalla			„	.....	56 14 0	56 14 0
„ Oyster Lake			„	.....	698 7 4	698 7 4
„ Orara River, near Keranghi			„	.....	519 3 8	519 3 8
„ Oakey Creek			„	.....	472 0 0	472 0 0
„ Oranmer—approaches			„	.....	50 0 0	50 0 0
„ Oolong Creek (Dalton)			„	.....	350 0 0	350 0 0
„ Old Man Creek			„	.....	411 0 0	411 0 0
„ Old Inverell			„	.....	133 18 7	133 18 7
„ Old Walgett			„	.....	19 0 0	19 0 0
„ Peterkins			„	.....	118 17 3	118 17 3
„ Pearce's Creek			„	.....	18 12 0	18 12 0
„ Pitnacree			„	.....	28 0 0	28 0 0
„ Poor Man's Hollow			1894	.....	25 9 8	3 16 8
„ Quondong			1895	.....	0 14 0	0 14 0
„ Ryan's			„	.....	24 0 0	24 0 0
„ Rhone's Creek			„	.....	342 2 0	342 2 0
„ Roache's Creek			„	.....	50 0 0	50 0 0
„ Railway—approach, Woodlawn			„	.....	45 19 6	45 19 6
„ Sandy Creek, Guyra to Inverell			1893	.....	60 10 1	15 11 3
„ Sidmouth Valley			1895	.....	13 2 1	13 2 1
„ Saltash			„	.....	0 4 5	0 4 5
„ St. Omer's Creek			„	.....	58 10 1	58 10 1
„ Saltwater Creek			„	.....	250 12 8	250 12 8
„ Spickett's Creek			„	.....	96 0 0	96 0 0
„ Southgate			„	.....	11 14 0	11 14 0
„ Smollett-street, Albury			„	.....	30 0 0	30 0 0
„ Screwing up Bridges			„	.....	179 16 0	179 16 0
„ Tempe			„	.....	0 3 7	0 3 7
„ Tellegherry Creek			„	.....	9 1 0	9 1 0
„ Turon River, Sofala			„	.....	10 12 2	10 12 2
„ Taylor's Creek			„	.....	229 0 0	229 0 0
„ Turpentine Creek			„	.....	50 0 0	50 0 0
„ Timber for Bridges			„	.....	383 1 3	383 1 3
„ Uralla			„	.....	32 2 0	32 2 0
„ Victoria, Dunmore, and Pitnacree			„	.....	9 0 0	9 0 0
„ Whiteman's Creek, at Eatonswill			„	.....	20 0 0	20 0 0
„ Wallaga Lake			„	.....	8 0 0	8 0 0
„ Wynter's Creek			„	.....	53 5 0	53 5 0
„ Wilcannia—maintenance, &c.			„	.....	468 0 1	468 0 1
„ Walgett—repairs			„	.....	55 0 0	55 0 0
„ Wakool			„	.....	102 15 0	102 15 0
„ Whiskin's Gully			„	.....	0 16 0	0 16 0
„ Wickham—approach			1894	.....	332 12 8	37 16 8
„ Wickham and Bullock Island			„	.....	279 19 6	0 12 6
„ Windsor—repairs			„	.....	497 5 8	16 0 11
„ Yanko Creek, at Wilson's			„	.....	596 19 6	21 9 8
„ Bega River, at Tarraganda			1889	12,598 16 9	.....	50 0 0
„ Darling River, Wilcannia			1888	20,000 0 0	.....	2,202 5 10
„ George's River, Liverpool			1891	12,859 16 3	.....	626 16 1
„ Murrumbidgee, at Wagga			1893	14,000 0 0	.....	3,635 15 5
„ Murrumbidgee, at Narrandera			1888	10,324 17 9	.....	0 18 2
„ Bogan River, at Monkey		Loans and Consolidated Revenue.	1895	.....	224 6 7	224 6 7
„ Cooradigbee Creek			„	.....	1,024 16 1	1,024 16 1
„ Denison Bridge, Bathurst—protection of river bank			„	.....	415 14 2	415 14 2
„ Edwards' River, Deniliquin			„	.....	3,833 8 0	3,661 3 3
„ Ellenborough River			„	.....	135 16 5	135 16 5
„ Kangaroo River, Kangaroo Valley			„	.....	989 19 9	905 5 4
„ Murray River, at Swan Hill			1892	.....	6,116 10 6	5,409 14 9
„ Marra River, near Butterbone			1895	.....	20 3 0	20 3 0
„ Marra River, at Hermitage			„	.....	1,102 17 2	1,102 17 2

RETURN OF EXPENDITURE ON PUBLIC WORKS—*continued.*

Work, and where situated.	Whether Constructing or under Repair.	Fund from which the Expense is defrayed.	When Commenced.	If Finished, actual amount of Expenditure.	If Unfinished, amount of Expenditure to 30 June, 1896.	Amount expended from 1 July, 1895, to 30 June, 1896.
				£ s. d.	£ s. d.	£ s. d.
Bridge Morpeth, Hunter River	Maintenance, repair, and construction.	Loans and Consolidated Revenue.	1895	.....	37 9 3	37 9 3
„ McIntyre River, Inverell			1891	.....	9,469 6 9	8,315 5 9
„ Namoi River, at Walgett			1895	.....	1,093 4 2	1,093 4 2
„ Nepean River, at Blaxland's Crossing			„	.....	410 4 9	410 4 9
„ Stonequarry Creek, Picton			1891	.....	106 8 8	1 19 3
„ Victoria, East Maitland			1894	.....	3,477 7 11	3,260 16 10
„ Windsor—raising and repairs			1895	.....	589 9 4	589 9 4
Road, Enmore Road—wood-blocking			„	.....	5,000 0 0	5,000 0 0
„ Granville to Southern Road (Woodville Road)			„	.....	954 11 1	954 11 1
„ Main South Road to Wombeyan Caves			1890	.....	1,704 6 11	.....
„ through Grand Arch, Jenolan Caves			1895	.....	1,693 0 4	1,693 0 4
Totals		.....	...	139,387 14 9	7,521,434 14 7	776,400 7 9

SUMMARY OF EXPENDITURE FROM 1ST JULY, 1895, TO 30TH JUNE, 1896.

	£ s. d.
Revenue	737,824 18 7
Loans	38,575 9 2
TOTAL	£776,400 7 9

ROADS AND BRIDGES EXPENDITURE.

Year.	Expenditure by Officers of Department.	Expenditure by Trustees.	Total.
	£ s. d.	£ s. d.	£ s. d.
1857	100,000 0 0	.....	100,000 0 0*
1858			
1859	46,621 16 10	.....	46,621 16 10
1860	114,585 18 5	.....	114,585 18 5
1861	199,208 6 10	.....	199,208 6 10
1862	85,641 4 0	50,000 0 0	135,641 4 0
1863	154,497 7 4	70,000 0 0	224,497 7 4
1864	185,248 3 11	70,000 0 0	255,248 3 11
1865	123,867 4 0	30,822 0 0	154,689 4 0
1866	109,075 12 8	39,731 0 0	148,806 12 8
1867	147,750 14 6	38,667 0 0	186,417 14 6
1868	140,086 10 4	36,923 0 0	177,009 10 4
1869	152,323 5 0	40,802 0 0	193,125 5 0
1870	141,863 2 4	40,336 0 0	182,199 2 4
1871	182,726 11 0	40,501 0 0	223,227 11 0
1872	144,257 5 6	34,728 0 0	178,985 5 6
1873	247,858 9 0	36,098 0 0	283,956 9 0
1874	257,366 5 8	41,524 0 0	298,890 5 8
1875	356,002 10 0	45,564 0 0	401,566 10 0
1876	366,802 14 0	37,153 0 0	403,955 14 0
1877	413,625 4 8	51,550 0 0	465,175 4 8
1878	497,032 17 5	24,280 0 0	521,312 17 5
1879	649,773 11 5	25,428 0 0	675,201 11 5
1880	614,708 11 3	28,800 0 0	643,508 11 3
1881	484,567 2 8	23,186 0 0	507,753 2 8
1882	577,212 4 1	24,722 0 0	601,934 4 1
1883	613,847 1 6	24,938 0 0	638,785 1 6
1884	750,584 1 10	27,722 0 0	778,306 1 10
1885	800,962 5 11	24,404 0 0	825,366 5 11
1886	628,379 4 5	28,414 0 4	656,793 4 9
1887	721,993 16 6	45,433 1 3	767,426 17 9
1888	663,928 14 10	31,503 0 0	695,431 14 10
1889	632,397 10 11	31,361 0 0	663,758 10 11
1890	770,808 18 10	34,500 0 0	805,308 18 10
1891	965,687 14 11	31,990 0 0	997,677 14 11
1892	859,027 13 11	30,605 0 0	889,632 13 11
1893	676,233 1 8	30,330 0 0	706,563 1 8
1894 to 30th June, 1895 (18 months)	800,620 2 9	30,034 0 0	830,654 2 9
1895-6	757,115 7 9	19,285 0 0	776,400 7 9
£	16,134,288 8 7	1,221,334 1 7	17,355,623 10 3

* Approximate.

(XIII.)

ROADS AND BRIDGES YEARLY STATISTICAL REPORT, FROM 1st JULY, 1895, TO 30th JUNE, 1896.

Table A.—Extent of District.

Classification.	Number.	Mileage.	
		miles.	chains.
Roads.			
1. Scheduled Roads under Road Superintendents	1,324	25,664	24
2. Unclassified Roads under Road Superintendents	898	10,427	18
3. Scheduled Roads under Trustees	190	1,467	40
4. Unclassified Roads under Trustees	44	289	.....
5. Roads subsidised by Department under Municipal Councils	442	1,103	74
Totals	2,898	38,951	76
Bridges.			
6. Bridges (20-ft. span and over), under care of Road Superintendents or Trustees, or built at cost of Government, on all classes of Roads, within or outside Municipal limits.	Number, 2,772. Total length overall, 260 519 feet.		
Ferries.			
7. Ferries, subsidised, leased, or worked by Department or Trustees, including emergency Punts and Boats.	No. of Punt Ferries, 96. No. of Boat Ferries, 37. Total No. of Punts, 104. Total No. of Boats, 203.		
Municipalities.			
8. Municipalities within limits of district in receipt of subsidies, for which Road Superintendent is required to give Certificates.	Number, 158.		

Table B.—Contracts.

Classification.	Number.	Amount.
		£
1. Contracts as let by Local Officers during 1895-96	4,642	328,959
2. Contracts as let by Head Office, but carried out by Local Officers	180	58,721
3. Aggregate Number and Amount of Contracts as let	4,822	387,680
4. Amount of smallest Contract	.....	3
5. Amount of largest Contract	.....	2,256
6. Average value of Contracts let by Road Superintendents	.....	71
7. Contracts as completed during 1895-96, including those let prior to 1895-96, Number and Value	5,030	353,838
8. Contracts incomplete on 30th June, 1896, and Amount due thereon	827	74,142

Table C.—Analysis of Expenditure.

Inclusive of all Vouchers rendered during 1895-6, and Progress Payments on Contracts incomplete on 30th June, 1896.

	Wages.	Contracts.	Stores, Materials, and Sundries.*	Supervision.†	Municipal Expenditure.‡	Total.
	£	£	£	£	£	£
Roads	130,185	333,806	6,934	7,037	31,431	509,393
Bridges	12,678	44,577	5,272	1,815	387	64,729
Bridges under Assistant Engineer for Bridges	252	32,821	670	.....	.....	33,743
Ferries	7,450	1,461	3,503	331	.....	12,745
Other Works	4,431	14,176	3,128	359	54	22,148
Total Value of Vouchers, as per Voucher Register, 1st July, 1895, to 30th June, 1896.	154,996	426,841	19,507	9,542	31,872	642,758
						No.
Vouchers submitted for payment						20,160

* Include goods obtained under annual contracts or locally, freight, compensation, &c.
† Include engineering and travelling expenses, office and store rent, cleaning, lighting, fuel, wages, and expenses of overseers, but not wages working foremen or gangers.
‡ The amount of certificates given on account of municipal subsidies.

Table D.

Table D.—Proportion of Classified Expenditure to Total Expenditure.

Classified Expenditure.	Amount	Percentage on Total Expenditure
	£	
1. Wages	154,996	22·4
2. Contracts	420,841	61 9
3 Stores, Materials, and Sundries	19,507	2 9
4 Supervision*	56,637	8 2
5. Municipal	31,872	4·6
Total Expenditure £	689,853	100·00

* The amount will be that quoted in Table C, plus the salaries and equipment allowances paid by head office to the officers and assistants who were employed in the district during the year

Table E.—Travelling and Cost thereof, 1895–6.

Officer.	Miles travelled.			Total Amount of Travelling Expenses Vouchers for above period
	Road	Rail.	Total.	
				£ s d.
1. Road Superintendents	271 905	70,437	342,342	3,146 17 10
2. Assistants	90,851	24,695	115,546	1,156 4 1
3. Foremen, Overseers	35,800	2,304	38,104	123 19 8
Totals	398,556	97,436	495,992	4,427 1 7

Table F.—Labour Statistics. (Monthly Average)

Classification of Labour	Permanent	Temporary	Total
By Department.			
Foremen, Overseers	36	28	64
Road Maintenance Men	938	204	1,142
All others (Ferrymen, &c)	92	190	282
Totals	1,066	422	1,488
Contractors and Contractors' Men			8,388

Table G.—Reports, Minutes, Returns, &c.

Official Papers, including Reports, Minutes, and Returns (other than Vouchers) registered from 1st July, 1895, to 30th June, 1896, number 25,468

Table H.—Summary of Work Executed.

Showing Work completed (inclusive of Contracts in progress on 1st July, 1895, but not including Contracts in progress on 30th June, 1896) on Roads under Road Superintendents during the year 1st July, 1895, to 30th June, 1896, and carried out under Contract or by day labour. Ordinary maintenance not to be included.

Class of Work	Unit	Scheduled Roads outside Municipality	Scheduled Roads within Municipality	Unclassified Roads outside Municipality	Unclassified Roads within Municipality	Totals
1. Road construction, including formation, metalling, gravelling, ballasting, or corduroying, exclusive of clearing or draining	chains	35,257	676	1,872	601	38,406
2. Formation, including cuttings, embankments, not metalled, gravelled, &c, exclusive of clearing or draining	chains	34,898	1,196	6,939	188	43,221
3. Clearing, any width	chains	74,205	102	27,262	377	101,946
4. Draining	chains	40,180	308	5,608	80	46,176
5. Maintenance metal, gravel, or ballast obtained	cub yds.	323,585	30,660	3,740	6,091	364,079
6 First-class timber culverts	No.	100	2	11		113
7 Second-class timber culverts	No.	321	3	51	5	380
8. Other timber culverts	No.	1,347	14	180	4	1,545
9 Pipe culverts	No	301	8	22	9	340
10. Causeways, any class	No.	1,320	9	375		1,704
11. Stone, brick, or concrete culverts	No.	15			7	22
12. „ „ „ walls with timber deck	No.	6				6
13. „ „ „ „ iron „	No.					
14. Fencing, split	rods	5,766		240		6,006
15. Ordnance fencing	rods	508	252		313	1,073
16. Punts built	No.	5				5
17. Boats—new, built or supplied	No.	9		5		14
18. Punts overhauled and repaired	No.	55				55
19. Boats „ „	No.	71		2		73

TABLE H.—*continued.*

BRIDGES CONSTRUCTED (20-ft. Span and over). Under the Superintendence of Departmental Officers.

Totals.	Details of Spans.	No.	Total Length.
Number of Bridges built, 125	With iron or steel superstructure, and timber or iron deck	4	305
	Stone, brick, or concrete arched bridges		
Number of Spans of all kinds, 307	Timber truss approach spans to iron or steel bridges	303	9,913
	Timber truss or arched spans		
Overall length of Bridges built, 10,218 ft.	Timber beam approach spans to truss bridges		
	Timber beam spans		
	Totals	307	10,218

TABLE I.—GENERAL SUMMARY OF WORK EXECUTED TO 30TH JUNE, 1896.

Irrespective of time or date of effecting same.

ROADS.

Classification.	Metalled, Gravelled, Ballasted, or Corduroyed.		Formed.		Cleared and Drained.		Cleared only.		Bush or Untouched Road.		Total Mileage (of all the preceding columns).	
UNDER ROAD SUPERINTENDENT.	Miles.	Chains.	Miles.	Chains.	Miles.	Chains.	Miles.	Chains.	Miles.	Chains.	Miles.	Chains.
1. Scheduled; outside Municipalities	6,044	9	4,304	25	4,931	29	5,342	52	4,930	37	25,552	72
2. Scheduled; within Municipalities	417	62	54	43	39	48	62	69	17	10	591	72
3. Unclassified; outside Municipalities	231	76	503	60	767	12	1,283	16	7,144	8	9,930	12
4. Unclassified; within Municipalities	77	29	18	24	12	8	15	54	101	27	224	62
Totals	6,771	16	4,880	72	5,750	17	6,704	31	12,193	2	36,299	58
5. Works superseded by deviations ...	4	37	12	42	6	17	14	8	1	69	39	13

CULVERTS (under 20-ft. Span).

Classification.	Number.	Total Length in feet.
Iron Decked	86	1,209
Stone, Brick, or Concrete Arched	576	4,624
Stone, Brick, or Concrete Walls, with Timber Deck	186	1,966
Timber, all classes	19,474	180,924
Pipe	10,751	272,855
	31,073	461,578

* Length of deck, measured along line of traffic, except in case of pipe culverts, which shall represent length between inlet and outlet.

BRIDGES (20-ft. Span and over).

Classification of Spans.	No. of Spans.	Total Length in feet.
Iron or Steel, with Iron Deck	296	260,376
Stone, Brick, or Concrete Arched		
Timber Trusses or Arches	7,355	
Timber Beam Spans		
Totals	7,651	260,376
Total No. of Bridges	2771	

CAUSEWAYS.

Number.	Total Length in feet along line of traffic.
14,316	345,785

BUILDINGS.

	Number.
Ferrymen's, Bridge Caretakers' or other houses, or buildings, the property of the Department	50.

PUNTS, BOATS, FERRIES.

Classification.	How Worked.				Total No.	Total Width between Mooring Posts.
	Oars only.	Wire Rope without Gearing.	Hand Gearing and Wire Rope.	Steam Gearing and Wire Rope.		
						feet.
Iron Punts	...	...	3	7	10	11,110
Timber Punts	...	17	71	...	88	50,856
Steam Launches	...	...	...	...	1	.....
Horse Boats	...	4	...	...	4	2,343
Flood Boats, iron	13	...	...	...	13	.....
Ditto timber	73	...	...	...	73	.....
Other Boats	111	...	...	...	111	.....
Punt slips, for execution of repairs	...	...	...	...	9	.....
Totals	197	21	74	7	309	64,309

Sewerage Construction.

(XIV.)

REPORT OF THE ENGINEER FOR SEWERAGE CONSTRUCTION.

Department of Public Works, Sewerage Construction Branch, Sydney, 15 February, 1897.

Western Suburbs Sewerage.

The unfinished portion of the triplicate outfall sewer was completed, and the foundations for the straining chamber, at which the carriers will branch off, were carried up to the invert level of the sewer. The construction of the main carrier across Muddy Creek and extending to a second chamber, where minor carriers will branch off, is well advanced.

This carrier, which is half a mile in length, will be built on concrete arches of 50 feet span springing from concrete piers.

Twenty arches have been turned, and the abutment piers for an iron trough bridge over Muddy Creek have been built up to the bed plate of the bridge.

The piers are all on piled foundations, the piles averaging 50 feet in length.

Levelling the sand hills into beds for receiving the sewage has been commenced near the end of the carrier, the work being carried out by men provided by the Labour Bureau.

The extension of the main eastern branch from Stanmore-road to the north of the Parramatta-road, with submains along Nelson-street, Parramatta-road, and the West Kingston branch are being pushed on, and when complete will provide for the drainage of a large area in Petersham, Leichhardt, and Annandale.

The Camden-street submain has now been completed.

On the northern branch the surveys for the first and second divisions have been completed, besides that of the Dobroyd branch of this sewer.

For the main western branch the surveys of the first and second divisions have been completed, and a preliminary survey made for the upper end of this line. A preliminary survey was also made for a portion of the proposed Canterbury branch sewer.

Main Northern Sewer Extension.

Two contracts are now in progress for the extension of this sewer through Annandale, Leichhardt, and Balmain.

This sewer crosses Johnston's and White's Creeks, and, following round the head of Rozelle Bay, terminates at Cook-street in Balmain.

The tunnels have been driven, excepting a short length; and of the two aqueducts over the creeks, that at Johnston's Creek is well advanced, and the White's Creek aqueduct is almost completed.

The arches for these two aqueducts are 75 feet span, and are the first structures of importance built in the Colony upon the "Monier" system of combining iron and cement mortar.

The piers are of concrete, and in the case of the Johnston's Creek aqueduct are resting upon piled foundations.

North Sydney Sewerage.

The extension of the main sewer towards Milson's Point has been pushed on, and the length from Alfred-street to Campbell-street, with its branches, was completed in the beginning of the year.

A contract for the excavation and filling at the outfall works, Willoughby Bay, has been let, and the work is being rapidly proceeded with. This contract includes the construction of a concrete storm-water channel to carry the waters of Willoughby Creek through the reclamation, and also the forming of a sea wall or dyke across the bay.

The portion of the bay inclosed by this dyke will be filled in with sand to form the filter-beds.

The construction of the sewer to drain Blue's Point, and extending from Alfred-street to East Crescent, is being proceeded with. A branch from this sewer will extend to Dumbarton-street, and will intercept the drainage from the Berry's Bay slope of Blue's Point.

Double Bay Low-level Drainage.

The drainage of this locality is being carried out on the Shone system of raising the sewage by means of compressed air.

The sewage is carried by means of earthenware and iron pipes to four collecting stations, whence it is lifted by the Shone ejectors into the Darling Point branch of the Bondi sewer.

Owing to the treacherous nature of the ground met with in the pipe trenches and shafts for the ejector stations, great difficulties have been experienced in carrying out the work, and a considerable amount of piling and timbering has been necessary.

About 50 chains of pipe-drain have been laid and the ironwork is now on the ground and being fixed in position.

Storm-water Drainage of Sydney and Suburbs.

During the year, 180 chains of storm-water channels were constructed, ranging in size from 21-inch pipe-drain to open concrete channel, 19 ft. 9 in. x 6 ft. 6 in.

The areas drained were in the municipalities of Ashfield, Burwood, Strathfield, Homebush, Woollahra, and Paddington

The material used was chiefly sandstone concrete, bluestone concrete being used in all cases where extra strength was required, as under roadways or in bad ground. Upon steep grades, where it was considered the velocity of the flow would wear the concrete, a lining of hard double-pressed bricks was built into the invert of the channels.

The creeks dealt with were the upper Ashfield and Croydon branches of the Iron Cove Creek, Homebush Creek, Double Bay Creek, and the Point Piper Road to Rushcutters' Bay Creek.

In addition to these lined channels, an open cutting, 16 feet wide, was made from the Parramatta Road along the Iron Cove Creek to the Five Dock tramway bridge.

Parramatta Storm-water Drainage.

In the Parramatta district an extension has been made to the Clay Cliff Creek storm-water channel. The new portion is now constructed in concrete. It is 33 chains long, and varies in width from 12 ft. 4 in. to 13 ft. 9 in.

The Brickfield Creek storm-water channel has also been extended from Pennant-street to Ross-street, with a branch to Church-street. This section consists of a covered channel, 10 ft. 6 in. wide, and drains an area of 700 acres.

A further extension of the same channel to Grose-street is now in course of construction.

Survey for Sydney and Suburbs.

During the year, 10¼ miles of main sewers have been permanently located and levelled, and the survey of 7½ miles of main sewer was partly completed.

About a mile of storm-water channels have been surveyed, and various surveys have been carried out in connection with the outfall works at North Sydney and Botany.

Designs for Sydney and Suburbs.

Contract drawings were prepared for 7½ miles of main sewer, varying in size from 8 ft. 6 in. x 7 ft. 6 in. to 3 ft. 3 in. x 2 ft. 2 in., for North Sydney and the western suburbs, and for a storm-water channel at Double Bay.

Additional drawings were made for the air-compressing plant and house at Double Bay for working the Shone ejectors.

A covered reservoir was designed for the Sydney Water Supply, the site chosen being in the Centennial Park, near Oxford-street. The area covered by the reservoir is 3·3 acres, and it is designed to contain an average depth of 20 feet of water, which will give a supply of 20,000,000 gallons. The plan is an oblong with rounded ends. The covering of the reservoir was composed of groined arches springing from brick piers.

Additional detail designs for the outfall works at North Sydney were got out, and the ironwork contract for 1896 was prepared.

Newcastle Storm-water Drainage.

Considerable progress was made with the main storm-water channel through the Newcastle Pasturage Reserve and its extension to Throsby's Creek, the length of channel completed being 1 mile and 50 chains. It is 110 feet in width at the outlet, diminishing to 20 feet at the head, and has an average depth of 9 feet. The channel is an open cutting without lining, excepting at two points, where to avoid steep grades which would cause erosion, steps constructed in concrete, and water cushions, have been built in.

Three road bridges have been constructed across the channel, and a bridge to carry the water-main. A bridge at Maitland Road to carry the tramway is in course of construction.

Plattsburg and Wallsend Drainage.

1 mile 16 chains of an earth channel, 60 feet wide, for draining Wallsend and Plattsburg, have been completed during the year, and 26⅓ chains of a concrete channel, 20 feet wide, at Plattsburg.

Considerable difficulty has been experienced owing to the swampy nature of the ground, and the difficulty of diverting the storm-waters.

The excavation has been carried out on the Butty Gang system, and has employed some hundreds of men.

Orange Drainage.

The storm-water channel along Blackman's Creek has been continued, and a contract embracing a further length of 25 chains is now in course of construction.

Hay Hospital Drainage.

A scheme for the improvement of the Hospital drainage has been designed, and is now being carried out.

Picton Storm-water Drainage.

Designs and estimates have been prepared for the drainage of the town of Picton, a portion of which has been periodically subjected to severe floods.

Liverpool Storm-water Drainage.

Designs and estimates have been prepared for this work. This channel, when constructed, will in dry weather carry off the sewerage matter that at present finds its way into the existing unlined channel causing much complaint.

Nowra Drainage.

For the drainage of the very extensive flats in and around Nowra, and which in times of heavy rain are subject to extensive floods, plans and specifications have been prepared, and forwarded to the Local Council, who proposed to carry out this work.

The outlet of the main channel, where it discharges into the Shoalhaven River, is provided with massive tidal flaps to prevent the water of the river when in flood entering the channel, and flooding the surrounding district.

J. DAVIS,
Engineer for Sewerage Construction.

(XV.)

RETURN of Expenditure on Sewerage Construction from 1st July, 1895, to 30th June, 1896.

Work.	Whether Constructing or under Repair.	Funds from which the Expense is defrayed.	When commenced.	If Finished, actual amount of Expenditure	If Unfinished, Amount of Expenditure to 30 June, 1896.	Amount Expended from 1st July, 1895, to 30 June, 1896.
					£ s. d	£ s. d.
Opening New Street, Paddington	Constructing	Consolidated Revenue.	1886		5,268 4 3	*
Country and Suburban Surveys			1885		12,225 11 5	*
Contingencies			1889		10,526 7 7	14 10 7
Drainage of Sandgate Cemetery, Newcastle			1893		851 8 10	*
Sewerage, City of Sydney, Kent-street Sewer		Loans.	1879		822,748 9 1	*
Darling Point Sewerage			1890		25,415 11 11	626 13 5
Pyrmont ,,			1891		607 9 2	*
Manly ,,			1889		637 0 0	*
Waverley and Woollahra Sewerage			,,		33 995 15 3	257 13 2
Parramatta ,,			1882		16,685 7 11	*
North Sydney ,,			1889		88,798 10 4	8,138 17 10
Western Suburbs ,,			,,		450,399 13 8	48,876 4 4
Randwick ,,			1893		484 17 1	34 14 5
Rose Bay Side Drainage Storm-water Channel			1891		3,133 9 4	38 15 0
Neutral Bay and Careening Cove Storm-water Channel			1892		6,573 1 0	*
Randwick (East and West) Storm-water Drainage			1893		128 2 4	*
Iron Cove Creek Storm-water Channel			1891		30,100 0 0	4,264 18 7
Long Cove Creek ,,			,,		16,601 18 10	24 17 8
Johnston's Creek ,,			,,		9,485 5 10	8,985 2 2
Newtown Branch, Johnston's Creek Storm-water Channel			1894		175 1 2	*
Darling-street to Buckland-street ,,			1892		8,620 10 6	1,861 13 0
Point Piper Road ,,			,,		10,407 4 11	5,088 17 3
Ironbark Creek, Plattsburg ,,			,,		7,690 6 4	5,335 14 7
Rookwood Necropolis Drainage			,,		14,891 8 11	987 19 1
Minor Storm-water Sewers, Western Drainage			,,		14,622 14 5	4,749 4 3
Homebush Creek Storm-water Channel			,,		15,671 14 9	5,609 19 2
Rockdale Creek ,,			1895		62 1 2	10 16 10
Kensington Estate Drainage, Randwick			,,		960 0 0	223 17 11
Bay-street Overflow Sewer			1894		154 11 6	63 5 0
Clay Cliff Creek, Parramatta, Storm-water Channel			,,		3,251 0 6	1,319 2 0
Brickfield Creek, Parramatta, ,,			1895		1,970 16 4	1,765 5 5
Storm-water Sewer, Newcastle District Pasturage Reserve Drainage			,,		12,339 0 5	9,992 8 0
Easton Park, Balmain, Storm-water Channel			1894		1,432 17 1	1,149 1 2
Long Cove Sewer, Leichhardt Branch			,,		5,000 0 0	*
,, Petersham Park			,,		2,483 16 2	*
,, Smith-street Branch			,,		1,595 10 0	*
Raising Storm-water Sewer from Eveleigh Sheds to Copeland-street			,,		1,813 14 6	85 15 0
White's Creek Storm-water Channel			1895		256 5 6	211 17 2
Storm-water Sewer, Munni street, to Shea's Creek			1891	24,816 12 6		11 8 10
Storm-water Channel, Stanmore Road, Marrickville			1895		306 17 11	1 5 9
Resumption of Land, North Sydney			1894		9,546 15 8	37 5 10
Double Bay Channel, from Main Bondi Sewer to Double Bay			1895		3,624 3 1	3,624 3 1
Resumption and Temporary Occupation of Land, Paddington and Rose Bay Side Drainage			,,		15 15 0	15 15 0
Double Bay Low-level Sewerage Scheme			,,		1,964 2 5	1,964 2 5
Sea Slopes, Bondi and Waverley			,,		36 12 9	36 12 9
Willoughby Falls Creek Storm-water Sewer			,,		44 5 0	44 5 0
Centennial Park Reservoir			,,		10,851 14 8	10,851 14 8
Cottage Creek, Newcastle, Storm-water Sewer			,,		13 17 3	13 17 3
Wallsend Storm-water Channel			,,		2,023 17 10	2,023 17 10
Careening Cove Storm-water Channel			,,		0 7 6	0 7 6
Sewerage and Water Supply, Surveys and Contingencies		Consolidated Revenue.	,,		2,090 11 8	2,090 11 8
Construction of Drain across Reclamation to connect with Main Drain, Long Cove			,,		3 3 0	3 3 0
Country Towns Sewerage			,,		14 3 9	14 3 9
Towards straightening course of Styx and Throsby Creeks to facilitate discharge of flood waters		Loans.	,,		2,366 6 5	2,366 6 5
Totals				24,816 12 6	1,670,967 11 11	132,816 3 9

* No expenditure, 1895-6

EXPENDITURE.	£ s. d.
Loans	130,707 18 6
Revenue	2,108 5 3
	£132 816 3 9

SEWERAGE CONSTRUCTION EXPENDITURE.

Year.	Amount.	Year	Amount
	£ s. d.		£ s d
1879	409 12 3	1889	90,931 19 2
1880	3,206 18 0	1890	93,992 19 2
1881	16,818 1 7	1891	211,697 4 6
1882	36,507 13 2	1892	213,407 9 9
1883	105,607 17 7	1893	113,920 5 11
1884	122,526 10 2	1 January, 1894, to 30 June, 1895	241,688 2 7
1885	170,765 15 1	1 July, 1895, to 30 June, 1896	132,816 3 9
1886	160,693 19 10		
1887	128,956 8 5	Total £	1 920,008 19 9
1888	76,061 18 10		

Government Architect.

(XVI.)

REPORT OF THE GOVERNMENT ARCHITECT.

ANNUAL REPORT FOR TWELVE MONTHS ENDING 30TH JUNE, 1896.

Department of Public Works, Government Architect's Branch, Sydney, 19 March, 1897.

I HAVE the honor to present my report on the work carried out in this Branch for the twelve months ending 30th June, 1896.

This work consists mainly in the erection and completion of new buildings; repairing, furnishing, and improving existing ones; valuations of, and advising generally on, Government properties; and performing other miscellaneous services.

The expenditure under all heads, and as set forth in the accompanying Schedule, is as follows:—

	£	s.	d.
Buildings and Services, Revenue	59,995	18	5
Furniture, "	5,512	8	10
Buildings and Services, Loans	141,672	13	10

This expenditure has been incurred in connection with 560 buildings, of which twenty-three new ones have been completed within twelve months.

The office expenses, including travelling and contingencies, for the year amount to £16,561 10s., which covers the cost of a large number of miscellaneous services, in addition to the works represented by the cost of building operations as above.

The following is a list of the completed buildings and important works:—

Building.	Work.	Amount. £	s.	d.
Argyle-street Police Station	Erection	1,020	1	6
Darlinghurst Gaol	Electric Light	1,486	19	8
Government House	Improvements	2,658	13	11
Crown Law Offices	Additions	4,961	4	0
Public Works and Colonial Secretary's Office	Additions, &c.	16,256	11	7
Parliamentary Buildings	Repairs	1,314	15	0
Supreme Court	Additions	1,129	3	7
Annandale Post and Telegraph Office	Erection	1,793	1	2
Balmain West do do	do	2,400	13	6
Camperdown do do	do	1,104	9	1
Enmore do do	do	1,181	7	9
Homebush do do	do	1,384	5	9
Kogarah Lockup	do	1,631	13	6
Marrickville do	do	2,369	2	4
Rookwood Benevolent Asylum	Additions	2,418	1	2
Rockdale Lockup	Erection	1,516	5	8
St. Peters Post Office	do	1,038	13	4
North Sydney do	do	1,403	9	8
Adamstown do	do	1,158	17	10
Bowral Court-house	do	1,527	1	6
Broadwater Police Station	do	1,071	16	2
Berry Lock-up	do	1,789	14	1
Corowa Police Quarters and Stables	do	2,680	2	3
Grafton—Conversion of Gaol (old) into Lands Office	do	1,367	0	0
Kelso Lockup	do	1,132	8	0
Katoomba Court-house	do	2,219	10	10
Maitland Gaol	Additions	2,182	11	11
Moruya Police Station	Erection	1,361	13	8
Mathoura Court-house	do	999	0	0
Cowra do	do	3,743	1	5
Penrith Lockup	do	1,332	0	3
Tarago Police Station	do	1,336	7	10
Kenmore Hospital for Insane	In course of erection	22,505	0	0

The amount expended on the erection of public buildings under the control of this Department up to 30th June, 1896, and exclusive of the cost of sites, is, as nearly as can be ascertained, £4,852,000. The public debt on the same amounts to £1,472,338.

During the year a new system of keeping public accounts was initiated, which involved the writing off on the 30th June of all unexpended balances on Revenue Votes. As the Appropriation Act of the year commencing July 1st, 1895, was not passed until November, great difficulty was experienced in expending the money voted for repairs and general services in the limited time left available, and on 30th June, 1896, no less than £12,975 representing current liabilities, was written off, and the corresponding Votes for the following year will have to be taxed to cover this. A considerable amount of urgent repair work was, therefore, lost to the year.

I have, in former reports, pointedly drawn attention to the need of systematic attention being given to the state of existing buildings, and I venture to do so again.

During the year I had a complete schedule prepared of all the buildings, showing the dates upon which they were last attended to (painting principally), with the hope that in the coming year a sufficient sum would be voted to enable me to establish a periodical repairing of buildings, and, as a commencement, to undertake the repairs of all those to which no attention had been paid during the previous five years.

The list of buildings was so overwhelming, however, that it has been impossible to make even a commencement, and the system, if ever adopted, must be left until larger funds are found in the succeeding years.

I mentioned in my last year's report the percentage of depreciation which was overtaking these buildings, and which I would again draw attention to. Notwithstanding

Notwithstanding these drawbacks an appreciable amount of renovation has been done, and those buildings which it was possible to repair will require no further attention for some years.

During the period under report the sum of £22,505 was expended upon the new buildings at the Hospital for the Insane, Kenmore, but it is not anticipated the whole scheme will be completed for at least three years.

In the course of the year I was instructed to submit a scheme for the housing of 3,000 inmates at the Benevolent Asylum, Rookwood, including all the hospital patients now distributed throughout the inadequate and unsuitable buildings at Parramatta and Liverpool. Complete drawings were, therefore, prepared, setting forth a scheme at an estimated cost of £108,350, and which was placed before the Parliamentary Standing Committee for investigation. The Committee reported to Parliament adversely on the housing of this large number of patients in one institution, and consequently no steps have been taken to remedy the evils which the scheme was intended to remove

A proposal, accompanied by complete plans, was also placed before the Parliamentary Standing Committee, for the construction of a large strong-room and additional offices at the Treasury, at an estimated cost of £21,500. This was recommended to Parliament without alteration, and instructions were issued to commence building operations at an early date.

During the year steps were taken to reduce the large amount of rental paid by the Government to private owners for offices outside the public buildings, and this Branch was closely engaged in assisting to accomplish this.

The Public Service Act was passed within the period under review and a Board appointed to carry out its provisions. A searching investigation was made into the composition of the staff in this office, in conjunction with the other branches of the Works Department, and I have the pleasure of reporting that the Board found it necessary to remove none of the officers; but, on the other hand, to increase salaries to those whose remuneration was previously inadequate. Mr. J. Forsythe, Clerk to Government Architect, and closely connected with this Branch for some years, was promoted to the position of Examiner of Accounts, Public Works Department.

The staff at the end of June consisted of the following —

Government Architect
Principal Assistant Architect
6 Assistant Architects
1 Sanitary Engineer
6 District Inspectors
1 District Inspector (temporary)
1 Assistant District Inspector
4 Draftsmen
10 „ (temporary)
4 Clerks of Works
9 „ „ (temporary)
Plan-mounter, &c.
Clerk to Government Architect
Assistant to Principal Assistant Architect
Annual Contract Clerk
Shorthand and Correspondence Clerk
Specification Clerk.

W. L. VERNON

(XVII.)

RETURN of Expenditure on Public Works carried on by Government Architect from 1st July, 1895, to 30th June, 1896.

Work, and where situated	Whether Constructing or under Repair	Fund from which the Expense is defrayed	When Commenced	If Finished, actual amount of Expenditure	If Unfinished, amount of Expenditure to 30th June, 1896	Amount expended from 1st July, 1895, to 30th June, 1896	Furniture.
SYDNEY				£ s d	£ s d.	£ s d	£ s d
Audit Office	Repairs, &c .		1895	33 10 4		33 3 9	0 6 7
Attorney General's Office	,		,,	23 18 4		4 5 10	19 12 6
Agricultural Department	Furniture	Con	,,	2 10 0			2 10 0
Admiral's Residence	Repairs, &c	Rev	,,	413 11 2		326 17 10	86 13 4
Art Gallery	Repairs		,,	57 16 3		57 16 3	.
,,	Additions		,,		1,366 1 5	1,366 1 5	.
Argyle street Police Station	Erection	Loans	,,	1,020 1 6		730 1 7	.
Botanic Gardens	Repairs, &c		,,	25 17 0		19 0 0	6 17 0
,,	Additions		,,	203 14 5		203 14 5	
Belmore Barracks	,,		,,	496 1 2		86 1 2	
,,	Repairs, &c		,,	110 5 3		14 0 0	96 5 3
Chancery Square	Additions		,,		127 2 6	127 2 6	
,,	Furniture		,,	2 15 0			2 15 0
Custom House	Additions		,,		748 16 0	748 16 0	.
,,	Repairs		,,	19 0 0		19 0 0	
Civil Service Board Office	,,		,,	3 12 6		3 12 6	.
Crown Law Offices	Repairs, &c		,,	92 5 3		17 0 6	75 4 9
Colonial Secretary's Office	,,	Con	,,	137 3 5		45 2 9	92 0 8
Central Police Court	,,	Rev	,,	14 1 3		0 10 0	13 11 3
,, (Temporary Court)	Repairs		,,	63 2 1		63 2 1	
Centennial Park	Statutes erection		,,	118 0 0		118 0 0	
,, Cycle Pavilion	Erection		,,		84 0 0	84 0 0	
,, Fountain	Additions		,,		177 6 9	36 0 0	
,,	Repairs, &c		,,	3 0 1		3 0 1	
Darlinghurst Gaol	Electric Light and Engines, &c		,,	1,486 19 8		566 19 8	
,, ,,	Repairs, &c		,,	1,132 5 0		1,102 6 2	29 18 10
,, Police Station	Erection	Loans	,,		1,066 0 0	1,066 0 0	
,, Court house	Repairs, &c		,,	88 1 11		81 11 8	6 10 3
,, Receiving house	Repairs		,,	81 15 9		81 15 9	
District Court	Repairs, &c		,,	71 17 2		23 6 3	48 10 11
Domain .	Repairs		,,	1 7 6		1 7 6	
,,	Additions		,,	231 2 1		111 2 1	
Expert, Board of Advice	Furniture		,,	3 17 0			3 17 0
Free Public Library	Repairs, &c		,,	102 4 7		32 18 2	69 6 5
,, Lending Branch	Repairs		,,	41 18 9		41 18 9	
Fire Brigade Station, George street North	,,	Con	,,	4 10 9		4 10 9	
Fisheries Department	,,	Rev	,,	1 15 0		1 15 0	
Flagstaff Hill Reserve	,,		,,	85 7 6		85 7 6	
Governor Phillip Statue	Foundations, erection, &c		1893		5,981 1 3	681 1 3	
Government House	Repairs, &c		1895	2,658 13 11		1,769 19 7	888 14 4
,, Stables . . .	,,		,,	301 6 7	...	270 18 2	30 8 5
General Post Office ..	Repairs ..		,,	130 17 4	.. .	130 17 4	..
,,	Additions		,,		90 0 0	90 0 0	. .
Government Printing Office . ..	Repairs, &c		,,	7 16 2		5 13 8	2 2 6
,, ...	Additions, &c... ..	Loans .	,,	. ....	10,514 19 2	10,299 18 2	.....

Return of Expenditure on Public Works, &c.—*continued.*

Work, and where situated.	Whether Constructing or under Repair.	Fund from which the Expense is defrayed.	When Commenced.	If Finished, actual amount of Expenditure.	If Unfinished, amount of Expenditure to 30th June, 1896.	Amount expended from 1st July, 1895, to 30th June, 1896.	Furniture.
				£ s. d	£ s. d.	£ s d.	£ s. d
SYDNEY—*continued*							
Government Statistician's Office	Furniture	Con Rev.	1895	4 15 10	.	4 15 10	4 15 10
George-street North Police Station	Repairs		,,	13 15 10		13 15 10	
Health Board Office	Repairs, &c.		,,	9 7 10		6 17 10	2 10 0
,,	Erection	Loans	,,		124 19 10	124 19 10	
Harbours and Rivers Branch	Furniture	Con Rev.	,,	0 10 8			0 10 8
Insolvency Court	Repairs, &c		,,	8 14 3		3 13 0	5 1 3
Inspector General of Police Offices	Repairs		,,	29 17 5		29 17 5	
Justice Department	Additions, &c.	Loans	,,	4,961 4 0		4,961 4 0	
,,	Repairs, &c.	Con Rev	,,	331 0 6		58 13 0	272 7 6
Lands Office	Additions	Loans and Con Rev	,,	74 12 6		74 12 6	
,,	Working lifts, &c.		,,	756 12 0		756 12 0	
,,	Repairs, &c		,,	228 0 11		197 2 8	30 18 3
Local Government Office	,,		,,	23 18 11		16 12 9	7 6 2
Lunacy Department	,,		,,	46 7 7		2 5 6	44 2 1
Lands Titles Office	Furniture		,,	21 15 0			21 15 0
Labour Bureau	Repairs, &c.		,,	39 0 10		16 5 7	22 13 3
Mines Department	,,		,,	276 18 7		219 14 4	57 4 3
Museum	,,	Con Rev.	,,	64 4 0		63 13 6	0 10 6
,,	New roof		,,		635 0 0	635 0 0	
Mint, Royal	Repairs, &c		,,	292 14 11		253 11 11	39 3 0
Master-in-Equity's Office	Repairs		,,	6 11 10		6 11 10	
Military Offices	,,		,,	0 10 0		0 10 0	
Marine Board Office	,,		,,	0 5 10		0 5 10	
Naval Depôt	,,		,,	134 7 0		134 7 0	
National Park Trustees	Furniture		,,	3 5 0			3 5 0
Observatory, Sydney	Repairs		,,	80 3 3		80 3 3	
Public Works and Colonial Secretary's Offices	Additions	Loans	1894	16,256 11 7		5,078 17 3	
Public Works Department	Repairs, &c.		1895	1,285 11 6		1,028 14 10	256 16 8
,, ,,	Lifts, &c.		,,	833 5 0		833 5 0	
Parliamentary Buildings	Repairs and additions, &c.		,,	1,314 15 0		961 0 2	353 14 10
,, ,,	Attending to gas, &c	Con. Rev.	,,	139 7 3		139 7 3	
Patents Office	Furniture, &c.		,,	31 16 0		0 1 6	31 14 6
Public Wharfs Office	,,		,,	3 7 2			3 7 2
Public Service Board	Repairs, &c		,,	26 2 5		6 1 9	20 0 8
Roads and Bridges Branch	,,		,,	26 4 1		14 17 10	11 6 3
Railway Department	,,		,,	8 10 9		1 0 0	7 10 9
Registrar-General's Office	,,		,,	194 4 1		88 13 11	105 10 2
Supreme Court	Additions, &c	Loans	1894		11,295 19 5	6,549 11 9	
,,	Repairs, &c	Con. Rev.	1895	1,129 3 7		52 14 3	1,076 9 4
Stamp Duties Office	Repairs		,,	38 7 9		38 7 9	
South Sydney Morgue	,,		,,	29 15 0		29 15 0	
Treasury Department	Additions	Loans	1896		152 17 9	152 17 9	
,,	Repairs, &c.	Con. Rev.	1895	61 14 9		34 13 5	27 1 4
University	,,		,,	539 19 3		539 19 3	
,,	Lighting Lamps, &c		,,	138 15 0		138 15 0	
Water Police Court	Repairs, &c.		,,	15 9 0		11 1 6	4 7 6
William street Post and Telegraph Office	Repairs		,,	70 1 6		70 1 6	
SUBURBS.							
ANNANDALE							
Post and Telegraph Office	Erection	Loans	1895	1,793 1 2		1,543 1 2	
,, ,,	Furnitur		,,	34 10 8			34 10 8
BILOELA							
Gaol	Additions	Con Rev.	,,	518 10 1		518 10 1	
,,	Repairs, &c.		,,	56 17 2		49 8 8	7 8 6
BALMAIN.							
Post and Telegraph Office	Repairs		,,	16 14 0		16 14 0	
Court house	,,		,,	3 7 6		3 7 6	
BALMAIN WEST.							
Post and Telegraph Office	Erection	Loans.	1894	2,400 13 6		58 12 10	
,, ,,	Land		1895	2,217 15 5		2,217 15 5	
CAMPERDOWN.							
Post and Telegraph Office	Erection		,,	1,104 9 1		1,104 9 1	
,, ,,	Repairs, &c		,,	24 18 8			24 18 8
COAST HOSPITAL	,,	Con. Rev.	,,	424 12 7		406 5 1	18 7 6
CALLAN PARK.							
Hospital for Insane	Additions & Repairs		,,		1,615 13 0	1,615 13 0	
,, ,,	Furniture		,,	287 13 10			287 13 10
ENMORE							
Post and Telegraph Office	Erection	Loan & Rev	,,	1,181 7 1		861 7 1	
,, ,,	Furniture	Con Rev	,,	32 7 6			32 7 6
FIVEDOCK.							
Post and Telegraph Office	Erection	Loans	1896		580 0 0	580 0 0	
GLADESVILLE							
Hospital for Insane	Additions		1895		215 0 0	215 0 0	
,,	Repairs, &c		,,	424 17 7		418 11 7	6 6 0
GLEBE ISLAND.							
Abbatoirs	Furniture	Con. Rev.	,,	2 5 4			2 5 4
GLEBE							
Post and Telegraph Office	Repairs		,,	94 15 8		94 15 8	
Police Station	,,		,,	35 15 7		35 15 7	
Court house	Repairs, &c		,,	60 7 0		48 7 1	11 19 11
HOMEBUSH.							
Post and Telegraph Office	Erection	Loans	,,	1,384 5 9		1,359 13 3	
,, ,,	Furniture	Con. Rev	,,	31 5 1			31 5 1
KOGARAH							
Lock up	Erection	Loan	,,	1,631 13 6		1,133 2 8	
,,	Repairs	Con. Rev	,,	12 10 0		12 10 0	
MARRICKVILLE.							
Lock up	Erection	Loans	,,	2,369 2 4		2,369 2 4	
MANLY BEACH.							
Post and Telegraph Office	Land	Con Rev	,,	538 17 7		538 17 7	
NEWTOWN.							
Court-house	Repairs, &c		,,	119 16 1		99 10 0	20 6 1
Police Station	Repairs		,,	11 12 0		11 12 0	
NEWINGTON.							
Asylum	,,	Con. Rev	,,	85 6 6		85 6 6	
PADDINGTON.							
Court house	Repairs, &c		,,	6 12 10		4 1 0	2 11 10
PARRAMATTA.							
Gaol	Repairs		,,	1,088 18 1		1,077 14 7	10 3 6
Hospital for Insane	,,		,,	427 7 10		427 7 10	
Court-house	Erection	Loans	,,		9,097 13 2	9,097 13 2	
Post and Telegraph Office	Additions	,,	,,		610 0 0	610 0 0	
,, ,,	Land		,,	1 15 0		1 15 0	
Benevolent Asylum (George-street)	Repairs	Con. Rev.	,,	41 11 0		41 11 0	
,, (Macquarie street)	,,		,,	4 10 0		4 10 0	
Cottage Homes	,,		,,	3 11 8		3 11 8	
PARRAMATTA NORTH.							
Post and Telegraph Office	Erection	Loans	,,	823 17 9		823 17 9	
,, ,,	Land		,,	158 15 3		158 15 3	
,, ,,	Furniture	Con Rev	,,	37 11 0			37 11 0

Return of Expenditure on Public Works, &c.—*continued.*

Work, and where situated.	Whether Constructing or under Repair	Fund from which the Expense is defrayed.	When Commenced.	If Finished, actual amount of Expenditure.	If Unfinished, amount of Expenditure to 30th June, 1896.	Amount expended from 1st July, 1895, to 30th June, 1896.	Furniture.
SUBURBS—*continued.*				£ s. d.	£ s. d.	£ s. d.	£ s. d.
Randwick.							
Post and Telegraph Office	Land	Con. Rev.	1895	82 17 4		82 17 4	
Lock up	Repairs		,,	16 0 6		16 0 6	
Rookwood							
Benevolent Asylum	Repairs, &c.		,,	111 14 4		111 14 4	
,, ,,	Additions	Loans	,,	2,418 1 2		2,418 1 2	
Police Station	Repairs	Con. Rev	,,	12 0 0		12 0 0	
Rockdale.							
Lock-up	Erection	Loans	,,	1,516 5 8		1,494 4 2	
,,	Repairs	Con. Rev.	,,	7 5 0		7 5 0	
Redfern.							
Court-house	Erection	Loans	,,		6 6 0	6 6 0	
Rydalmere.							
Hospital for Insane	Erection and additions.	Loans and Con. Rev	,,		4,034 9 9	4,034 9 9	
,, ,,	Repairs	Con. Rev	,,	67 9 7		67 9 7	
Surry Hills.							
Lock-up	Erection	Loans	,,		2,998 13 11	2,998 13 11	
Stanmore.							
Police Station	Repairs	Con. Rev	,,	30 0 0		30 0 0	
Sydney North.							
Post Office	Additions	Loans	,,	1,403 9 8		1,403 9 8	
,,	Land	Loans	,,	641 7 2		641 7 2	
,,	Furniture	Con. Rev.	,,	23 13 6			23 13 6
Court-house	Repairs	Con. Rev.	,,	3 15 0		3 15 0	
St. Peters							
Post and Telegraph Office	Erection	Loans	,,	1,038 13 4		538 13 4	
,, ,,	Land		,,	0 7 6		0 7 6	
,, ,,	Furniture		,,	35 18 11			35 18 11
Woolloomooloo.		Con.					
Police Station	Repairs	Rev.	,,	2 2 6		2 2 6	
Watson's Bay.							
Health Office	Furniture		,,	0 12 0			0 12 0
COUNTRY.							
Albury.							
Post and Telegraph Office	Repairs, &c		,,	240 6 8		235 0 8	5 6 0
Gaol	,,		,,	21 0 8		15 18 10	5 1 10
,,	Additions		,,	88 0 0		88 0 0	
Court-house	Repairs		,,	10 5 0		10 5 0	
Armidale							
Post and Telegraph Office	,,		,,	8 6 0		8 6 0	
Roads Office	,,		,,	0 18 0		0 18 0	
Gaol	,,		,,	19 3 8		19 3 8	
Court house	,,	Con	,,	15 0 0		15 0 0	
Lock-up	Additions	Rev.	,,	104 6 0		104 6 0	
,,	Repairs		,,	3 0 0		3 0 0	
Police Station and Officers' Quarters	,,		,,	23 11 6		23 11 6	
Lands Office	,,		,,	14 14 0		14 14 0	
Clerk of Works' Office	Repairs, &c.		,,	20 17 5		20 17 5	
Adelong.							
Post and Telegraph Office	Repairs		,,	128 10 8		1 8 10 8	
Adaminaby							
Court-house	,,		,,	4 13 10		4 13 10	
Albion Park							
Post and Telegraph Office	Erection	Loans	,,	341 10 0		341 10 0	
Aberdeen.							
Police Buildings	Repairs	Con. Rev.	,,	44 17 6		44 17 6	
Adamstown							
Post and Telegraph Office	Repairs, &c		,,	34 7 6		2 0 0	32 7 6
,, ,,	Erection	Loans	,,	1,158 17 10		1,158 17 10	
Alectown.							
Lock-up	Repairs		,,	58 0 0		58 0 0	
Police Quarters	Additions		,,	42 15 0		42 15 0	
Bathurst.							
Gaol	Repairs, &c		,,	933 1 8		922 7 6	10 14 2
Court-house	,,		,,	40 8 9		34 12 6	5 16 3
Post Office	,,		,,	151 2 6		136 7 6	14 15 0
Clerk of Works' Office	,,		,,	5 14 0		5 14 0	
Experimental Farm	Furniture		,,	4 15 6			4 15 6
Police Barracks	Repairs, &c.	Con Rev.	,,	15 3 9		7 10 0	7 13 9
Bombala							
Lock-up	Repairs		,,	1 10 0		1 10 0	
Bourke.							
Gaol	Repairs, &c		,,	33 7 0		13 13 3	19 13 9
Court-house	,,		,,	17 18 6		15 18 0	2 0 6
Post and Telegraph Office	Repairs		,,	244 8 0		244 8 0	
Broken Hill							
Gaol	Additions		,,		395 18 7	395 18 7	
Court-house	Repairs, &c.		,,	16 4 10		5 8 6	10 16 4
Police Barracks	Erection	Loans	,,		805 0 0	805 0 0	
,,	Furniture		,,	5 9 6			5 9 6
Braidwood							
Police Station	Repairs		,,	5 0 0		5 0 0	
Lock up Gaol	Additions		,,	76 0 0		76 0 0	
Berrima.							
Gaol	Repairs		,,	162 13 7		162 13 7	
,,	Additions		,,	151 12 6		151 12 6	
Balranald.							
Court-house	Repairs		,,	1 10 0		1 10 0	
Lock up	,,		,,	1 19 0		1 19 0	
,,	Additions		,,	31 7 6		31 7 6	
Bingara.		Con.					
Post and Telegraph Office	,,	Rev	,,		377 19 0	377 19 0	
Court house	Repairs		,,	0 9 0		0 9 0	
Police Barracks	Additions		,,	52 4 6		52 4 6	
,,	Repairs		,,	1 8 0		1 8 0	
Lock-up Gaol	Additions		,,	17 18 6		17 18 6	
Brewarrina.							
Post and Telegraph Office	Repairs		,,	2 0 0		2 0 0	
Court house	,,		,,	148 10 0		148 10 0	
Bega							
Court house	,,		,,	2 17 9		2 17 9	
Post and Telegraph Office	Additions		,,	345 15 0		345 15 0	
Ballina.							
Post and Telegraph Office	Repairs		,,	15 0 0		15 0 0	
Bowral.							
Court-house	Erection	Loans	,,	1,527 1 6		1,527 1 6	
Broadwater.							
Police Station	,,	Loan and Con. Rev.	,,	1,071 6 2		812 11 2	
,,	Repairs	Con Rev.	,,	7 7 6		7 7 6	

Return of Expenditure on Public Works, &c.—*continued.*

Work, and where situated	Whether Constructing or under Repair	Fund from which the Expense is defrayed	When Commenced	If Finished, actual amount of Expenditure	If Unfinished, amount of Expenditure to 30th June, 1896	Amount expended from 1st July 1895 to 30th June, 1896	Furniture
COUNTRY—*continued*				£ s d	£ s d	£ s d	£ s d
BARRABA							
Police Station	Erection	Loans	1895	992 7 9		992 7 9	
"	Repairs	Con Rev	"	4 12 6		4 12 6	
BERRIGAN							
Police Station			"	86 19 0		86 19 0	
Court house	Alterations	Con Rev	"	217 10 9		217 10 9	
"	Furniture		"	29 1 5			29 1 5
BURROWA							
Post and Telegraph Office	Repairs	Con Rev	"	1 10 0		1 10 0	
BRUSHGROVE							
Post and Telegraph Office	Erection	Loans	"	394 10 0		394 10 0	
BARMEDMAN							
Court house	"	Con Rev	"		196 0 0	196 0 0	
BYRON BAY							
Police Station	Repairs	Con Rev	"	2 5 0		2 5 0	
BERRY							
Lock up	Erection	Loans	"	1,789 14 1		1,789 14 1	
Court house	Repairs	Con Rev	"	2 0 0		2 0 0	
BATEMANS BAY							
Post and Telegraph Office	Erection	Loans	"	301 15 0		301 15 0	
BUNGENDORE							
Post and Telegraph Office	"	Loans	"		300 0 0	300 0 0	
" "	Land	Loans	"	85 0 0		85 0 0	
BYEROCK							
Post and Telegraph Office	Repairs	Con Rev	"	127 5 6		127 5 6	
BOGGABRI							
Court house	"	Con Rev	"		52 18 4	52 18 4	
"	Furniture	Con Rev	"	5 10 5			5 10 5
BURRAGA							
Court house	"	Con Rev	"	6 16 3			6 16 3
BARADINE							
Police Station	Repairs	Con Rev	"	2 1 3		2 1 3	
BRUSH FARM							
Reformatory	"	Con Rev	"	51 15 9		51 15 9	
BOGGABILLA							
Court house	Erection	Loans	"		315 10 0	315 10 0	
BENDEMEER							
Court house	Repairs	Con Rev	"	4 11 5		4 11 5	
BINALONG							
Post and Telegraph Office	"	Con Rev	"	1 8 7		1 8 7	
BOAT HARBOUR							
Court house	Additions	Con Rev	"		425 0 0	425 0 0	
BOOLIGAL							
Court house	Repairs &c	Con Rev	"	20 2 6		16 7 10	3 14 8
Police Station	Repairs	Con Rev	"	4 14 8		4 14 8	
BERRIDALE							
Police Station	Additions	Con Rev	"	35 0 0		35 0 0	
COONAMBLE							
Lock up	Repairs	Con Rev	"	11 1 10		11 1 10	
Police Station	"	Con Rev	"	1 6 7		1 6 7	
Court-house	Repairs, &c	Con Rev	"	62 7 7		1 5 0	61 2 7
COROWA							
Police quarters and stables	Erection	Loans	1893	2 680 2 3		315 6 0	
Court house	Repairs	Con Rev	1895	3 15 0		3 15 0	
Custom House	Erection	Loans and Revenue	"	780 9 0		780 9 0	
COOMA							
Court house	Repairs	Con Rev	"	1 2 6		1 2 6	
Police Station	"	Con Rev	"	2 14 0		2 14 0	
Lands Office	Alterations	Loans	"	599 5 0		599 5 0	
Gaol	Repairs	Con Rev	"	0 16 9		0 16 9	
COOTAMUNDRA							
Court house	Erection and additions	Loans and Con Rev	"	825 10 3		586 12 3	
"	Furniture	Con Rev	"	6 10 6			6 10 6
Post and Telegraph Office	Repairs	Con Rev	"	0 16 0		0 16 0	
COONABARABRAN							
Court and Watch house	"	Con Rev	"	57 6 0		57 6 0	
Police Station		Con Rev	"	46 5 0		46 5 0	
Lock up Gaol	Additions	Con Rev	"		22 0 0	22 0 0	
COWRA							
Court house	Repairs	Con Rev	"	14 5 0		14 5 0	
Lock up	"	Con Rev	"	41 5 0		41 5 0	
Post and Telegraph Office	"	Con Rev	"	11 10 0		11 10 0	
CASINO							
Court house	Repairs, &c	Con Rev	"	226 6 9		221 18 3	4 18 6
Police Station	"	Con Rev	"	143 4 10		139 12 4	3 12 6
COBAR							
Lock up Gaol	Repairs	Con Rev	"	54 10 0		54 10 0	
Court house	"	Con Rev	"		75 0 0	75 0 0	
Police Station	Additions	Con Rev	"	62 5 0		62 5 0	
CLARE							
Police Station	Repairs	Con Rev	"	35 0 0		35 0 0	
CARCOAR							
Post and Telegraph Office	"	Con Rev	"	44 12 8		44 12 8	
CARRATHOOL							
Police Buildings	"	Con Rev	"	11 8 0		11 8 0	
CONDOBOLIN							
Court house	"	Con Rev	"	3 0 0		3 0 0	
Post and Telegraph Office	"	Con Rev	"	71 12 6		71 12 6	
CARROLL							
Police Station	"	Con Rev	"	2 12 10		2 12 10	
COOLAH							
Post and Telegraph Office	"	Con Rev	"	47 15 0		47 15 0	
Court house	Furniture	Con Rev	"	9 2 2			9 2 2
CAL LAL (TAREENA)							
Police Station	Additions	Con Rev	"	44 12 6		44 12 6	
COPPLAND							
Post and Telegraph Office	Repairs	Con Rev	"	38 0 0		38 0 0	
CUNDLETOWN							
Police Station	"	Con Rev	"	4 0 0		4 0 0	
Post Office	"	Con Rev	"	5 0 0		5 0 0	
CAMDEN HAVEN							
Police Station	"	Con Rev	"	13 11 7		13 11 7	
CORAKI							
Police Station	"	Con Rev	"	8 15 0		8 15 0	
CUDGELLICO							
Police Station	Additions	Con Rev	"	27 7 6		27 7 6	
COBBORA							
Court house and Police Station	Repairs, &c	Con Rev	"	93 12 1		79 17 0	13 15 1
CROOKWELL							
Court house	Repairs	Con Rev	1895	9 15 0		9 15 0	
Police Buildings	Alterations	Con Rev	"	811 2 6		811 2 6	

Return of Expenditure on Public Works, &c.—*continued.*

Work, and where situated	Whether Constructing or under Repair	Fund from which the Expense is defrayed	When Commenced	If Finished, actual amount of Expenditure	If Unfinished, amount of Expenditure to 30th June, 1896	Amount expended from 1st July, 1895, to 30th June, 1896	Furniture.
COUNTRY—*continued*				£ s d	£ s d	£ s d	£ s d
COLLARENDABRI							
Court-house	Furniture		1895	4 7 5			4 7 5
CUDAL							
Court house	,,		,,	4 10 7			4 10 7
COOPERNOOK							
Court house	,,		,,	9 0 3			9 0 3
CARRINGTON							
Police Station	Repairs		,,	3 5 0		3 5 0	
DENILIQUIN							
Police Station	Repairs, &c		,,	121 0 1		114 17 6	6 2 7
Gaol	Repairs		,,		83 6 11	83 6 11	
,,	Furniture	Con	,,	1 16 8			1 16 8
Court-house	,,	Rev	,,	8 0 0			8 0 0
Post and Telegraph Office	Repairs		,,	0 15 0		0 15 0	
Lands Office	,,		,,	6 7 6		6 7 6	
North Lock up	,,		,,	4 5 0		4 5 0	
South Lock up	,,		,,	9 15 0		9 15 0	
DUBBO							
Gaol	Additions		,,		808 11 6	808 11 6	
,,	Repairs		,,	13 7 11		13 7 11	
Court house	Additions		,,	49 14 6		49 14 6	
,,	Repairs		,,	166 5 6		166 5 6	
Police Station	,,		,,	2 12 0		2 12 0	
Post and Telegraph Office	,,		,,	13 0 0		13 0 0	
Lands Office	Erection	Loans	,,		3,381 2 1	3,381 2 1	
,,	Furniture		,,	1 11 7			1 11 7
DANDALOO							
Court house	Repairs, &c	Con Rev	,,	18 13 4		4 15 0	13 18 4
DUNGOG							
Post and Telegraph Office	Repairs		,,	77 19 0		77 19 0	
DRAKE							
Court house and Lock up	Erection	Loans	,,		597 5 0	597 5 0	
DAPTO							
Police Station	Repairs		,,	14 0 0		14 0 0	
EDEN							
Post and Telegraph Office	,,	Con Rev	,,	49 0 11		49 0 11	
EMMAVILLE							
Post and Telegraph Office	,,		,,	82 4 6		82 4 6	
ENNGONIA							
Post and Telegraph Office	Furniture		,,	32 0 11			32 0 11
,, ,,	Erection	Loans	,	707 5 0		707 5 0	
EULOURIE							
Police Buildings	Repairs	Con Rev	,,	49 9 6		49 9 6	
EUGOWRA							
Police Station	,,		,,	47 5 0		47 5 0	
FERNMOUNT							
Police Buildings	Erection	Loans	,,		770 15 8	770 15 8	
FOSTER							
Police Station	Repairs		,	8 0 0		8 0 0	
FORBES							
Court house	Furniture		,,	25 4 9			25 4 9
Survey Office	,		,,	1 10 10			1 10 10
Post and Telegraph Office	Repairs &c		,,		150 0 0	150 0 0	
,, ,,	Repairs		,,	9 9 0		9 9 0	
Gaol	Repairs, &c	Con Rev	,,	9 3 0		4 15 11	4 7 1
GOULBURN							
Gaol	Repairs		,,	589 9 11		589 9 11	
Court house	,,		,,	70 1 0		70 1 0	
Post and Telegraph Office	Repairs, &c		,,	4 16 0		4 16 0	
Police Barracks	,,		,,	34 5 11		27 12 6	6 13 5
Clerk of Works Office	,		,,	11 14 4		11 14 4	
Land and Survey Office	Repairs		,	21 0 1		21 0 1	
,, ,,	Additions	Loans	1894	761 3 6		308 13 6	
GRAFTON							
Gaol	Repairs, &c	Con	1895	135 7 8		126 16 0	8 11 8
Police Barracks	Repairs	Rev	,,	110 1 6		110 1 6	
Lands Office	Erection, &c	Loans	,,	1,367 0 0		1,367 0 0	
Custom House	Repairs	Con	,,	15 13 0		15 13 0	
Clerk of Works Office	Repairs, &c	Rev	,,	9 2 8		8 10 8	0 12 0
GRAFTON SOUTH		Con					
Police Barracks	Erection	Rev & Loans	1894	850 14 10		53 14 10	
GUNDAGAI							
Court house	Repairs		1895	12 17 6		12 17 6	
GUNNEDAH							
Court house	Repairs, &c		,,	30 14 6		0 4 0	30 10 6
Lock up	,,		,,	6 10 10		5 19 9	0 11 1
Police Barracks	Repairs		,,	34 10 0		34 10 0	
GUNNING		Con Rev					
Post and Telegraph Office	,,		,,	10 0 0		10 0 0	
GRENFELL							
Lock up	Furniture		,,	1 8 7			1 8 7
GOODOOGA							
Police Station	Repairs		,,	4 12 0		4 12 0	
GLEN INNES							
Post and Telegraph Office	Erection	Loans	,,		1,368 14 3	1,368 14 3	
Court house	Furniture		,,	0 16 4			0 16 4
Lock up and Police Station	Additions	Con	,,	57 15 6		57 15 6	
Gaol	Repairs	Rev	,,	34 4 9		34 4 9	
Clerk of Works Office	Repairs, &c		,,	0 10 6		0 10 6	
GRETA							
Court house	Erection	Loans	,,		973 0 0	973 0 0	
Lock up	Repairs		,,	27 10 0		27 10 0	
GUYRA							
Court house	Repairs, &c		,,	138 7 9		126 16 5	11 11 4
GRESFORD							
Court house	Furniture		,,	1 5 0			1 5 0
GUY FAWKES							
Police Station	Erection	Con Rev	,,	682 6 0		166 6 0	
GERMANTON							
Police Station	Repairs		,,	6 10 0		6 10 0	
GLADSTONE							
Police Buildings	,,		,,	3 10 0		3 10 0	
Court house	,,		,,	39 15 0		39 15 0	
GUNDAROO							
Court house	,,		,,	119 0 0		119 0 0	
Police Station	,,		,,	63 3 6		63 3 6	
HAY							
Land and Survey Office	Erection	Loans	,,		1,490 14 3	1,490 14 3	
Post and Telegraph Office	Repairs	Con Rev	,,	1 15 6		1 15 6	
Court house	Additions	Loans	,,	138 11 6		138 11 6	
,,	Repairs, &c	Con	,,	11 7 1		5 0 1	6 7 0
Police Barracks	Repairs	Rev.	,,	19 15 6		19 15 6	
Gaol	,, ...		,,	49 1 4		49 1 4	

RETURN OF EXPENDITURE ON PUBLIC WORKS, &c.—*continued.*

Work, and where situated	Whether Constructing or under Repair	Fund from which the Expense is defrayed	When Commenced	If Finished, actual amount of Expenditure	If Unfinished, amount of Expenditure to 30th June, 1896	Amount expended from 1st July, 1895, to 30th June, 1896	Furniture.
COUNTRY—*continued*				£ s d	£ s d	£ s d	£ s d.
HINTON							
Police Buildings	Repairs		1895	2 5 0	. .	2 5 0	.. ....
HILLGROVE							
Police Station and Quarters	,,		,,	17 0 0		17 0 0	. .....
HELENSBURGH							
Court house and Police Station	Furniture		,,	13 5 0			13 5 0
HARDEN							
Post and Telegraph Office	Repairs		,,	5 0 0	.	5 0 0	.
HOWLONG							
Court house	Furniture		,,	2 11 6			2 11 6
HILLSTON							
Police Station	Additions		,,		288 0 0	288 0 0	
,,	Repairs		,,	4 12 6		4 12 6	.
Court house	Furniture	Con Rev	,,	3 16 10			3 16 10
INVERELL							
Post and Telegraph Office	Repairs		,,	2 0 0		2 0 0	.
Court house	Repairs, &c		,,	61 15 11		19 10 0	42 5 11
Police Barracks	,,		,,	9 16 4		8 8 0	1 8 4
JERILDERIE							
Lock up	Repairs		,,	49 18 0		49 18 0	.
JUNEE							
Police Station	,,		,,	3 4 1		3 4 1	. .
JUGIONG							
Court and Watch house	,,		,,	4 5 0		4 5 0	. .
JINDABYNE							
Court house	Repairs, &c		,,	2 8 0		2 0 0	0 8 0
Police Station	Repairs		,,	1 6 10		1 6 10	. . .
JINDERA							
Police Station	Erection	Loans	,,		568 0 0	568 0 0	.
KIAMA							
Post and Telegraph Office	Repairs	Con Rev	,,	138 16 0		138 16 0	.
KELSO							
Lock up	Erection	Loans	,,	1,132 8 0		342 8 0	
KEMPSEY							
Post and Telegraph Office	Repairs	Con	,,	12 0 0		12 0 0	
Police Station	,,	Rev	,,	1 11 9		1 11 9	
KENMORE							
Hospital for Insane	Erection		1894	18,030 10 2		386 13 9	
, ,,	,,	Loans	1895	906 16 2		906 16 2	
, ,,	,,		,,		22,505 4 2	22,505 4 2	
,, ,			,		466 17 6	466 17 6	
,, ,,	Repairs, &c	Loans and Con Rev	,,	438 10 9		438 10 9	
, ,,	Furniture	Con Rev	,,	25 0 3			25 0 3
KATOOMBA							
Court house	Repairs &c		,,	4 7 6		1 4 0	3 3 6
,,	Erection	Loans	,,	2,219 10 10		1,190 0 7	
KERAMINGBY							
Police Station	Repairs		,,	32 17 5		32 17 5	
LIVERPOOL							
Benevolent Asylum	,,		,,	87 2 3		87 2 3	
Post and Telegraph Office	,,		,,	5 15 0		5 15 0	.
Court house	,,	Con Rev	,,	32 9 2		32 9 2	
LISMORE							
Post and Telegraph Office	,,		,,	26 19 0		26 19 0	
LAMBTON							
Court house	Furniture		,,	8 17 0		.	8 17 0
LAWRENCE							
Police Station	Repairs		,,	7 12 6		7 12 6	
Post and Telegraph Office	Erection	Loans	,,		150 0 0	150 0 0	
LITHGOW							
Court house	Additions, &c	Loans and Con Rev	,,	836 3 10		836 3 10	
,,	Furniture	Con Rev	,,	13 9 5			13 9 5
Post and Telegraph Office	Land	Loans	,,	20 12 9		20 12 9	
LEADVILLE							
Court house	Repairs		,	6 16 3		6 16 3	
LAKE MACQUARIE		Con					
Fishery Inspector's Office	,,	Rev	,,	3 1 0		3 1 0	
MAITLAND							
Gaol	Repairs, &c		,	709 19 6		696 14 8	13 4 10
,	Additions	Loans	1894	2,182 11 11		915 6 2	
Police Station	Repairs, &c		1895	22 18 0		19 2 6	3 15 6
MAITLAND EAST		Con					
Court house	Repairs	Rev	,,	50 15 9		50 15 9	
Post and Telegraph Office	,,		,,	76 17 6		76 17 6	
Lands Office	Erection	Loans	,,		1,808 0 0	1,808 0 0	
MAITLAND WEST							
Court house	,,	Loans and Con Rev	1894		7,946 3 2	7,667 2 8	
,,	Repairs		1895	0 6 0		0 6 0	
Post and Telegraph Office	Additions		,,		70 0 0	70 0 0	
,, ,,	Repairs		,,	190 5 0		190 5 0	
,, ,,	Land		,,	0 7 6		0 7 6	
MUDGEE							
Gaol	Repairs &c		,,	6 2 2		2 8 6	3 13 8
Post and Telegraph Office	Repairs		,,	86 0 0		86 0 0	
Court house	Additions		,,		105 0 0	105 0 0	
,,	Repairs &c	Con	,,	124 12 0		99 1 3	25 10 9
Police Station	Additions	Rev	,,	154 5 0		154 5 0	
,	Repairs		,,	38 12 0		38 12 0	
MUSWELLBROOK							
Court house	,,		,,	13 9 0		13 9 0	
Police Station	,,		,,	1 17 6		1 17 6	
Post and Telegraph Office	,,		,,	116 12 0		116 12 0	
MOREE							
Court house	Repairs, &c		,,	5 18 11		5 11 0	0 7 11
Police Station	Repairs			13 12 0		13 12 0	
Post and Telegraph Office	Erection	Loans and Con Rev	1896		741 15 7	741 15 7	
Gaol	Repairs	Con Rev	1895	5 11 6		5 11 6	.
MILPARINKA							
Police Station	,,		,,	10 18 6		10 18 6	
Court house	Erection	Loans	,,		124 0 0	124 0 0	
MOSS VALE							
Post and Telegraph Office	Repairs	Con	,,	27 7 0		27 7 0	
Court house	,,	Rev	,,		46 12 6	46 12 6	
MURRUMBURRAH							
Police Station	Additions	Loans	1896		172 7 2	172 7 2	
MENINDIE							
Police Station and Lock up	Repairs	Con	1895	5 0 0	.	5 0 0	
MERRIWA		Rev			25 0 0	25 0 0	
Post and Telegraph Office	,,		,,				
Court and Watch house	,,		,	33 0 4		33 0 4	

Return of Expenditure on Public Works, &c.—*continued.*

Work, and where situated.	Whether Constructing or under Repair.	Fund from which the Expense is defrayed.	When Commenced.	If Finished; actual amount of Expenditure.	If Unfinished, amount of Expenditure to 30th June, 1896.	Amount expended from 1st July, 1895, to 30th June, 1896.	Furniture.
COUNTRY—*continued.*				£ s. d.	£ s. d.	£ s. d.	£ s. d.
MORPETH.							
Lock-up	Repairs	Con. Rev.	1895	7 13 6	.....	7 13 6	.....
Court-house	,,		,,	13 12 6	.....	13 12 6	.....
MURRURUNDI.							
Gaol	,,		,,	17 15 0	.....	17 15 0	.....
MOAMA.							
Police Station	,,		,,	4 0 0	.....	4 0 0	.....
Court-house	,,		,,	5 7 6	.....	5 7 6	.....
Lock-up	,,		,,	2 10 0	.....	2 10 0	.....
Post and Telegraph Office	,,		,,	89 11 7	.....	89 11 7	.....
Forester's Office	,,		,,	30 8 0	.....	30 8 0	.....
MACLEAN.							
Lock-up	Erection	Loans	,,	.....	1,652 1 0	1,652 1 0	.....
Post and Telegraph Office	Repairs	Con. Rev.	,,	13 5 0	.....	13 5 0	.....
MACKSVILLE.							
Court and Watch-house	,,		,,	9 15 0	.....	9 15 0	.....
MURWILLUMBAH.							
Court-house	Additions		,,	.....	114 0 0	114 0 0	.....
MORUYA.							
Police Station	Erection	Loans and Con. Rev.	,,	1,361 13 8	.....	1,361 13 8	.....
MOUNT VICTORIA.							
Post and Telegraph Office	,,	Loans.	,,	.....	179 0 0	179 0 0	.....
MILTON.							
Court-house	,,		,,	.....	1,253 11 1	1,216 6 8	37 4 5
,,	Land		,,	50 0 0	.....	50 0 0	.....
Post and Telegraph Office	Additions		,,	354 17 6	.....	354 17 6	.....
MOLONG.							
Post and Telegraph Office	,,	Con. Rev.	,,	59 15 0	.....	59 15 0	.....
MOULAMEIN.							
Police Quarters	Furniture		,,	3 0 0	.....	.....	3 0 0
MAJOR'S CREEK							
Police Station	Repairs		,,	15 0 0	.....	15 0 0	.....
MINMI.							
Post and Telegraph Office	Land	Loans.	,,	9 4 8	.....	9 4 8	.....
,, ,,	Erection		,,	.....	179 14 2	179 14 2	.....
Lock-up	Additions	Con. Rev.	,,	380 10 10	.....	380 10 10	.....
MILTHORPE.							
Post and Telegraph Office	Erection	Loans	,,	456 0 0	.....	456 0 0	.....
MUNGINDI.							
Police Station	Repairs	Con. Rev.	,,	8 12 0	.....	8 12 0	.....
MITTAGONG.							
Court-house	,,		,,	2 15 0	.....	2 15 0	.....
MILLTOWN.							
Lock-up	,,		,,	42 7 6	.....	42 7 6	.....
MATHOWRA.							
Court-house and Lock-up	,,		,,	1 15 3	.....	1 15 3	.....
,, ,,	Erection	Loans	,,	999 0 0	.....	999 0 0	.....
MOSSGIEL.							
Police Station	Repairs		,,	1 12 8	.....	1 12 8	.....
MOGIL MOGIL.							
Police Station	,,		,,	36 15 0	.....	36 15 0	.....
MARULAN.							
Post and Telegraph Office	Alterations		,,	224 7 6	.....	224 7 6	.....
MULBRING.							
Police Station	Repairs		,,	.....	50 0 0	50 0 0	.....
MORANGARELL							
Police Buildings	,,		,,	36 0 0	.....	36 0 0	.....
MOUNT HOPE.							
Police Station	,,		,,	53 14 6	.....	53 14 6	.....
MUNDOORAN.							
Police Station and Lock-up	,,		,,	73 12 2	.....	73 12 2	.....
NEWCASTLE.							
Asylum for Imbeciles	Additions & Repairs		,,	.....	251 10 4	251 10 4	.....
Court-house	Repairs	Con. Rev.	,,	15 15 1	.....	15 15 1	.....
Clerk of Works' Office	Repairs, &c.		,,	51 13 11	.....	51 13 11	.....
Police Barracks	,,		,,	23 18 0	.....	22 0 0	1 18 0
Custom House	Repairs		,,	20 18 0	.....	20 18 0	.....
Boatmen's Houses	,,		,,	36 5 0	.....	36 5 0	.....
Examiner of Coal-fields	Repairs, &c.		,,	0 12 10	.....	0 3 0	0 9 10
Lock-up and Gaol	Repairs		,,	180 9 9	.....	178 1 2	2 8 7
Morgue	,,		,,	6 4 0	.....	6 4 0	.....
NARRANDERA.							
Court-house	Furniture		,,	3 9 4	.....	.....	3 9 4
Police Station	Repairs		,,	162 6 0	.....	162 6 0	.....
NARRABRI.							
Gaol	,,		,,	183 2 8	.....	183 2 8	.....
Court-house	,,		,,	.....	187 15 0	187 15 0	.....
Post and Telegraph Office	,,		,,	307 17 6	.....	307 17 6	.....
NOWRA.							
Court-house	,,		,,	2 12 8	.....	2 12 8	.....
,,	Erection	Loans	,,	3,743 1 5	.....	2,804 16 10	.....
Lock-up	Repairs	Con. Rev.	,,	4 17 6	.....	4 17 6	.....
NYNGAN.							
Court-house	Additions	Loans	,,	9 0 0	.....	9 0 0	.....
,,	Furniture		,,	0 10 0	.....	.....	0 10 0
NUNDLE.							
Lock-up	Repairs, &c.		,,	23 17 6	.....	23 9 3	0 8 3
NYMAGEE.							
Post and Telegraph Office	Repairs		,,	81 10 6	.....	81 10 6	.....
NARROMINE.							
Police Station	Repairs, &c.		,,	57 9 10	.....	15 10 0	41 19 10
NERRIGUNDAH.							
Lock-up	Repairs		,,	12 0 0	.....	12 0 0	.....
NAROOMA.							
Court-house	Repairs, &c.	Con. Rev.	,,	3 6 0	.....	.....	3 6 0
Police Station	,,		,,	40 12 6	.....	40 12 6	.....
ORANGE.							
Gaol	,,		,,	4 1 9	.....	4 1 9	.....
Police Station	,,		,,	1 4 0	.....	1 4 0	.....
OBERON.							
Court-house	,,		,,	76 0 0	.....	76 0 0	.....
PENRITH.							
Court-house	,,		,,	57 0 0	.....	57 0 0	.....
Lock-up	Furniture		,,	4 17 8	.....	.....	4 17 8
,,	Erection	Con. Rev. & Loans.	,,	1,332 0 3	.....	832 0 3	.....
Post and Telegraph Office	Repairs, &c.		,,	41 19 5	.....	34 0 0	7 19 5
PICTON.							
Court-house	Repairs	Con. Rev.	,,	34 15 0	.....	34 15 0	.....
PORT MACQUARIE.							
Court-house	,,		,,	3 0 0	.....	3 0 0	.....
Police Station	,,		,,	44 19 6	.....	44 19 6	.....
Gaol	,,		,,	2 4 1	.....	2 4 1	.....

Return of Expenditure on Public Works, &c.—*continued.*

Work, and where situated.	Whether Constructing or under Repair.	Fund from which the Expense is defrayed.	When Commenced.	If Finished, actual amount of Expenditure.	If Unfinished, amount of Expenditure to 30th June, 1896.	Amount expended from 1st July, 1895, to 30th June, 1896.	Furniture.
COUNTRY—*continued.*				£ s. d.	£ s. d	£ s. d.	£ s. d.
PILLIGA.							
Post and Telegraph Office	Repairs		1895	50 0 0		50 0 0	
PARKES.							
Post and Telegraph Office	Furniture		,,	12 17 1			12 17 1
Court house	Repairs		,,	2 10 0		2 10 0	
,,	Erection		,,		840 0 0	840 0 0	
Police Station	Repairs	Con.	,,	34 3 6		34 3 6	
PATERSON							
Court house	,,	Rev.	,,	17 15 0		17 15 0	
PLATTSBURG							
Post and Telegraph Office	,,		,,	49 15 0		49 15 0	
PALMER'S ISLAND.							
Police Station	,,		,,	9 3 7		9 3 7	
PAMBULA							
Police Station	,,		,,	7 0 0		7 0 0	
Court house	Additions	Loans and Con. Rev	,,	601 14 0		329 14 0	
QUIRINDI							
Court house	Repairs, &c.		,,	145 10 6		140 0 0	5 10 6
QUEANBEYAN.							
Court house	Repairs		,,	7 10 0		7 10 0	
Post and Telegraph Office	,,		,,	40 13 3		40 13 3	
Gaol	,,		,,	2 15 9		2 15 9	
RICHMOND		Con.					
Agricultural College	Repairs, &c.	Rev.	,,	2 2 0		0 7 0	1 15 0
Post and Telegraph Office	,,		,,	67 1 0		67 1 0	
RAYMOND TERRACE							
Court-house	Repairs		,,	4 15 0		4 15 0	
Post and Telegraph Office	Additions		,,		95 0 0	95 0 0	
RYLSTONE.							
Lock-up	Erection	Loans and Con Rev	,,		1,473 13 0	1,183 13 0	
Post and Telegraph Office	Repairs		,,	133 11 0		113 11 0	
ROBERTSON.		Con					
Court and Watch house	,,	Rev	,,	13 9 6		9 0 0	4 9 6
Post and Telegraph Office	Furniture		,,	16 13 5			16 13 5
,, ,,	Erection	Loans	,,		885 0 0	885 0 0	
SHAFTSBURY							
Reformatory	Repairs	Con	,,	12 6 0		12 6 0	
SINGLETON		Rev.					
Lock-up	,,		,,	0 15 0		0 15 0	
,,	Erection	Loans	,,		691 0 0	691 0 0	
Court-house	Repairs, &c	Con.	,,	2 3 11		12 0	1 11 11
SCONE		Rev.					
Post and Telegraph Office	Repairs		,,	10 0 0		10 0 0	
SOLALA							
Lock up	Erection	Loans	,,		80 0 0	80 0 0	
Court house	Repairs		,,	78 10 0		78 10 0	
ST MARY'S							
Lock up	,,		,,	1 5 0		1 5 0	
SWANSEA							
Court house	Repairs, &c.		,,	228 2 5		191 8 0	36 14 5
SUNNY CORNER							
Court house	Furniture		,,	3 2 9			3 2 9
,,	Additions		,,		154 3 6	154 3 6	
Post and Telegraph Office	Repairs		,,		85 12 6	85 12 6	
SMITHFIELD							
Police Station	Alterations	Con	,,	137 2 9		137 2 9	
SWAMP OAK		Rev.					
Police Buildings	Additions		,,	28 15 0		28 15 0	
TAMWORTH							
Lands Office	Furniture		,,	1 17 10			1 17 10
Police Station	Repairs, &c.		,,	25 3 2		18 2 4	7 0 10
,,	Additions		,,	198 4 6		198 4 6	
Court house	Repairs		,,	1 4 3		1 4 3	
Gaol	Repairs, &c.		,,	8 9 11		4 17 7	3 12 4
TENTERFIELD							
Police Station	,,		,,	4 15 0		4 15 0	
Court-house	,,		,,	48 0 0		48 0 0	
TUMUT							
Lock-up	Erection	Loans	,,		1,173 0 0	1,173 0 0	
Post and Telegraph Office	Repairs		,,	183 6 8		94 11 0	8 15 8
Police Station	,,		,,	71 6 2		71 6 2	
Court-house	,,		,,	0 7 0		0 7 0	
TEMORA							
Court-house	,,		,,	1 5 0		1 5 0	
Police Buildings	,,		,,	13 3 4		3 5 0	9 18 4
,,	Alterations	Con.	,,	809 17 0		809 17 0	
TINGHA.		Rev.					
Police Buildings	Repairs		,,	4 7 6		4 7 6	
Court house	Furniture		,,	0 13 9			0 13 9
TUMBERUMBAH							
Court house	Repairs		,,	42 6 0		42 6 0	
TAREE							
Lock up Gaol	,,		,,	9 6 0		9 6 0	
TWEED RIVER HEADS (COOLOON).							
Police Station	Erection	Loans	,,		546 6 6	546 6 6	
TERRAWINGEE.							
Police Station	Repairs		,,	3 12 6		3 12 6	
TRANGIE							
Court-house	Furniture		,,	3 11 4			3 11 4
TARCUTTA.							
Police Station	Repairs		,,	5 13 0		5 13 0	
TARBAR SPRINGS		Con					
Police Station	,,	Rev.	,,	8 0 0		8 0 0	
TEA GARDENS							
Police Station	Repairs, &c.		,,	8 14 2		4 10 0	4 4
THE ROCKS							
Police Station	Repairs		,,	7 3 11		7 3 11	
TARAGO							
Police Station and Lock-up	Erection	Loans	,,	1,336 7 10		1,336 7 10	
TARALGA							
Police Station	Repairs		,,	10 0 0		10 0 0	
TRUNKEY.							
Court house	,,		,,	6 14 0		6 14 0	
ULLADULLA							
Post and Telegraph Office	,,		,,		61 15 10	61 15 10	
URALLA		Con.					
Police Station	,,	Rev.	,,	43 5 0		43 5 0	
Post and Telegraph Office	,,		,,	0 5 6		0 5 6	
URANA.							
Post and Telegraph Office	,,		,,	121 15 0		121 15 0	
Court-house	,,		,,	20 6 0		20 6 0	

Return of Expenditure on Public Works, &c.—*continued.*

Work, and where situated.	Whether Constructing or under Repair.	Fund from which the Expense is defrayed.	When Commenced.	If Finished, actual amount of Expenditure.	If Unfinished, amount of Expenditure to 30th June, 1896.	Amount expended from 1st July, 1895, to 30th June, 1896	Furniture.
COUNTRY—*continued.*				£ s. d.	£ s. d.	£ s d.	£ s. d
WOLLONGONG							
Court house ..	Repairs, &c .		1895	20 2 6	. ..	19 7 0	0 15 6
Police Station	Furniture .		,,	0 10 4	. .	.	0 10 4
Post and Telegraph Office	Repairs		,,	19 0 0	.. . .	19 0 0	..... .
WARIALDA							
Court-house .	,, ...		,,	2 2 0	. .	2 2 0	... .
Police Station	,, .	Con.	,,	3 2 6	. .	3 2 6	. . .
Lock-up .	,,	Rev.	,,	46 5 2	. .	46 5 2	.
WINGHAM.							
Post and Telegraph Office	,, .		,,	77 13 9	. .	77 13 9	..... .
Police Station ...	,, .		,,	2 10 0	. ..	2 10 0	. .. .
WAGGA WAGGA							
Gaol	Repairs, &c. . .		,,	3 16 6	..	2 18 3	0 18 3
,,	Additions .		,,		45 0 0	45 0 0	.
Post and Telegraph Office	Repairs, &c.		,,	44 17 4	.. ..	17 2 6	27 14 10
,, ,, . .	Additions ..	Loans .	,,	770 8 5	.. .	770 8 5	.. .
Court house .	Repairs . .		,,	.	85 0 0	85 0 0	.
,, .	Furniture		,,	10 19 0	. .	.	10 19 0
Land and Survey Office	Repairs, &c.		,,	53 4 4	. .	52 6 10	0 17 6
Lock up	Repairs		,,	5 10 6	. .	5 10 6	.. .
Police Station . .	Repairs, &c.	Con. Rev.	,,	9 9 2	. .	4 15 2	4 14 0
Police Buildings .	,,		,,	19 8 6	. .	19 4 0	0 4 6
Experimental Farm .	Furniture		,,	0 14 6	. .	.	0 14 6
WILCANNIA							
Lock up Gaol	Repairs, &c.		,,	62 3 9		62 3 9	.. .
,, ,,	Additions	Loans .	1894	..	1,029 5 3	520 16 3	. .
Court house .	Repairs .		1895	64 12 0	.	64 12 0	.
Police Station	Repairs, &c.		,,	23 18 8	.	11 13 0	12 5 8
Clerk of Works' Office .	Repairs		,,	0 15 0	.	0 15 0	.. . ..
WALGETT							
Post and Telegraph Office							
Gaol	,, .		,,	8 16 7	. .	8 16 7	. .
Public Buildings .	,,		,,	11 2 0		11 2 0	.
WELLINGTON	Additions .		,,	. ..	1,196 0 0	1,196 0 0	.
Post and Telegraph Office							
Gaol	,, ...		,,	.	110 0 0	110 0 0	. . .
Court house .	Repairs		,,	1 4 6	. .	1 4 6	..
WENTWORTH	Repairs, &c .		,,	70 0 5	. .	21 0 0	49 0 5
Court-house .		Con.					
Gaol	,, . .	Rev.	,,	21 17 10	. . .	18 9 6	3 8 4
WEE WAA	Repairs		,,	30 14 10	.	30 14 10	. .
Police Station .							
WARATAH	,, ...		,,	2 13 6	. .	2 13 6	..... .
Court and Watch-house	Furniture		,,	8 13 9	. .	. .	8 13 9
WALCHA							
Court-house	Repairs, &c.		,,	12 11 10	.	7 10 0	5 1 10
Post and Telegraph Office	Repairs		,,	150 10 0		150 10 0	...
WARREN							
Police Station .	,, .		,,	0 10 0	.	0 10 0	.. .
WOLLAR							
Police Station	,,		,,	71 10 0	.	71 10 0	. .
WISEMAN'S FERRY							
Post and Telegraph Office ..	Land .	Loans	,,	50 0 0	. .	50 0 0	.
WYALONG							
Court house	Repairs		,,	80 5 5		69 14 6	10 10 11
Mining Office	Additions		,,	282 10 0		282 10 0	.
WILSON'S DOWNFALL							
Court house	Repairs		,,	7 13 2	.	7 13 2	. .
Police Station	Erection		,,	232 0 0		232 0 0	
WERRIS CREEK							
Lock-up	Repairs .		,,	6 14 4		6 14 4	... .
WICKHAM							
Post and Telegraph Office	,, .	Con. Rev.	,,	13 15 0		13 15 0	
WYNDHAM							
Court house	Furniture		,,	25 0 5			25 0 5
WINDEYER							
Police Station	Repairs		,,	26 15 0	.	26 15 0	.
WARDELL							
Court house	Furniture .		,,	4 0 8	.		4 0 8
WALLSEND							
Court-house	Repairs, &c		,,	35 11 0	.	2 10 0	33 1 0
Lock-up .	Repairs		,,	3 9 0		3 9 0	
WOODBURN SOUTH							
Post and Telegraph Office . . .	Erection . .	Loans	,,	446 0 0	. .	446 0 0	...
WYAGDON							
Police Station	Additions .. .		,,	. .	119 2 0	119 2 0	. . .. .
WALLENDBEEN							
Police Station	Repairs . .		,,	6 0 0	. ..	6 0 0	....
WOOLGOOLGA							
Police Station	,, . ..		,,	7 3 8	. ..	7 3 8	.....
YASS.		Con. Rev.					
Gaol . . .	,, .		,,	1 0 0	. .	1 0 0	. .. ...
Post and Telegraph Office	,, ..		,,	18 16 0	..	18 16 0	. .....
Court House	,, . ..		,,	.	124 0 0	124 0 0	.....
YANTABULLA.							
Court-house . .	,, .		,,	0 16 6	... ..	0 16 6	.....
YOUNG							
Gaol . . .	Additions .	Loan	,,		129 0 0	129 0 0	....
,,	Repairs		,,	303 14 11	. . ....	303 14 11	. .....
Court house	,,		,,	298 11 3	. . . .	298 11 3	.
Police Station .	,, .		,,	50 19 0	.	50 19 0	
Post and Telegraph Office	,,		,,	1 5 0	. .	1 5 0	... . .
Advertising							
Ballot-boxes	. ...		,,	6 18 6	.. .	6 18 6	.. ....
Expenses in connection with reception of Governor Hampden			,,	11 0 6	. .	11 0 6	. .....
Fuel and Light		Con. Rev	,,	196 7 6	. .	196 7 6	.....
Gratuity to Widow of A U Telfer			,,	1,748 8 6	. .. .	1,748 8 6	.....
Incidental and unforseen expenses			,,	450 0 0	. ..	450 0 0	.....
Lighting Government Lamps			,,	225 18 9	.	225 18 9	.. ..
Public Buildings generally			,,	1,016 18 3	. .	1,016 18 3	. . .
,, Travelling expenses, &c. .			,,	7,778 0 7	. .	7,778 0 7	. ...
Photographs of Public Buildings			,,	470 17 2	. . ..	470 17 2	. . . ..
Winding Government Clocks	.. ..		,,	247 10 5	.	247 10 5	... .. .
			,,	60 11 10	. . . .	60 11 10	. .
				150,767 8 6	111,918 5 9	201,668 12 3	5,512 8 10

Summary of Expenditure—

	£ s d.
Loans	141,672 13 10
Revenue	65,508 7 3
Total.....	£207,181 1 1

Land Valuation.

(XVIII.)

REPORT OF THE LAND VALUER.

Department of Public Works, Valuation Branch, Sydney, 31 August, 1896.

I HAVE the honor to furnish a return relating to services under this Branch for the year ending 30th June, 1896.

During that period the following claims, valuations, and estimates were made:—

1. Claims for land resumed for Railway and Tramway purposes...	£14,158	5	0
Other purposes	42,627	6	6
Total	£56,785	11	6
2. Valuations of resumptions for Railway and Tramway purposes	£5,167	6	9
Other purposes	8,752	13	6
Total	£13,920	0	3
3. Estimates of Value of proposed Resumptions	£127,490	0	0

It may be pointed out that, in addition to the ordinary work of the Branch, the draftsmen have been engaged in compiling, for the Railway Commissioners, copies of the Working Plans of all Lines of Railways, as verified by the deeds.

A great quantity of information in connection with lands resumed out of grants, &c., involving much time, has also been supplied to the Land Tax Commissioners.

J. B. THOMPSON,
Government Land Valuer.

The Under Secretary and Commissioner for Roads.

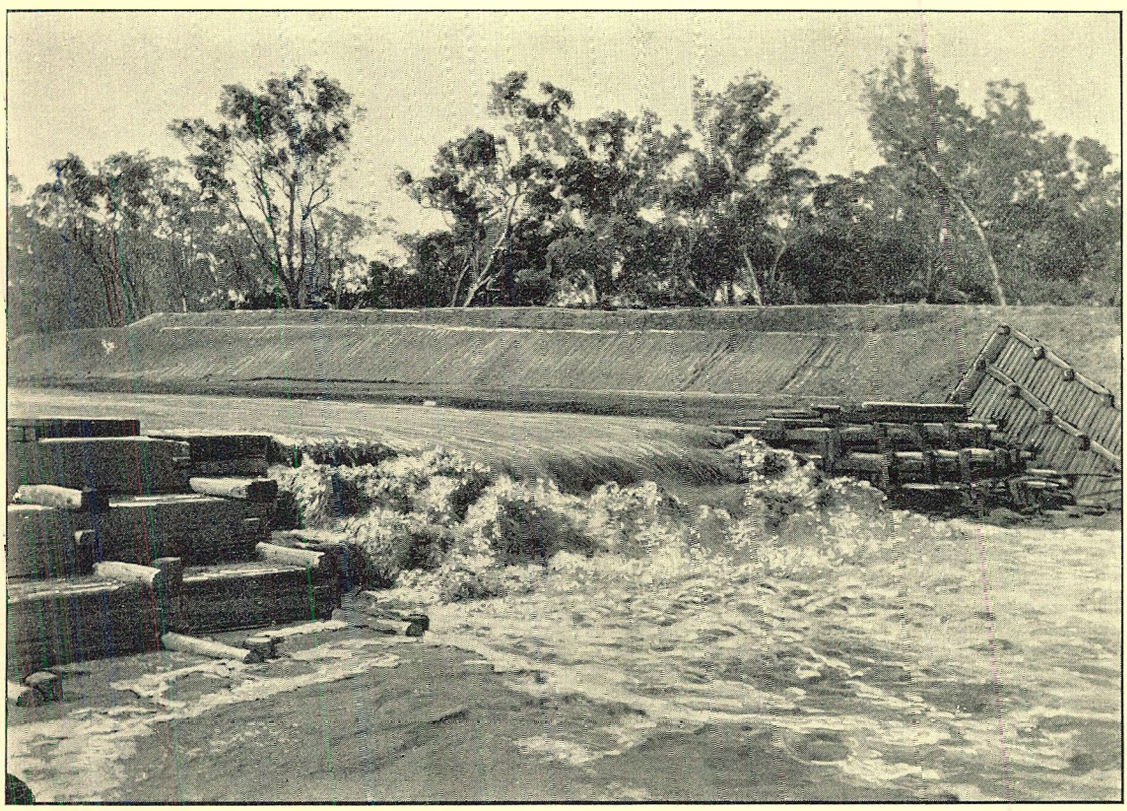
Sydney: William Applegate Gullick, Government Printer.—1897.



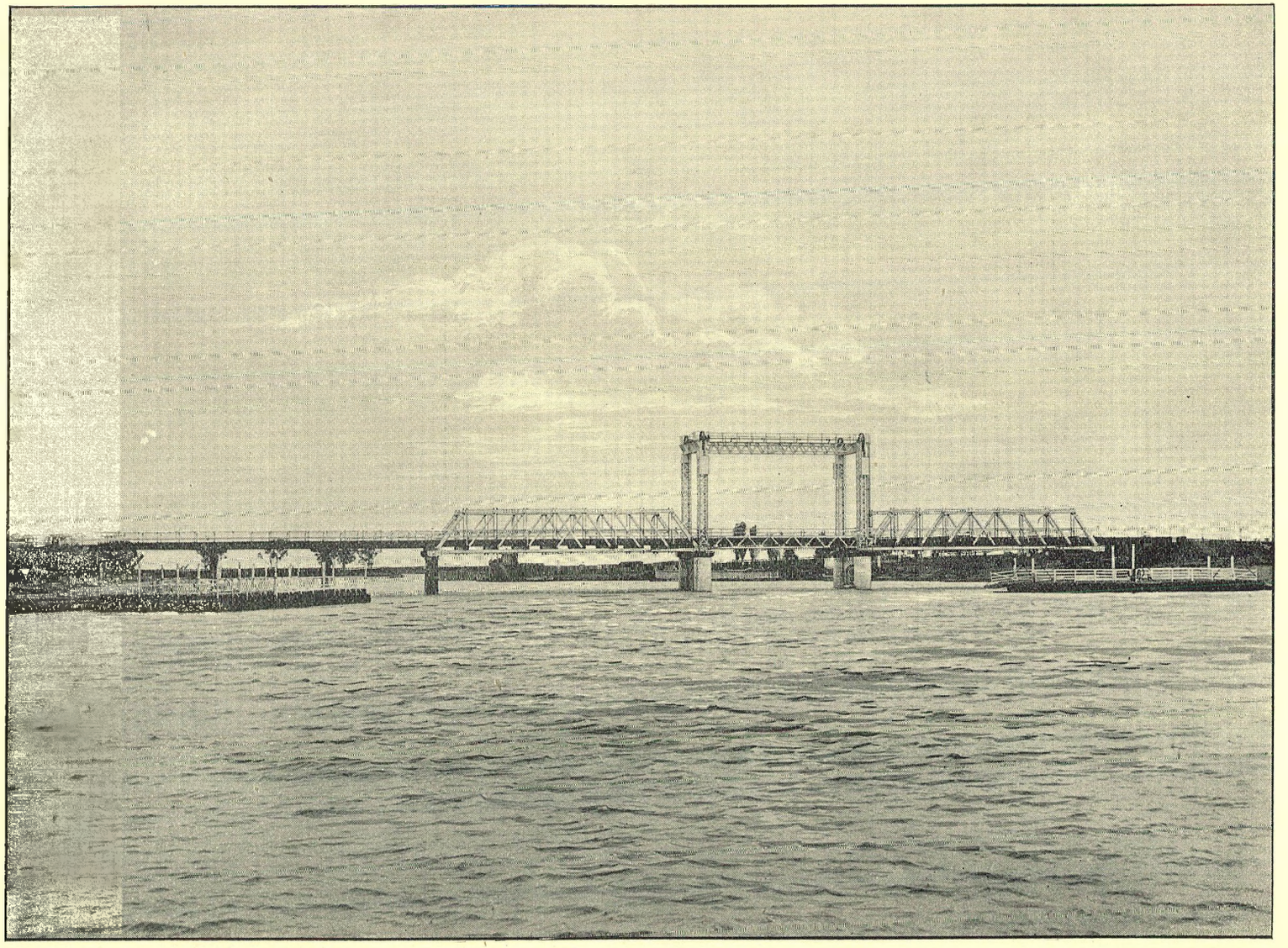
JUNEE WATER SUPPLY—STORAGE RESERVOIR AT BETHUNGRA.



WARREN WEIR, SHOWING PILES DRIVEN AND LOWER CRIBS COMPLETED, AND OTHER CRIBS IN COURSE OF CONSTRUCTION.



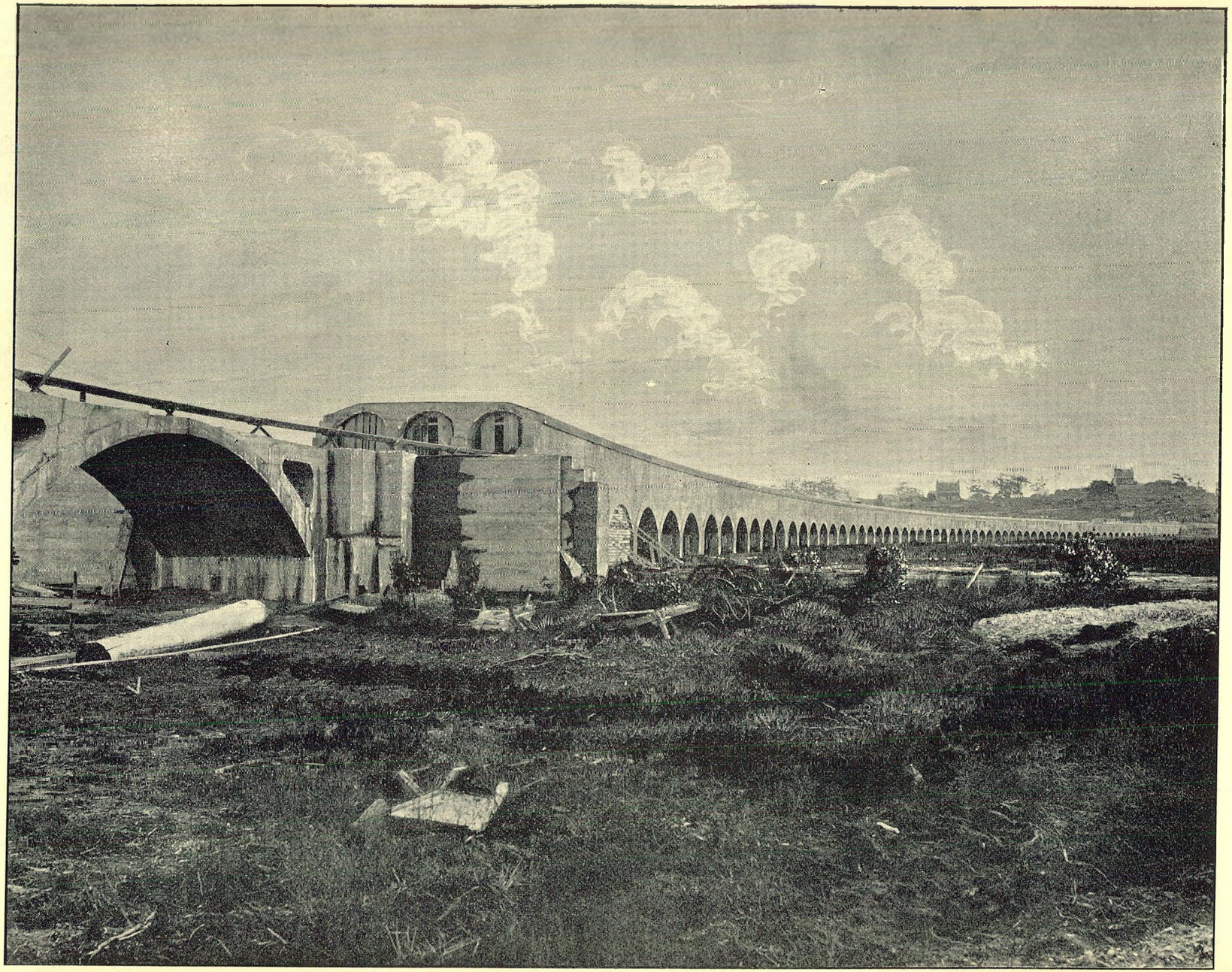
WARREN WEIR, WITH A SUMMER FLOW OF WATER PASSING OVER IT.



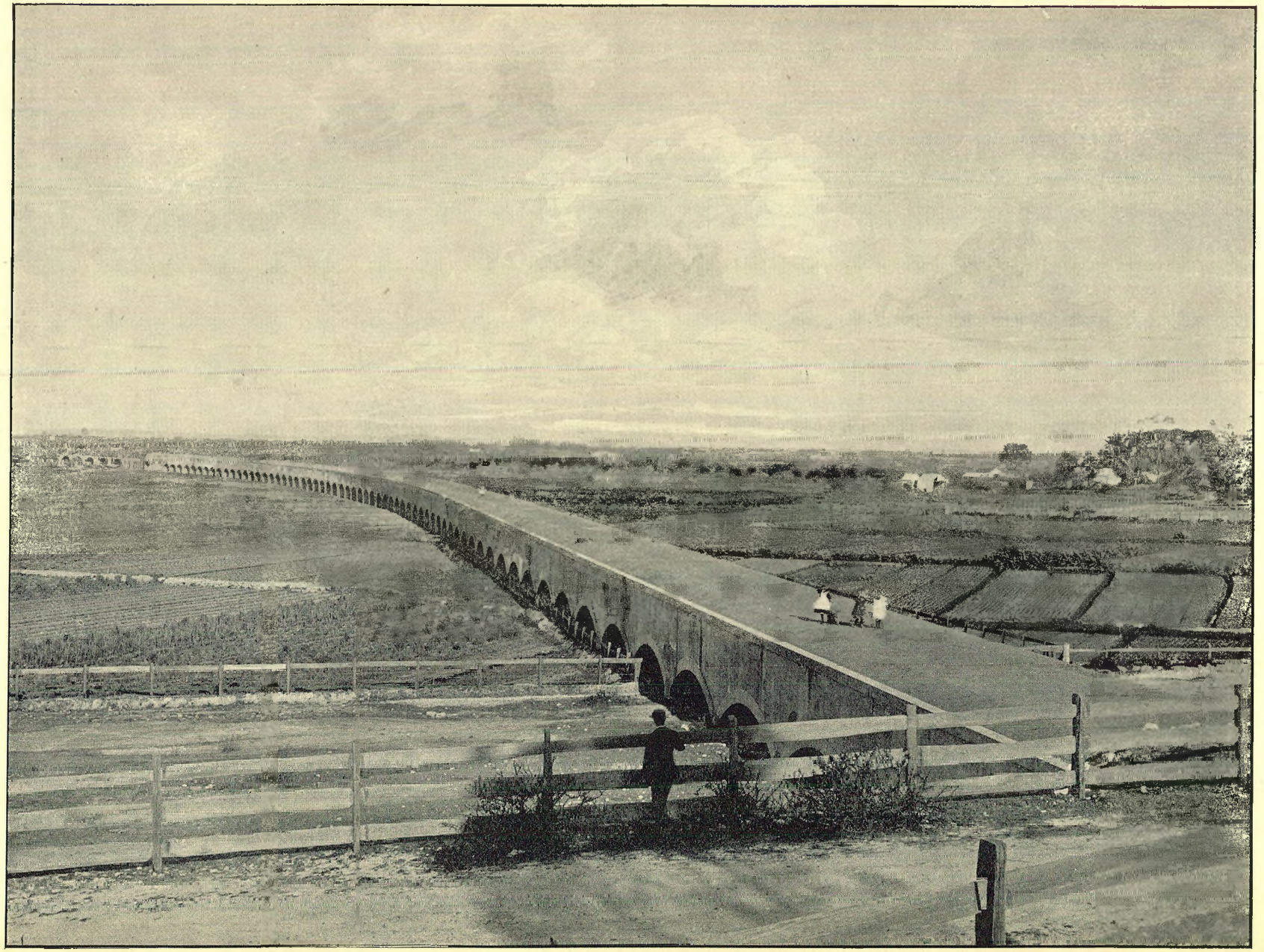
SWAN HILL BRIDGE.



SWAN HILL BRIDGE.



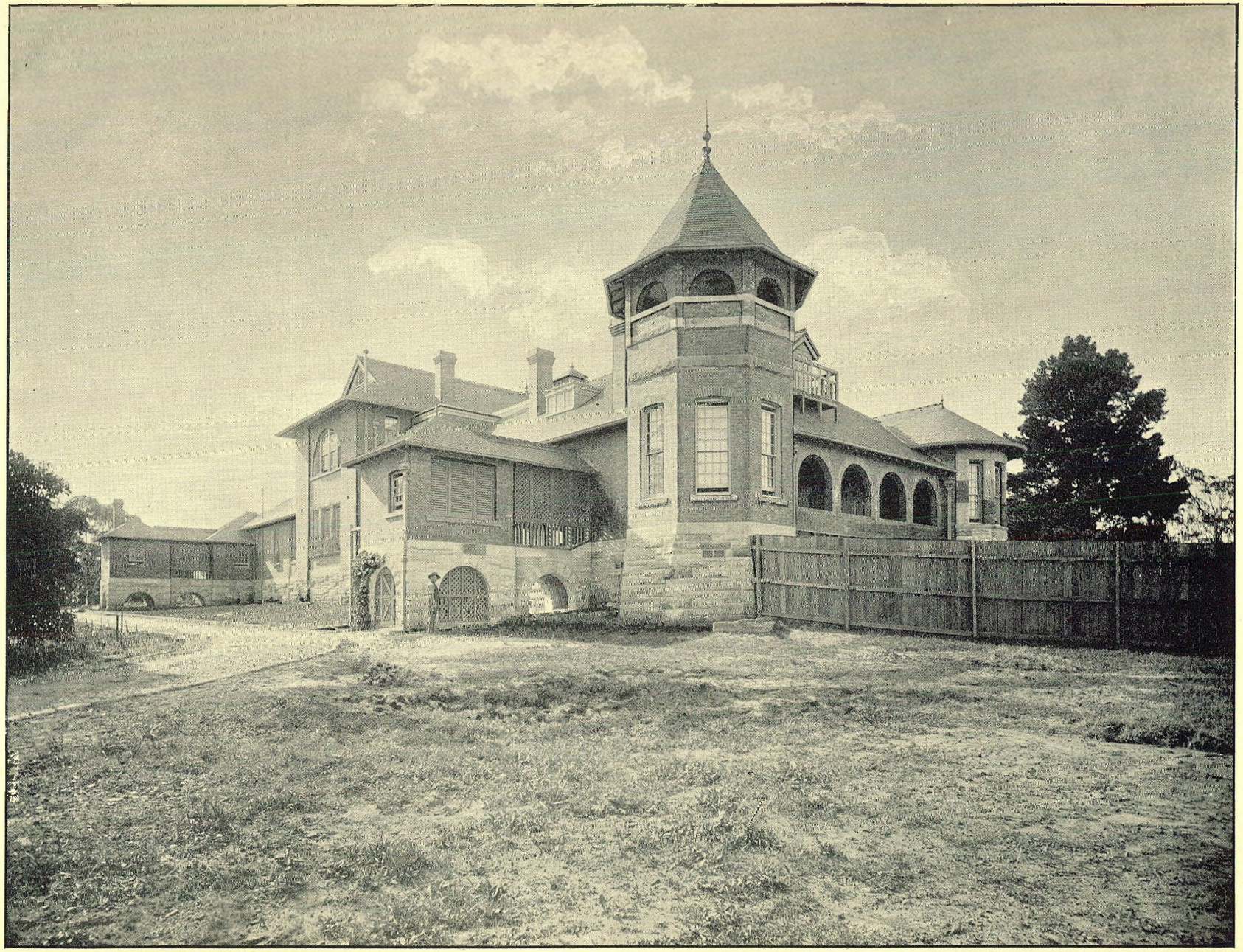
WESTERN SUBURBS SEWERAGE—OUTFALL SEWER ACROSS SEWAGE FARM, ARNCLIFFE.



WESTERN SUBURBS SEWERAGE—OUTFALL SEWER ACROSS SEWAGE FARM, ARNCLIFFE.



BALMAIN POST AND TELEGRAPH OFFICE.



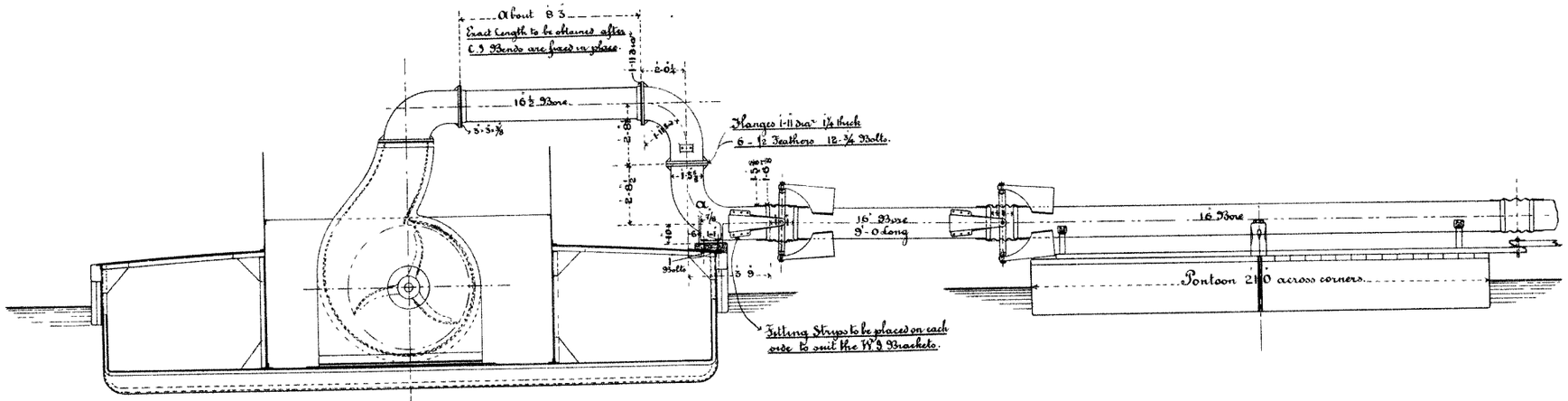
GLADESVILLE HOSPITAL FOR INSANE--CONVALESCENT WARD FOR WOMEN.



ROOKWOOD ASYLUM FOR INFIRM AND DESTITUTE—NEW DORMITORIES.

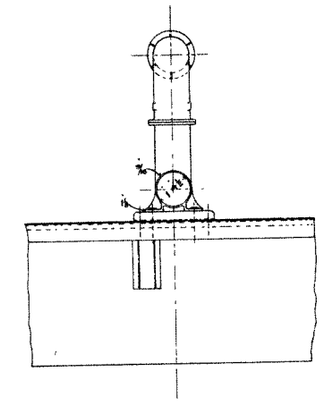
Grab Dredge "Tau". Conversion into a Pump Dredge.

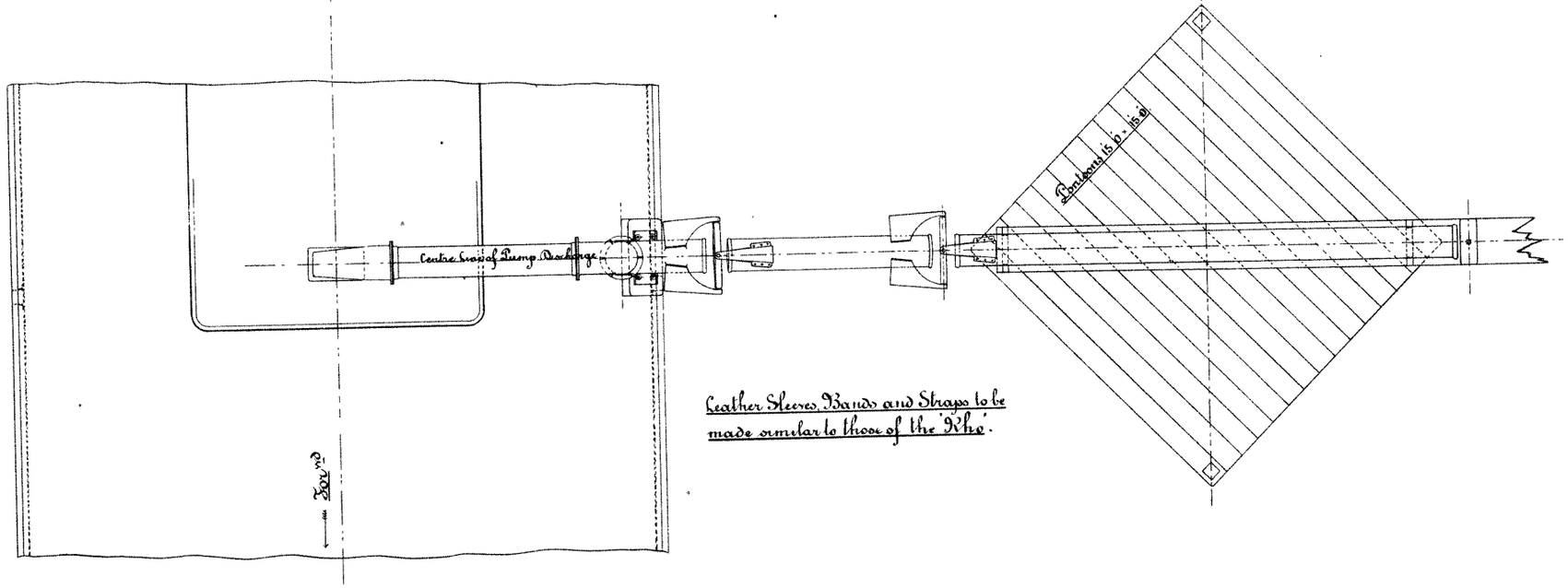
Discharge Pipes from Pump to side of Dredger, etc.



Section looking Aft.

Note The C.I. Bend a, to be securely fastened to the side of Dredge.





Leather Sleeves, Bands and Straps to be made similar to those of the 'Rhe'.

Plan.

PHOTO-LITHOGRAPHED AT THE GOVT. PRINTING OFFICE, SYDNEY, NEW SOUTH WALES

GRAB DREDGE "THETA". LENGTHENING & CONVERSION INTO A PUMP DREDGE.

SCALE ⅜ INCH TO ONE FOOT

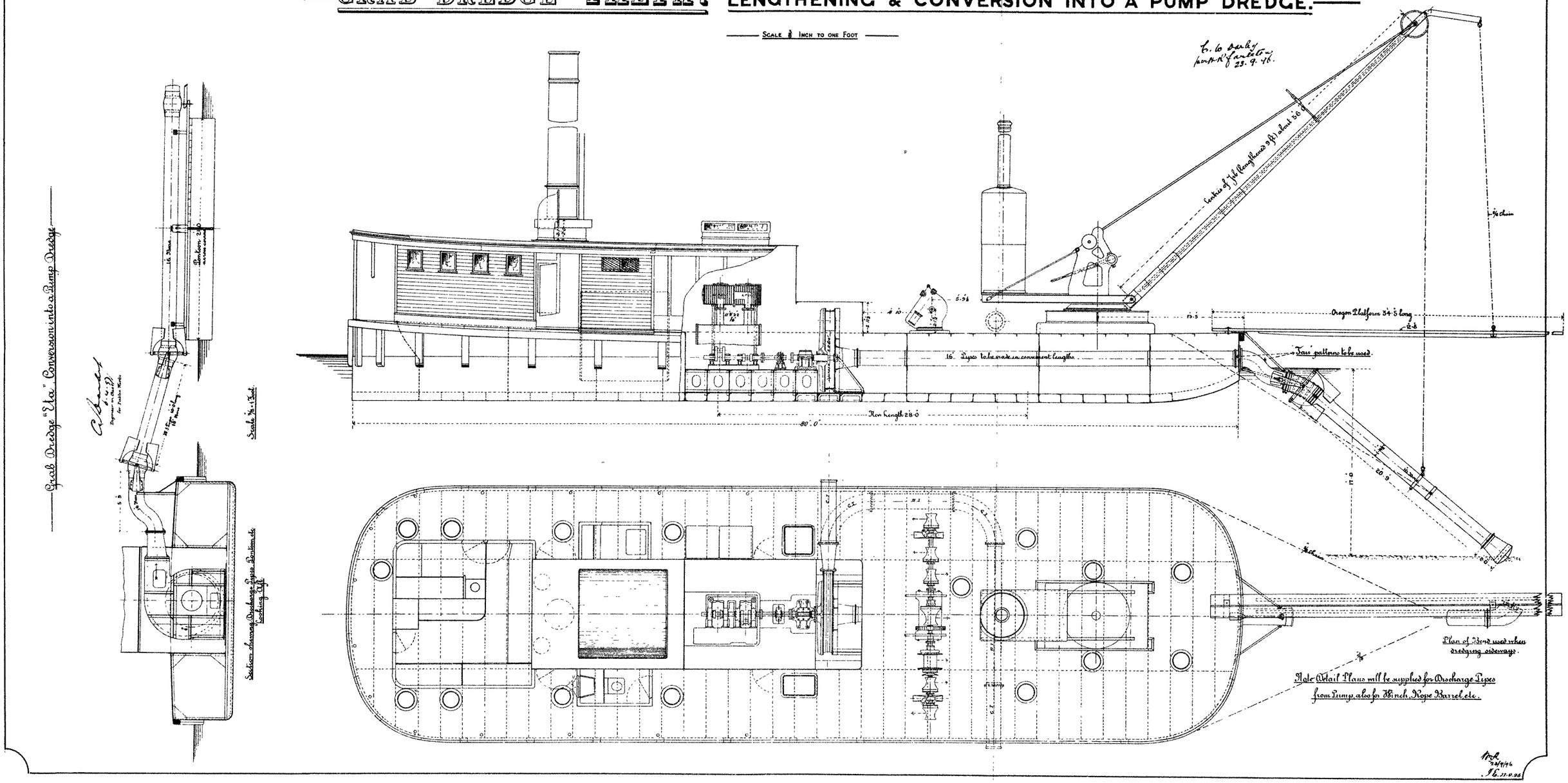


PHOTO-LITHOGRAPHED AT THE GOVT. PRINTING OFFICE, SYDNEY, NEW SOUTH WALES.

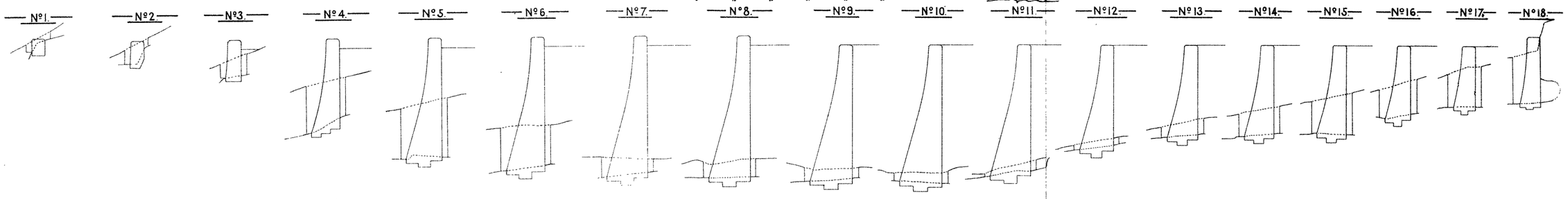
CONTRACT No. 3.

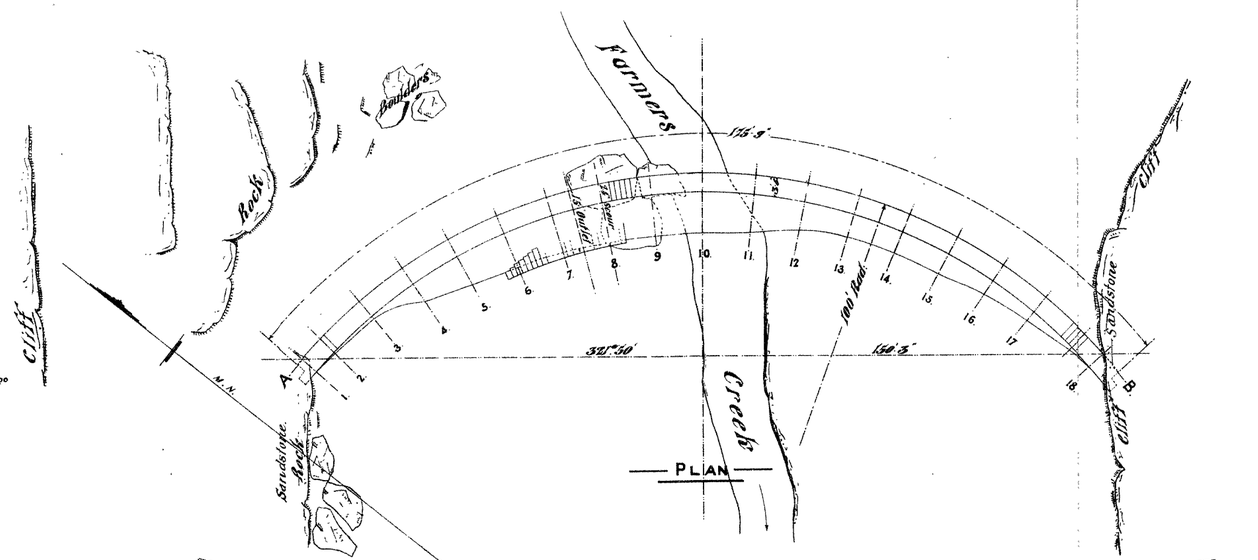
LITHGOW WATER SUPPLY

STORAGE RESERVOIR DAM

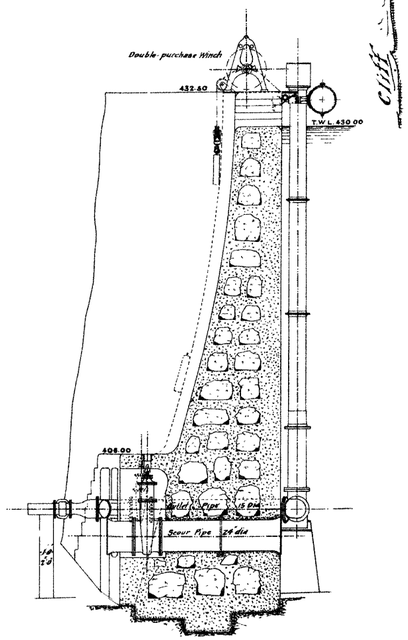
DRAWING No. 2.

SCALE 1 IN = 10 FT



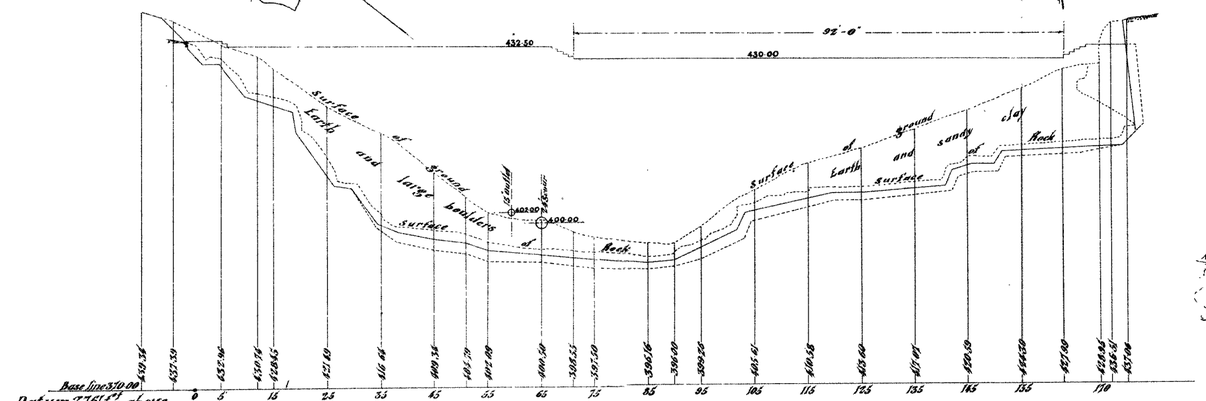


PLAN

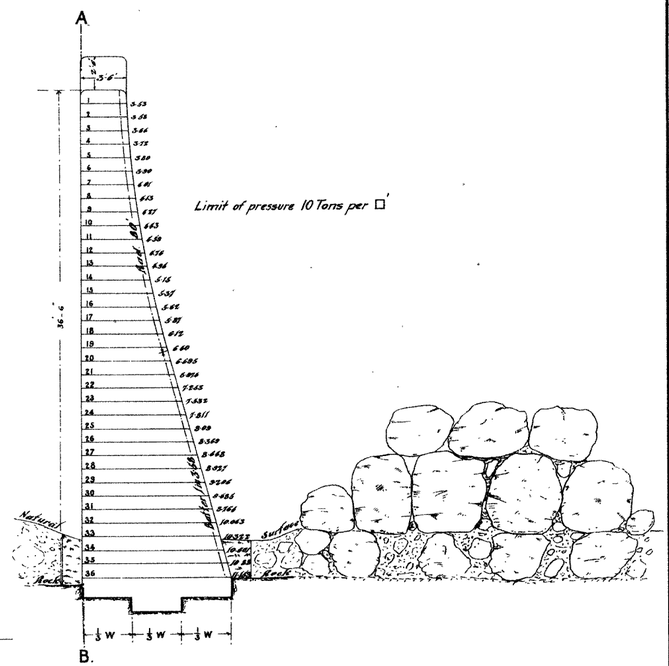


CROSS SECTION No. 8.

SCALE 1/4 INCH TO ONE FOOT.



LONGITDL SECTION ON LINE A. B.



CROSS SECTION No. 10.

SCALE 1/4 INCH TO ONE FOOT

PHOTO-LITHOGRAPHED AT THE GOVT. PRINTING OFFICE, SYDNEY, NEW SOUTH WALES.

COONAMBLE WATER SUPPLY.

CONTRACT Nº 3.

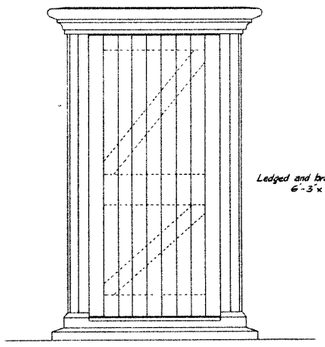
DRAWING Nº 3.

ELEVATED TANK ETC.

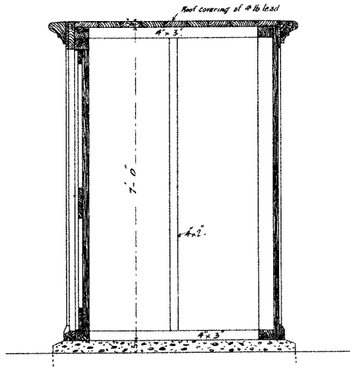
CONNECTION WITH BORE.

"A"

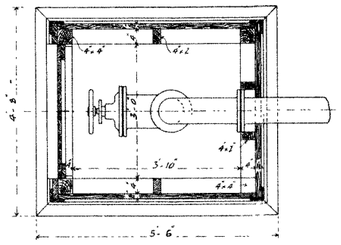
C. Darley
18.10.94



END ELEVATION.



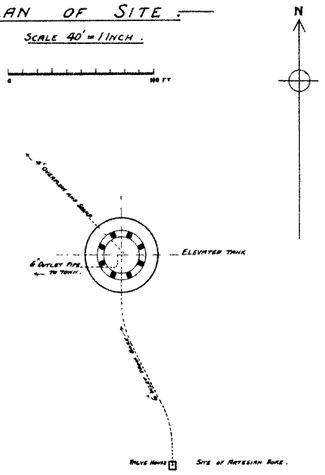
LONGITUDINAL SECTION.



SECTIONAL PLAN.

PLAN OF SITE.

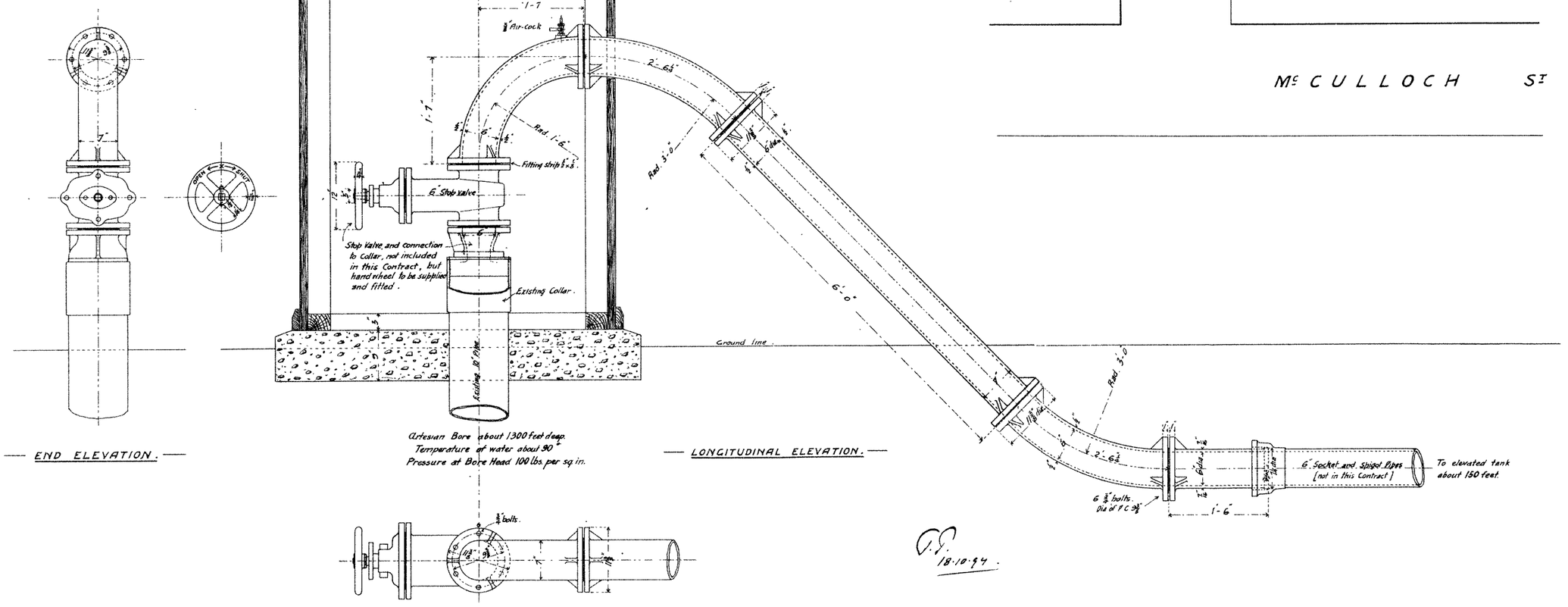
SCALE 40' = 1 INCH.



DUBBO ST

Mc CULLOCH ST

DETAIL OF VALVE-HOUSE. SCALE ¾ INCH = 1 FOOT



Artesian Bore about 1300 feet deep.
Temperature of water about 90°
Pressure at Bore Head 100 lbs. per sq in.

END ELEVATION.

LONGITUDINAL ELEVATION.

PLAN.

G.T. 18-10-94.

DETAIL OF PIPES ETC AT BORE. SCALE 1½ = 1 FOOT.

J. McC. Oct 17/94

PHOTO-LITHOGRAPHED AT THE GOVT. PRINTING OFFICE
SYDNEY, NEW SOUTH WALES

CONTRACT No 3.

COONAMBLE WATER SUPPLY.

DRAWING No 1.

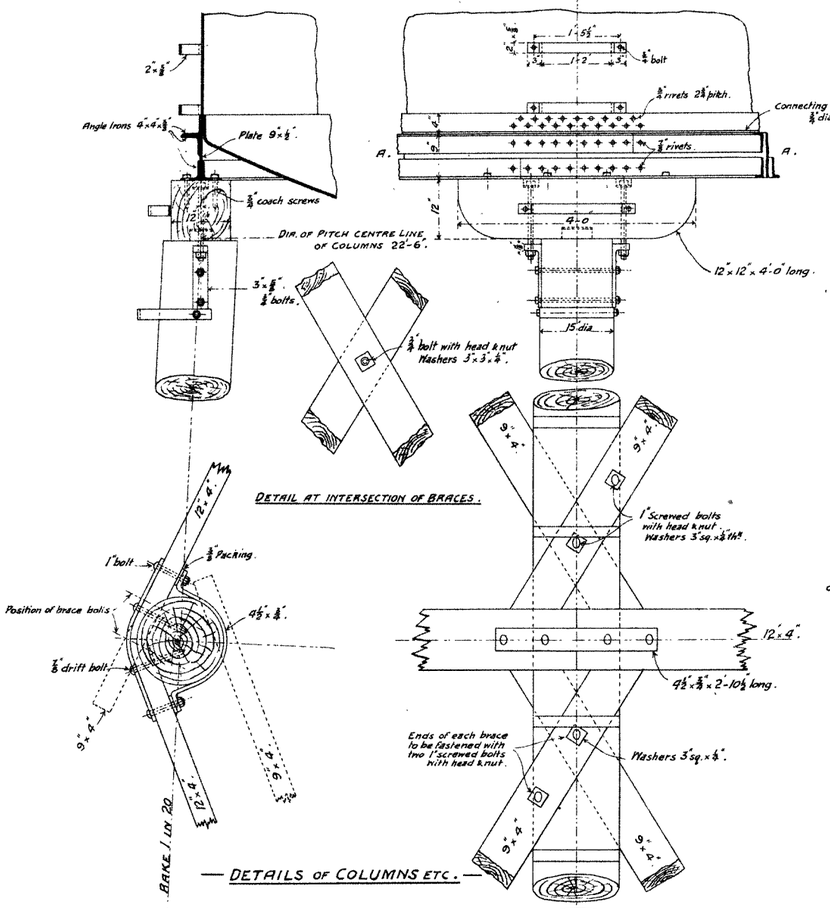
"A."

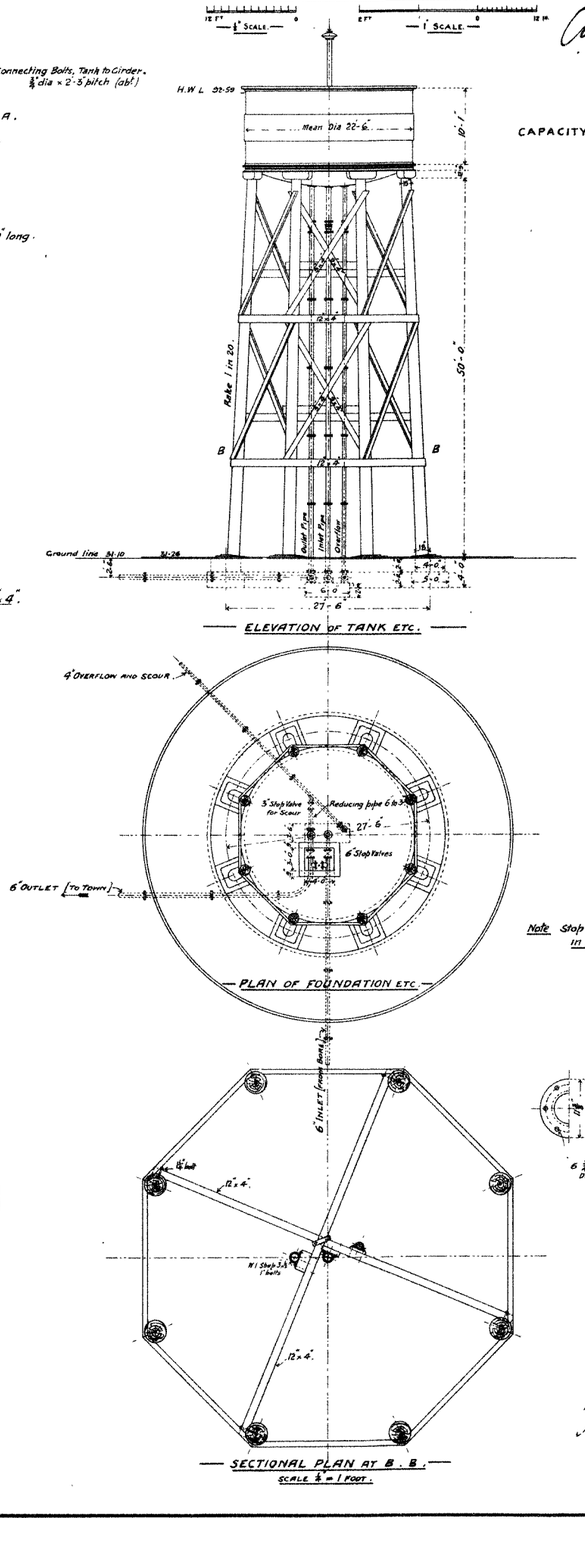
ELEVATED TANK ETC.

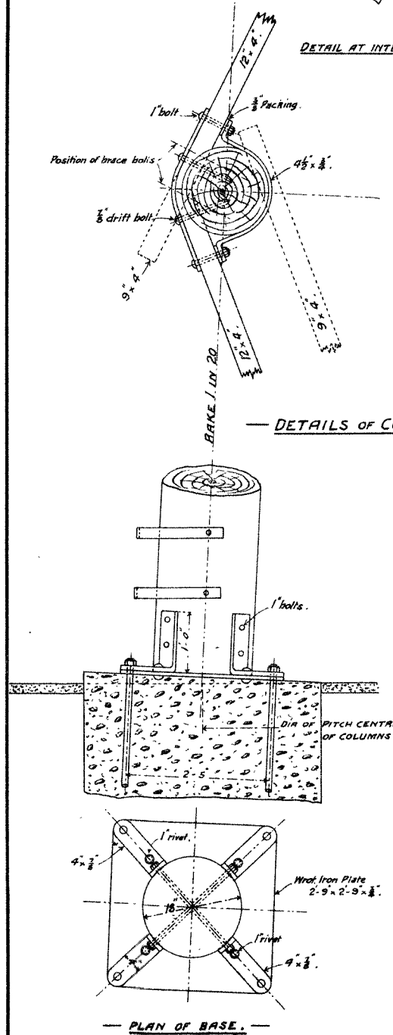
SCALES ⅛ INCH = 1 FOOT.

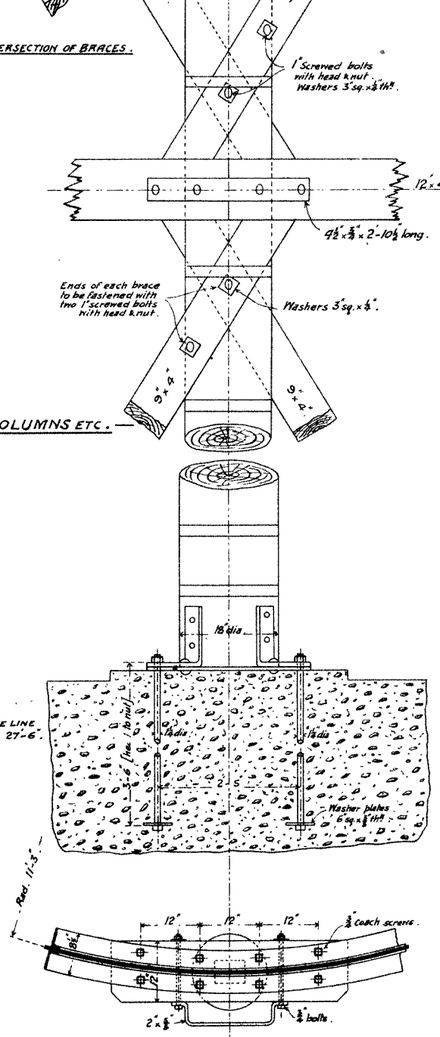
CAPACITY = 27000 GALLONS. [NETT]

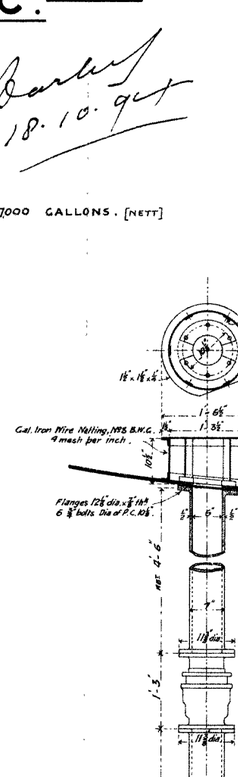
18.10.94

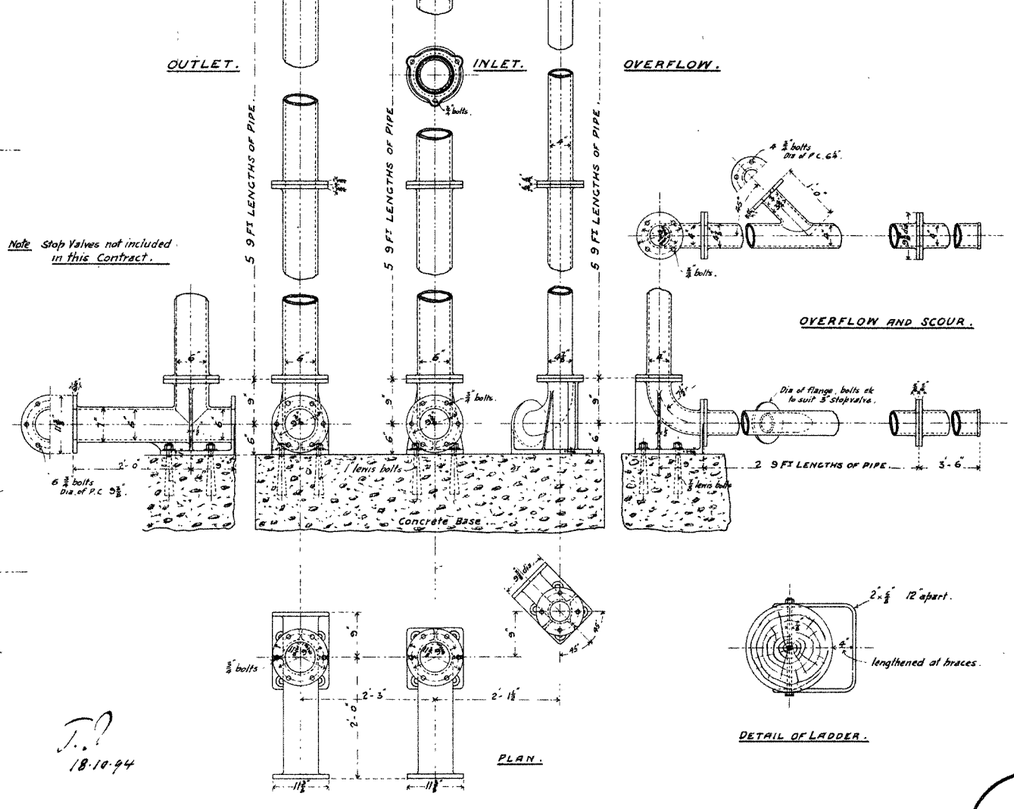








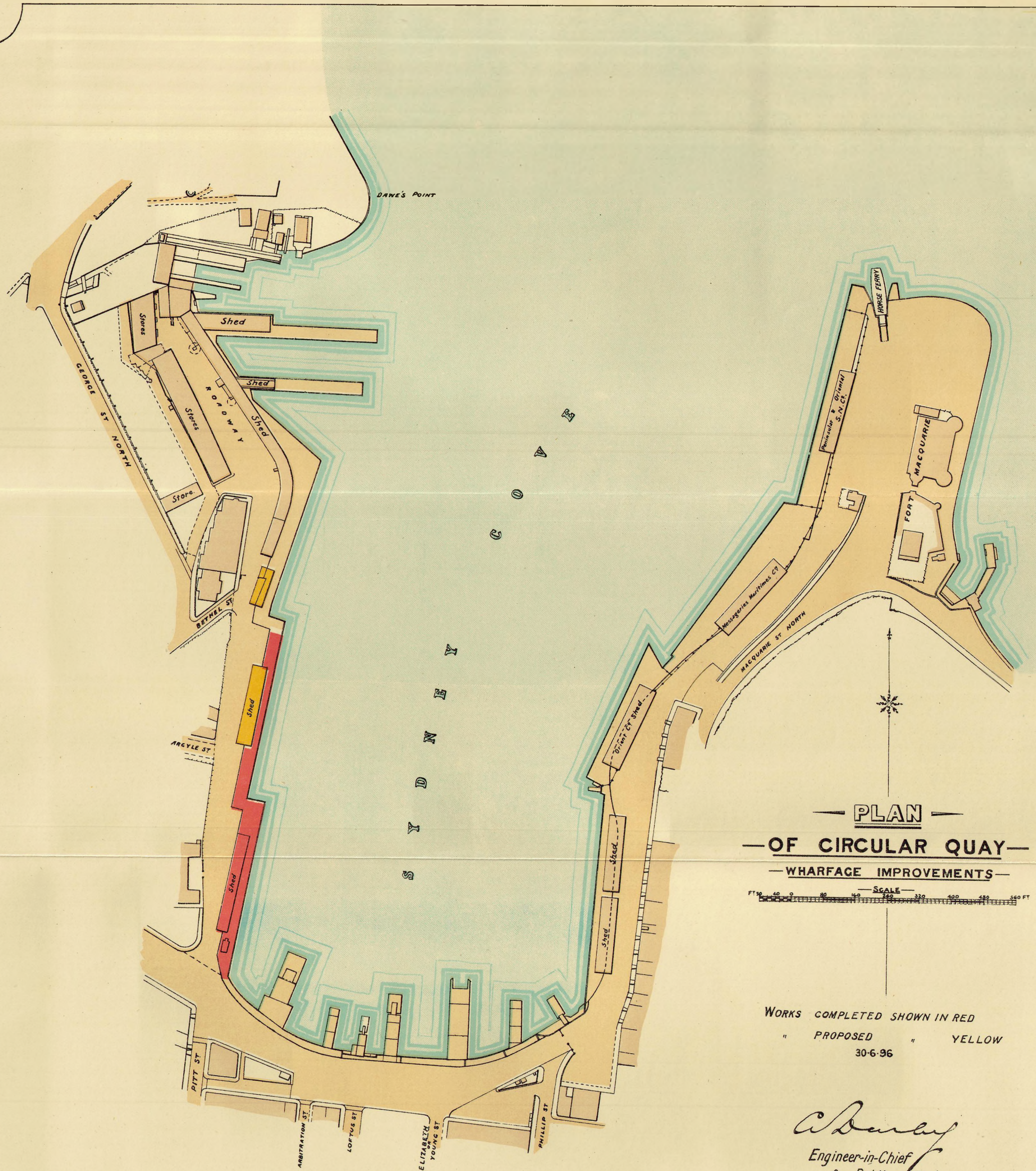




Note. Stop Valves not included in this Contract.

J.P. 18.10.94

J. McK. 18.10.94.



PLAN
—OF CIRCULAR QUAY—
—WHARFAGE IMPROVEMENTS—

—SCALE—

FT 20 40 0 80 160 240 320 400 480 560 FT

WORKS COMPLETED SHOWN IN RED

" PROPOSED " YELLOW

30·6·96

A Barney

Engineer-in-Chief
for Public Works.

PHOTO-LITHOGRAPHED AT THE GOVT. PRINTING OFFICE,
SYDNEY, NEW SOUTH WALES.

MANNING RIVER ENTRANCE

SCALE OF FEET

0 2000 4000 6000 8000 Feet

NOTE. PROPOSED WORKS. SHOWN IN RED
COMPLETED . . . BLACK

Engineer-in-Chief
for Public Works

Contract N°3 coating bottom in advance of tip head, length advanced 405 ft

PELICAN BAY

ROAD TO THE HEADS

TOWNSHIP OF HARRINGTON

Leading Light

PILOT STATION

FLAGSTAFF

Leading Light

Future H.W. Line

Low dense scrub, honeysuckle, ti-tree &c

Sandhills covered with honeysuckle, oak, and ti-tree scrub, brush &c

RUBBLE STONE FACING

Future low water Line

BARRIER BANK

SOUTH SAND SPIT

High Water Line of Spring Tides

Low Water Line of Spring Tides

SOUTH PACIFIC OCEAN

CONTRACT N°2

NORTH TRAINING BANK

WAVE BASIN

BANKS NORTH BREAKWATER

H.W. Line of Spring Tides

Future L.W. = H.W.

Wreck of S.S. "BRUNSWICK"

Wreck of S.S. "MURRAY"

SOUTH BREAKWATER

THE BAR

1 Fathom Contour Line

2 Fathoms Contour Line

3 Fathoms Contour Line

4 Fathoms Contour Line

5 Fathoms Contour Line

6 Fathoms Contour Line

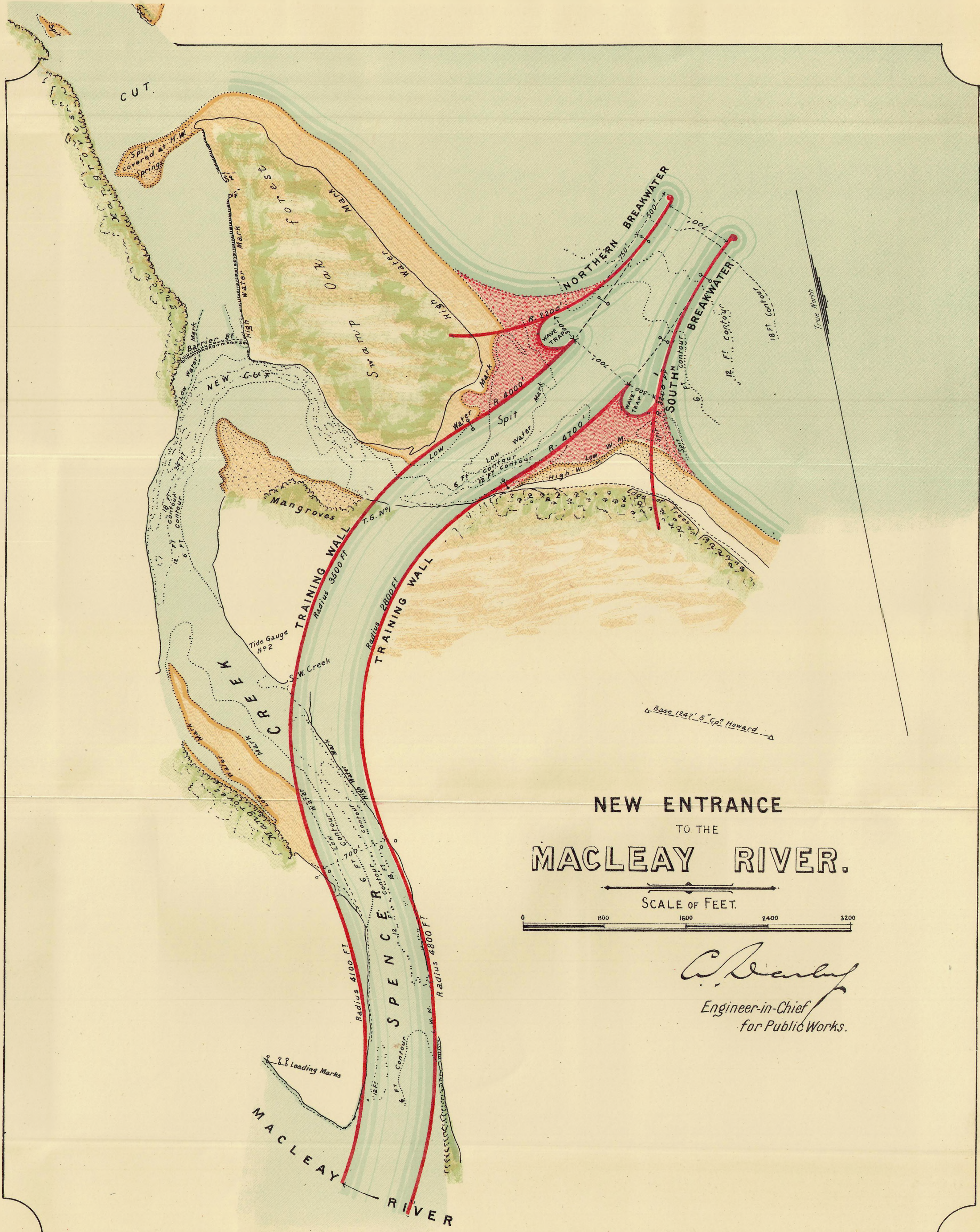
7 Fathoms Contour Line

8 Fathoms Contour Line

(48-)

PHOTO-LITHOGRAPHED AT THE GOVT. PRINTING OFFICE, SYDNEY, NEW SOUTH WALES.

NEW ENTRANCE
TO THE
MACLEAY RIVER.



SCALE OF FEET.

0 800 1600 2400 3200

C. Darley

Engineer-in-Chief
for Public Works.

(48—)

PHOTO-LITHOGRAPHED AT THE GOVT. PRINTING OFFICE,
SYDNEY, NEW SOUTH WALES.

TRIAL BAY BREAKWATER

SCALE OF FEET.

0 500 1000 2000 3000 4000 5000

NOTE: PROPOSED WORKS SHOWN IN RED
COMPLETED „ „ BLACK
LENGTH COMPLETED TO 30TH JUNE, '96, = 537 F.T

C. Bradley
Engineer-in-Chief
for Public Works.

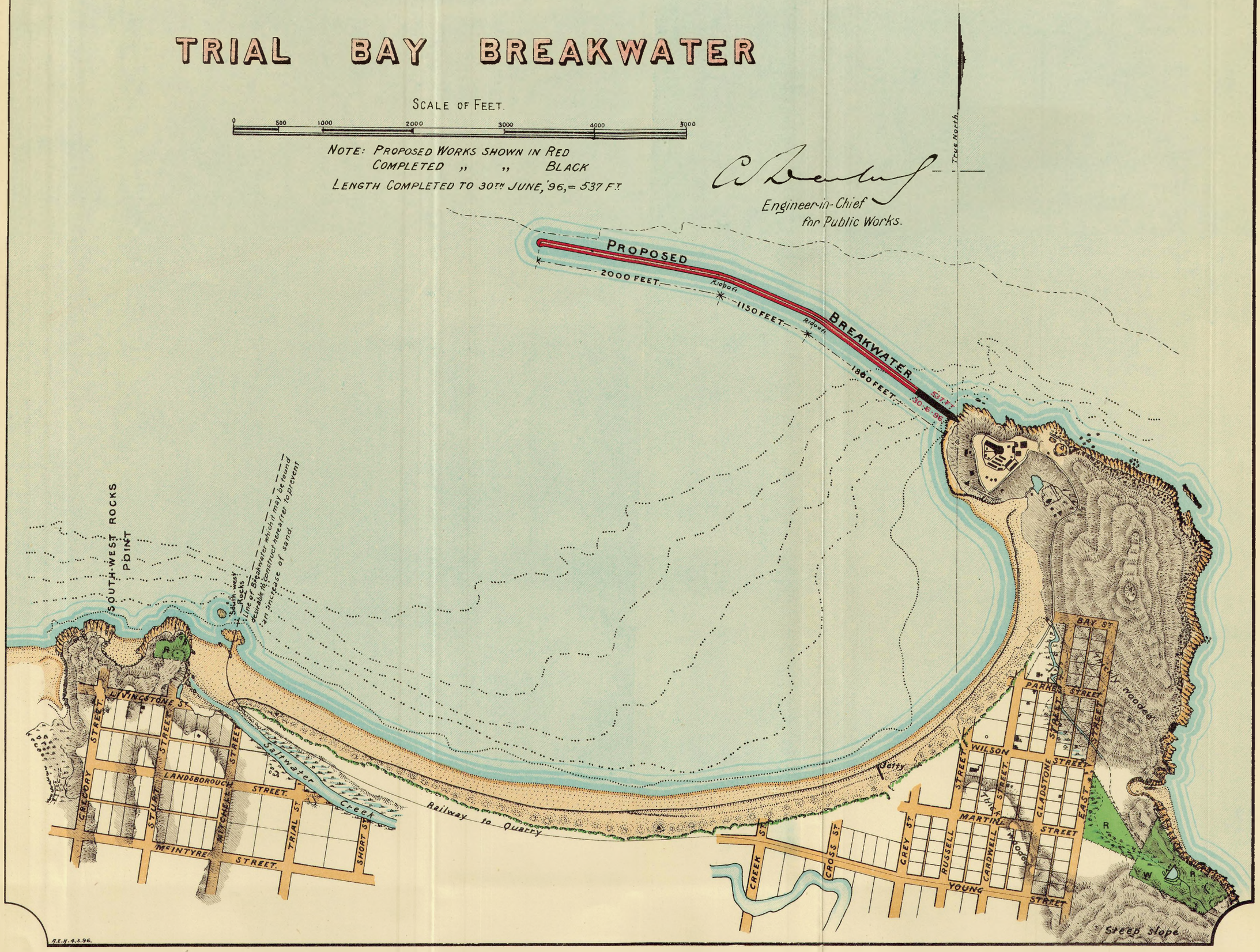


PHOTO-LITHOGRAPHED AT THE GOVT. PRINTING OFFICE,
SYDNEY, NEW SOUTH WALES.

NAMBUCCRA RIVER ENTRANCE

M.N.

SCALE OF CHAINS

0 5 10 15 20 40 60

Soundings in feet reduced to L.W.O.S.

NOTE: PROPOSED WORKS SHOWN IN RED
COMPLETED " " " BLACK

30.6.96.

C Bailey
Engineer-in-Chief
for Public Works

W.R.10 Notd 19th June '86 40a. 1r

VILLAGE OF NAMBUCCA

R.17 Notd 19 Jne '86

R.13 PUB. REC. Notd 19th June '86

R.9 Notd 19th June 1886

R. 10. Notd 24th Dec'r '61 Thick forest

RALEIGH

NAMBUCCA

COUNTY OF RAWDON

PARISH OF CONGARINNI

PARISH OF GURAVEMBI

PACIFIC OCEAN

SOUTH HEAD

STEWARTS Ip. W.R.140 Notd 17th Apl '82

Belmore 58 Sawmill T. Davis 10a

Slip

Warrell Point

Awash Hard

Awash

Shifting Sand

Wreck

NORTH BREAK

SOUTH BREAK

BAR

Training Bank

Training Wall

Cutting

Sandy Low

Low sandy land covered with scrub

Road to Nambucca for Roadway & Access R. 13646

71 J. N. Teague 50ac ex rd

70 W. H. Smith 50ac ex. rd

53 William Keash 60ac

52 W. H. Smith 50ac

51 Edw. Mason 50a

59 Luke Pickett 73ac

88 40ac Swampy

86 40ac

50 Matias Holm 37. 1. 30 ex rd

49 61ac

Redbank

Open forest

cleared & cultivated

A.W. 2.6.94

(48—)

PHOTO-LITHOGRAPHED AT THE GOVT. PRINTING OFFICE,
SYDNEY, NEW SOUTH WALES.

BELLINGER RIVER ENTRANCE

SCALE OF FEET

0 500 1000 2000 3000 4000

NOTE. PROPOSED WORKS SHEWN IN DOTTED LINES
COMPLETED " " " FULL "

25.6.96

C. Darley
Engineer-in-Chief
for Public Works.

48

PHOTO-LITHOGRAPHED AT THE GOVT. PRINTING OFFICE,
SYDNEY, NEW SOUTH WALES.

CLARENCE RIVER

Scale

0 5 10 20 40 80 120 CHAINS

NOTE. PROPOSED WORKS SHEWN IN RED
COMPLETED . . . BLACK
30·6·96

Engineer-in-Chief
for Public Works.

(48–)

PHOTO-LITHOGRAPHED AT THE GOVT. PRINTING OFFICE,
SYDNEY, NEW SOUTH WALES.

RICHMOND RIVER ENTRANCE

SCALE OF FEET

0 2000 4000 6000 8000 Feet

NOTE. PROPOSED WORKS. SHOWN IN RED
COMPLETED " " " BLACK

Engineer-in-Chief
for Public Works

TRUE NORTH

IMMIGRANT CREEK

IMMIGRANT POINT

TIDE GAUGE No 3

OYSTER POINT

FISHERMAN CREEK

TIDE GAUGE No 2

NORTH CREEK

GUIDE BANK No 1

GUIDE BANK No 2

WEST BALLINA

EAST BALLINA

BALD HILL

LIGHT HOUSE

North Head

SEA REACH

2 fathoms Contour

1 fathom contour

PROPOSED DEEP WATER TRAINING BANK

5552 Ft.

End of Trees

SOUTH SPIT

BREAKWATER EXTENSION

CHANNEL

FUTURE LOW WATER LINE

SOUTH PACIFIC OCEAN

(Sig 48)

PHOTO-LITHOGRAPHED AT THE GOVT. PRINTING OFFICE,
SYDNEY, NEW SOUTH WALES.

PART OF THE TWEED RIVER AND TERRANORA CREEK

Scale. 0 10 20 40 80 120 CHAINS

NOTE. PROPOSED WORKS SHEWN IN RED
COMPLETED " " BLACK.
30.6.96

QUEENSLAND BOUNDARY

BETWEEN COLONIES

F. & W. R. 1165

R. 797

Notified 25th June 1884.

V. R. 154

Notified 25th Nov.r 70 — Wm Bignell

Notd 7th Nov.r 81 — Hugh E. Montgomery

Notd 18th July 76

Notd

Cobaki Broadwater

Cobaki Creek

Bradys Creek

Bingam Bay

Terranora Broadwater

Trutes Bay

TERRANORA CREEK

PACIFIC OCEAN

POINT DANGER

NORTH HEAD

SOUTH HEAD

Spit

PROPOSED DEEP CHANNEL

TWEED RIVER

COOK Isd

FINGAL Pt

Puninabah

Suburban Lands

R. 75 from lease

Notified 15th Sept.r 84

VILLAGE OF CHINDERAH

CHINDERA F. R. 256 Notified 29th April 1872.

TEMP. COMMON Notified 15th Sept.r 84

Bituminous Ck

Dunoby Ck

Tree and Mangrove Swamp

R.C. Montgomery 194ac 2r.

H.B. Montgomery 500ac.

H.B. Montgomery 100ac.

H. B. Montgomery

R.M. Stack

Thomas Carrick 281ac

G.M. Matheson 130ac

G.M. Matheson 230ac

H. Caddy 120ac

340ac

T. O'Keefe 78ac

Wm Ryan 40ac

Geo Mc Leod Matheson

T.J. Morgan

T. O'Keefe

P. Kirby

P. Dunne

Walter Parrish

Ann Parrish

P. Christensen

G. Gillieatt

S. Charles

T. Clarke

James Buchanan

John Trute 220ac.

S. Vincent 100ac

T. S. Arnold 60ac.

J. Cowen 313ac.

T. Fraser

T. Lillie

James King 200ac.

J. Sweetman 160ac

J. Sexton 50ac

J. Hogan 100ac

A. Newton 50ac

B. Kiernan 80ac.

R. D. McLennan 80ac.

F. J. Davey

F. Stanley

J. J. Graham 80ac

W. Marks 45ac

W. Marks 40ac

W. Marks 40 ac

W. Marks

William Marks

J. O'Reilly 200 ac.

Bank of New South Wales 200 ac.

Ben Ryan 40ac

J. X. Staunton 50 ac.

J. X. Staunton 40ac.

John J. Graham 140ac.

G. Davison 40ac.

J. O'Reilly 40ac.

J. O'Reilly 52ac.

J. O'Reilly 40ac.

J. M.c Gregor 40 ac.

W. Boyd 40ac

T. Campbell 40ac

T. Campbell

Rob.t Eady

R. Tighe

J. Brady 160

J. Brady 60 ac

J. Brady 45ac

J. Brady 57ac

The Com.l Bank of Sydney 52 ac

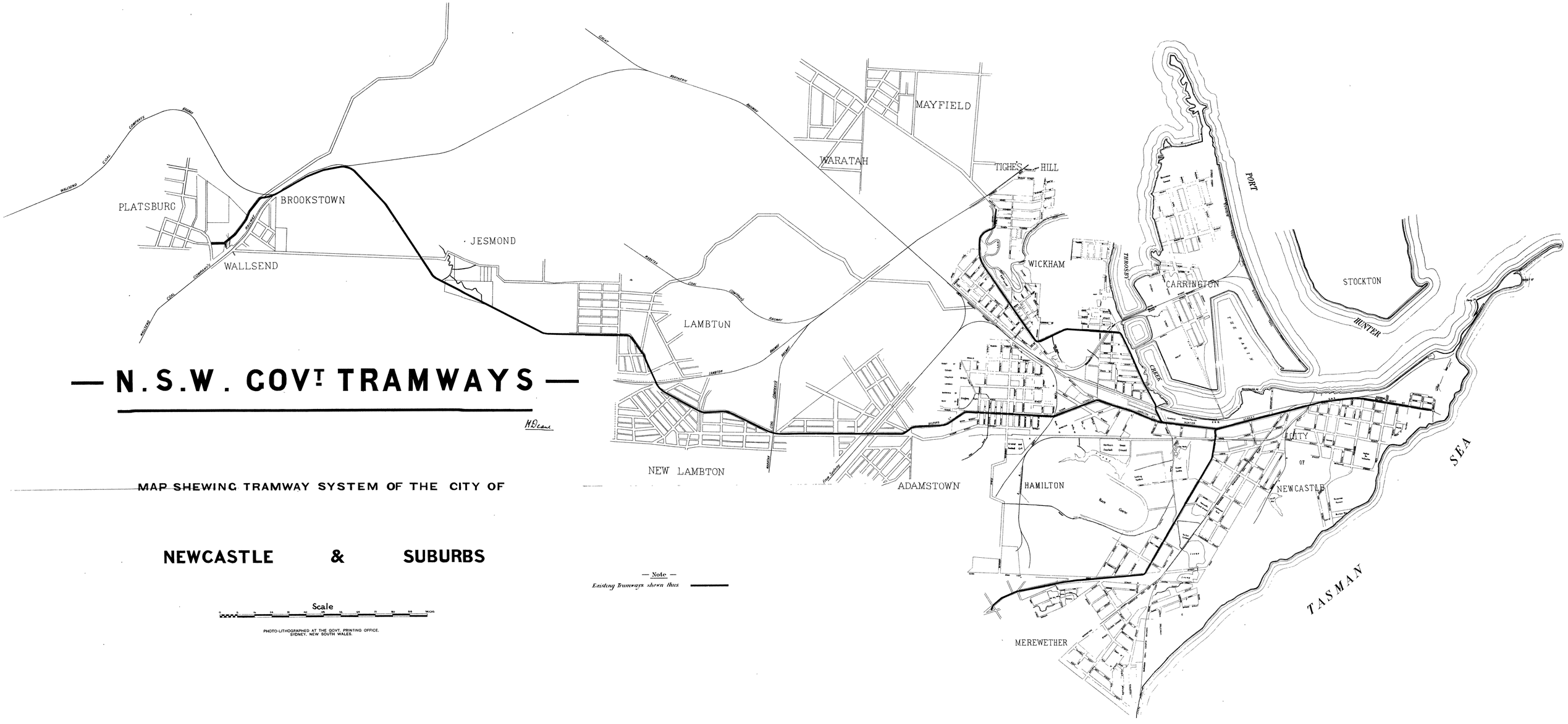
J. Quirk 40a 60a

R. Watts

J. Quirk

Notes: No 1 Wall Completed 30.6.96; No 2 Wall Completed 30.6.96; No 3 Wall 2370 Completed 30.6.96; No 4 Wall 1870 Completed 30.6.96; No 5 Wall Completed 30.6.96; No 6 Wall Completed 30.6.96; No 7 Wall Completed 30.6.96; No 8 Wall Completed 30.6.96

(Sig. 48–)



— N.S.W. GOVT TRAMWAYS —

H.D. Lane

MAP SHEWING TRAMWAY SYSTEM OF THE CITY OF

NEWCASTLE & SUBURBS

— Note —

Existing Tramways shewn thus ———

Scale

PHOTO-LITHOGRAPHED AT THE GOVT. PRINTING OFFICE, SYDNEY, NEW SOUTH WALES.

N.S.W. GOVT TRAMWAYS

MAP SHEWING TRAMWAY SYSTEM OF THE CITY OF

SYDNEY & SUBURBS

H Deane

Scale

— Notes —

Existing Tramways shewn thus ——— *Authorised Tramways shewn thus* - - - -

NORTH SYDNEY
VICTORIA AVENUE
from Hunters Hill Junction
MIDDLE HARBOR
SUGAR LOAF BAY
SAILORS BAY
WARD
MIDDLE HARBOR
NORTH HARBOR
MANLY COVE
LITTLE MANLY COVE
SPRING COVE
SHELL CRK
CHOWDER BAY
Accumulator House
LONG BAY
GEORGES RIVER
LANE COVE RIVER
LONGUEVILLE
GLADESVILLE
TARBAN CREEK
Tarban Pump
Raven Pt
Breakfast Pt
Cabarita Pt
Bedlam Pt
CABARITA
PARRAMATTA RIVER
ABBOTSFORD TERMINUS
HEN & CHICKEN BAY
FIVE DOCK
Birchgrove
BALMAIN
IRON COVE
FIVE DOCK
Leichhardt Park
IRON CREEK
WHITE BAY
GLEBE ISLAND
ROTELLE BAY
GLEBE POINT TERMINUS
from Parramatta
Dobroyd
LEICHHARDT
ERSKINEVILLE
ASHFIELD
Ashfield Park
CAMPERDOWN
NEWTOWN JUNCTION
RAILWAY TERMINUS
DARLINGTON
CROWN ST
CROWN JUNCTION
PADDINGTON
WOOLLAHRA
QUEEN ST
CENTENNIAL PARK
BONDI TERMINUS
BONDI BAY
Ben Buckler
WAVERLEY
WAVERLEY JUNCTION
WAVERLEY TERMINUS
Waverley Cemetery
ENFIELD TERMINUS
GEORGES RIVER ROAD
PETERSHAM
ENMORE
NEWTOWN
MACDONALDTOWN
DULWICH HILL
ST PETERS TERMINUS
ALEXANDRIA
WATERLOO
MARRICKVILLE
CANTERBURY
from Belmore
ST PETERS
Rosebery Park Racecourse
GLUE WORKS
GARDINERS ROAD
WATERWORKS
ENGINE PUMP
BAY ST
NORTH BOTANY
BOTANY
CORRYS
SIR J BANKS
GOVT PIER
TERMINUS
ENGINE HOUSE
RANDWICK JUNCTION
RANDWICK
Randwick Race Course
Randwick Park
Bishopscourt
COOGEE TERMINUS
South Bowra
KAMOURA BAY
PORT JACKSON
SEA
TASMAN
BOTANY BAY
Vaucluse
ROSE BAY
DOUBLE BAY
WATSONS BAY
CLARK IS
SHARK IS
BOTTLE & GLASS PT
GARDEN IS
Middle Head
Flagstaff Hill
Signal Station
Fort Denison
Pinchgut
Shark Pt
Obelisk Bay
Taylors Bay
Chowder Bay
Cobblers Bay
Careening Bay
Little Sirius Cove
Cremorne Point
Berrys Bay
Balls Head Bay
Goat Island
Long Nose Pt
Snails Bay
Blackwattle Cove
Pyrmont Bridge
Darling Harbour
Jones Bay
Sydney Cove
Garden Island
Mrs Macquaries Chair
Mrs Macquaries Point
Farm Cove
Bennelong Point
Fort Macquarie
Circular Quay
Moore Park
Lang Park
Hyde Park
Victoria Barracks
Sydney Hospital
Sydney Technical College
Sydney Grammar School
Sydney Girls High School
Sydney Boys High School
Sydney Museum
Sydney Observatory
Sydney Mint
Sydney Domain
Sydney Botanic Gardens
Government House
Parliament House
Supreme Court
Central Railway Station
Darlinghurst Gaol
Darlinghurst Police Station
Darlinghurst Courthouse
Darlinghurst Fire Station
Darlinghurst Reformatory
Darlinghurst Road
Oxford St
Liverpool St
Bourke St
Flinders St
Elizabeth St
Castlereagh St
George St
Pitt St
Kent St
Sussex St
Clarence St
York St
Macquarie St
Phillip St
Bridge St
Hunter St
Market St
King St
Wynyard Station
Wynyard Park
Milsons Point
Kirribilli Point
Lavender Bay
Waverton
Wollstonecraft
Blues Point
McMahons Point
Balls Head
Berrys Bay
Northbridge
Willoughby
Chatswood
Roseville
Lindfield
Killara
Gordon
Pymble
Turramurra
Wahroonga
Waitara
Hornsby
Hornsby Junction
Hornsby Tramway
Hornsby Railway Station
Hornsby Post Office
Hornsby Police Station
Hornsby Public School
Hornsby Hospital
Hornsby Cemetery
Hornsby Park
Hornsby Bowling Club
Hornsby Golf Links
Hornsby Racecourse
Hornsby Showground
Hornsby Swimming Pool
Hornsby Tennis Courts
Hornsby Football Ground
Hornsby Cricket Ground
Hornsby Rugby League Ground
Hornsby Soccer Ground
Hornsby Basketball Courts
Hornsby Netball Courts
Hornsby Hockey Ground
Hornsby Athletics Track
Hornsby Velodrome
Hornsby Speedway
Hornsby Motor Racing Circuit
Hornsby Aerodrome
Hornsby Heliport
Hornsby Seaplane Base
Hornsby Marina
Hornsby Boat Harbour
Hornsby Yacht Club
Hornsby Sailing Club
Hornsby Rowing Club
Hornsby Canoe Club
Hornsby Surf Club
Hornsby Lifesaving Club
Hornsby Ambulance Station
Hornsby Fire Station
Hornsby Police Station
Hornsby Courthouse
Hornsby Gaol
Hornsby Reformatory
Hornsby Asylum
Hornsby Hospital
Hornsby Infirmary
Hornsby Dispensary
Hornsby Maternity Hospital
Hornsby Children's Hospital
Hornsby Eye and Ear Hospital
Hornsby Dental Hospital
Hornsby Nurses Home
Hornsby Medical School
Hornsby University
Hornsby Technical College
Hornsby Teachers College
Hornsby Conservatorium of Music
Hornsby Art Gallery
Hornsby Museum
Hornsby Library
Hornsby Town Hall
Hornsby Post Office
Hornsby Telegraph Office
Hornsby Telephone Exchange
Hornsby Railway Station
Hornsby Tramway Depot
Hornsby Workshops
Hornsby Power House
Hornsby Gasworks
Hornsby Waterworks
Hornsby Sewerage Works
Hornsby Abattoirs
Hornsby Markets
Hornsby Wharves
Hornsby Docks
Hornsby Shipping Office
Hornsby Customs House
Hornsby Quarantine Station
Hornsby Lighthouse
Hornsby Signal Station
Hornsby Observatory
Hornsby Meteorological Station
Hornsby Weather Bureau
Hornsby Geological Survey
Hornsby Mines Department
Hornsby Lands Department
Hornsby Public Works Department
Hornsby Railways Department
Hornsby Tramways Department
Hornsby Harbour Trust
Hornsby Maritime Services Board
Hornsby Water Board
Hornsby Sewerage Board
Hornsby Electricity Authority
Hornsby Gas Company
Hornsby Telephone Company
Hornsby Telegraph Company
Hornsby Broadcasting Station
Hornsby Television Station
Hornsby Radio Station
Hornsby Newspaper Office
Hornsby Printing Office
Hornsby Publishing House
Hornsby Bookshop
Hornsby Library
Hornsby Museum
Hornsby Art Gallery
Hornsby Theatre
Hornsby Cinema
Hornsby Concert Hall
Hornsby Opera House
Hornsby Ballet School
Hornsby Dancing School
Hornsby Music School
Hornsby Singing School
Hornsby Acting School
Hornsby Drama School
Hornsby Film Studio
Hornsby Recording Studio
Hornsby Broadcasting Studio
Hornsby Television Studio
Hornsby Radio Studio
Hornsby Newspaper Office
Hornsby Printing Office
Hornsby Publishing House
Hornsby Bookshop

COLONY OF QUEENSLAND

SOUTH AUSTRALIA

COLONY OF VICTORIA

SOUTH PACIFIC OCEAN

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.

Railways authorised do.

1897.

1897.

LEGISLATIVE ASSEMBLY.

NEW SOUTH WALES.

PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS.

TWELFTH GENERAL REPORT,

TOGETHER WITH

RETURNS GIVING A RECORD OF THE COMMITTEE'S INQUIRIES

AND

MINUTES OF PROCEEDINGS.

Presented to Parliament in accordance with the provisions of the Public Works Act, 51 Vic. No. 37.

Printed under No. 3 *Report from Printing Committee,* 13 *May,* 1897.

SYDNEY: WILLIAM APPLEGATE GULLICK, GOVERNMENT PRINTER.

[3s.] *35—A 1897.

MEMBERS OF THE COMMITTEE.

LEGISLATIVE COUNCIL.

The Honorable Frederick Thomas Humphery, Vice-Chairman.
*The Honorable John Davies, C.M.G
The Honorable James Hoskins.
The Honorable Charles James Roberts, C.M.G.
The Honorable William Joseph Trickett.
*The Honorable Daniel O'Connor.

LEGISLATIVE ASSEMBLY.

Thomas Thomson Ewing, Esquire, Chairman.
Henry Clarke, Esquire.
Charles Alfred Lee, Esquire.
John Lionel Fegan, Esquire.
*Angus Cameron, Esquire.
Thomas Henry Hassall, Esquire.
George Black, Esquire.
Francis Augustus Wright, Esquire.
*Frank Farnell, Esquire.

[*Since the appointment of the present Committee, the Honorable John Davies, C.M.G., and Angus Cameron, Esquire, died, thus causing two vacancies, which were subsequently filled by the appointment of the Honorable Daniel O'Connor and Frank Farnell, Esquire.]

PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS.

TWELFTH GENERAL REPORT.

To His Excellency the Right Honorable HENRY ROBERT, VISCOUNT HAMPDEN, Governor and Commander-in-Chief of the Colony of New South Wales and its Dependencies.

MAY IT PLEASE YOUR EXCELLENCY,—

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, the Public Works Act Amendment Act of 1889, 52 Vic. No. 26, and the Public Works (Committees' Remuneration) Act of 1889, 53 Vic. No. 11, have the honor to submit, in accordance with clause 8 of the Public Works Act, the following General Report of their proceedings:—

Inquiries at date of last Report

1. At the date of the Committee's last General Report the inquiries concerning three proposed works then before them had not been completed sufficiently to enable the Committee to report upon them to Parliament; but since that time the Reports have been laid before the Legislative Assembly. These works were—

	Estimated Cost.
Railway from Nevertire to Warren	£32,730
Railway from Tamworth to Manilla	72,150
Additions to the Treasury Building	21,500

There was also before the Committee at that date a proposal to construct six locks and weirs on the River Darling, from Stony Point to Brewarrina, at an estimated cost of £121,100; and the Report respecting this proposed work has also since then been submitted to the Assembly.

The Committees' recommendations.

2. With regard to the Railway from Nevertire to Warren and the Additions to the Treasury Building, the Committee found no difficulty in approving of the proposals as referred to them; but in the case of the Railway from Tamworth to Manilla they passed the proposal with a recommended important alteration in the route. As proposed by the Department the route interfered with properties within the municipal boundaries of Tamworth, and passed through other private land to such an extent that were it adopted land resumption and severance would form a serious item of cost. To obviate this the Committee recommended a route which should start from West Tamworth instead of from the Tamworth railway station, and, passing on the southern side of the Peel River to a crossing below Attunga Creek, follow approximately parallel from that point the main road to Manilla. A line by this route, the Committee found, would serve every interest as fully as that submitted by the Department of Public Works, and while it would be 1 mile longer than the railway according to the Departmental proposal, the cost of construction would be about £64 less per mile.

The construction of locks and weirs on the River Darling the Committee decided was a work the carrying out of which it would be premature to recommend, and they negatived the proposal.

Works referred to Committee last Session.

3. During the last session of Parliament the following other proposed works were referred to the Committee by the Legislative Assembly:—

	Estimated Cost.
Railway from Berrigan to Finley	£27,250
Improvement of Cook's River...	36,400
Railway from Condobolin to Broken Hill	955,063
Railway from Moree to Inverell	279,500
Construction of a Deepwater Harbour at Port Kembla	440,000
Duplicate Main from Prospect to Potts' Hill (as voted)	100,000
Sewerage Works for Parramatta	60,000
New Houses of Parliament for the Colony	533,484
Total	2,431,697

Results of inquiries.

4. Of these eight proposed works the Committee have passed two as submitted, and three with amendment, one they negatived, and in the cases of the other two their inquiries are not yet completed.

The two works passed as proposed were—

Sewerage Works for Parramatta.

Railway from Moree to Inverell.

The following works were passed in an amended form—

Railway from Berrigan to Finley—the Committee affirming that the cost of construction should not exceed £2,000 per mile.

Improvement of Cook's River—the Committee recommending that a portion only of the proposed work be undertaken by the Government at a cost not to exceed £15,000.

Construction of a Deep-water Harbour at Port Kembla—the Committee recommending the construction of the proposed eastern breakwater, the total cost not to exceed £200,000.

The proposed work negatived was the—

Railway from Condobolin to Broken Hill.

After considering the national aspect of the case as it was represented in this inquiry, the special claims of other localities, and the advantages anticipated from the construction of this railway, the Committee came to the conclusion that they could not recommend a line which, at best, could furnish only a more expensive means of transit than that which at present obtains over much of the country to be traversed, and one which would entail an annual loss of about £60,000 upon the railway system of the Colony.

Works still before the Committee.

5. With regard to the two works which are still before the Committee—New Houses of Parliament for the Colony and Duplicate Main from Prospect to Potts' Hill—the inquiry respecting the expediency of erecting New Houses of Parliament has been commenced, and will be proceeded with as rapidly as possible. That in relation to the proposed Duplicate Main from Prospect to Potts' Hill has not been opened, as the Departmental plans and estimates in connection with it are not yet complete.

Returns attached to the Report.

6. Attached to this Report, and completed to the present date, are the returns which have been published with previous General Reports, and which contain a record of the whole of the works inquired into by the present Committee and by previous Committees that have been appointed under the "Public Works Act"; and also a copy of the Committee's Minutes of Proceedings.

Summary of the work of the Committees.

7. The returns show that the several Committees appointed under the Act have, up to the present, inquired into eighty-one proposals—five of these being works which were twice referred to the Committee, and one three times. As estimated by the Department, these proposals would involve an expenditure of £16,422,969, but allowing for the repeated references, the figures are reduced to £14,398,787. Only a portion of these works, however, has been passed by the Committees as proposed by the Department, and of the remainder some have been recommended with modifications, and others negatived. These results show a saving of expenditure, consequent upon the Committees' recommendations, amounting to £4,941,839.

THOS. EWING,
Chairman.

Office of the Parliamentary Standing Committee on Public Works,
Sydney, 23 April, 1897.

PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS.

RECORD OF INQUIRIES.

LIST of Proposed Public Works inquired into by the several Committees, with the results of their inquiries, from 27 August, 1888, the date of the first sitting of the first Committee appointed under the Act, to 23 April, 1897.

Date of inquiry.	Proposed Work.	Expenditure proposed by the Government.	Expenditure recommended by the Committee.	Amount in excess of that proposed.	Amount in reduction of that proposed.	Remarks.
1888.		£	£	£	£	
4 Sept. to 22 Oct.	Improvements to the Circular Quay.	120,000	125,000	5,000	.....	The Committee recommended an alteration in the plan of these improvements, by which the total estimated cost would be increased to £125,000.
26 Sept. to 22 Oct.	Storage reservoir at Potts' Hill, and second line of pipes to Crown-street.	120,000 165,000	285,000	.....	.....	Recommended as proposed.
13 Sept. to 22 Oct.	New Central Police Court	48,000	48,000	.....	.....	Recommended as proposed.
4 Oct. to 22 Oct.	Drainage works, Manly...	34,114	22,000	.....	12,114	The Committee recommended the adoption of a modified plan of these drainage works, by which the total estimated cost would not exceed £22,000.
10 Oct. to 22 Oct.	Drainage works, North Shore.	77,062	107,000	29,938	.....	The Committee recommended the adoption of the complete scheme proposed in relation to this work, and the estimated cost of which, as shown by the evidence, is £107,000.
31 Aug. to 22 Oct.	Harbour improvements at Newcastle.	112,000	112,000	.....	.....	Recommended as proposed.
19 Sept. to 22 Oct.	Wharfage acccommodation, Woolloomooloo Bay.	42,000	.....	.....	42,000	The Committee were of opinion that the proposed expenditure was not justified either by the requirements in connection with the wharfage accommodation of the port, or by the nature of the proposal if regarded as a scheme for the improvement of a very valuable Government property.
16 Nov. to 1889. 11 Jan.	Bridge at the Spit, Middle Harbour.	62,000	.....	.....	62,000	The Committee decided that the proposed expenditure was not justified by the evidence, and that a steam-punt would meet the requirements of the district in the vicinity of the proposed work for some years to come.
1888. 7 Dec. to 1889. 27 Aug.	Drainage works for the Western Suburbs.	830,304	830,304	.....	.....	Recommended as proposed.
26 June to 30 Sept.	Improvements to the entrance of the Richmond River.	326,000	326,000	.....	.....	The Committee recommended that the proposed works be carried out in a certain order, so that the results from the works first constructed might be ascertained before others were proceeded with.
9 Oct. to 11 Dec.	Railway to connect North Shore Railway with Port Jackson, at Milson's Point.*	262,000	.....	.....	262,000	The Committee considered, for various reasons stated in their report on the subject, that the work as proposed should not be carried out.
29 Aug. to 12 Dec.	Railway from Culcairn to Corowa.	197,300 (or £4,184 per mile.)	164,500 (or £3,500 per mile.)	.....	32,800	The Committee were of opinion that this line should be constructed at a cost not exceeding £3,500 per mile.
22 Aug. to 19 Dec.	Railway from Goulburn to Crookwell.	198,300 (or £5,984 per mile.)	148,500 (or £4,500 per mile.)	.....	49,800	The Committee considered that the cost of this railway should not exceed £4,500 per mile, and that a saving should also be effected by utilizing a certain portion of the present main line instead of taking the proposed railway through a part of the city of Goulburn.
1890. 22 Jan. to 6 Feb. 1889.	Dredge and plant for Sydney Harbour.	30,000	.....	.....	30,000	The evidence showed that this class of dredge was not required.
25 Sept. to 1890. 18 Feb.	Railway from Nyngan to Cobar.	207,360	207,360	.....	.....	The Committee recommended the construction of this railway as part of a line which should be extended to Wilcannia and Broken Hill.
14 Jan. to 11 Feb.	Offices for the Board of Water Supply and Sewerage.	50,000	50,000	.....	.....	Recommended as proposed.
14 Jan. to 6 Feb.	Reticulation of the Western Suburbs Drainage Scheme.	713,592	713,592	.....	.....	Recommended as proposed.
14 Jan. to 11 Feb.	Extension of Sydney Water Supply to Southern Suburbs — Hurstville and Rockdale.	66,000	.....	.....	66,000	This expenditure was rendered unnecessary by reason of a temporary water-supply scheme being sufficient to meet requirements for some years.
19 Nov. to 2 April.	Railway from Marrickville to the Burwood Road.	90,250	90,250	.....	.....	Recommended as proposed.
	Carried forward.....£	3,751,282	3,229,506	34,938	556,714	

List of Proposed Public Works inquired into by the Committee, &c.—*continued.*

Date of inquiry.	Proposed Work.	Expenditure proposed by the Government.	Expenditure recommended by the Committee.	Amount in excess of that proposed.	Amount in reduction of that proposed.	Remarks.
		£	£	£	£	
	Brought forward ...£	3,751,282	3,229,506	34,938	556,714	
1890. 23 Oct. to 24 April.	Improvements to the entrance of the Clarence River.	580,900	211,900	.....	369,000	In this case the Committee recommended the construction of only a portion of the works proposed, as they were of opinion that when this portion had been constructed it might be found that the remainder would not be required.
31 Oct. to 15 April.	Breakwater at Byron Bay.	241,723	241,723	.....	.. ..	The original estimate for this work was £162,000; the increase was due to a difficulty in obtaining stone.
4 Dec. to 24 April.	Railway from Kiama to Nowra.	381,390	381,390	.....	.....	In this case there was an original estimate of £441,663. The reduction was due to an amended estimate made by the Acting Engineer-in-Chief for Railways since the railway was referred to the Committee.
12 Nov. to 24 April.	Railway from Grafton to the Tweed.*	1,728,100	800,000	.....	928,100	The Committee recommended that this railway should be constructed from Lismore to Murwillumbah, instead of from Grafton to Murwillumbah, the Committee's recommendation involving a length of about 60½ miles as compared with 140 miles 76 chains, the length of the line as referred to them by the Legislative Assembly.
15 Jan. to 24 April.	Railway from Cootamundra to Temora.	138,000 (or £3,656 per mile.)	125,400 (or £3,300 per mile.)	.....	12,600	The Committee considered that the cost of constructing this railway should not exceed £3,300 per mile.
23 Jan. to 24 April	Railway from Moss Vale to Robertson.	84,900	.....	.....	84,900	The Committee negatived this proposal because they considered another route, described in their report, was preferable.
23 Jan. to 25 Mar.	Railway from Mudgee to Gulgong.	109,330	.....	.....	109,330	The Committee decided against this work, on the ground that any extension of the Mudgee Railway should form part of a more comprehensive proposal, the consideration of which should be deferred until after the suggestion for the connection of the Northern and Western systems, by a line between Dubbo and Werris Creek, has been dealt with.
12 Feb. to 24 April.	Bridge over Tarban Creek, Parramatta River.	26,000	.....	....	26,000	The Committee considered this bridge to be unnecessary.
20 Feb. to 15 April.	Bridge over the Hunter River, at Jerry's Plains.	20,000	.....	.. ..	20,000	The Committee considered that a less expensive bridge would be sufficient to meet requirements.
25 Feb. to 24 April	Bridge to connect Bullock Island with the mainland at Newcastle.	33,000	.. ..	.....	33,000	The Committee considered that this proposed expenditure was premature, pending certain reclamation works.
12 Feb. to 21 May.	Iron Bridge at Cowra ...	26,537	26,537	.....	.....	The original proposal represented an expenditure of £69,971, which amount was afterwards reduced to £26,537, as the result of a revision of the system of bridge-building in the Colony.
22 Jan. to 21 May.	Railway from Molong to Parkes and Forbes.	433,000	433,000	..... .	..... .	Recommended as proposed.
28 May to 8 July.	Hospital for the Insane upon the Kenmore Estate, near Goulburn.*	120,000	.....	.....	120,000	This proposed work, after being partly considered, was withdrawn from the Committee by resolution of the Assembly.
28 May to 21 Aug.	Railway to connect the North Shore Railway with the deep waters of Port Jackson, at Milson's Point.* (Second Reference).	231,156	231,156	.....	.....	This proposal was before the Committee on a previous occasion (estimated cost, £262,000), when it was negatived; but having been referred to the Committee for further consideration, and circumstances appearing in the second inquiry which justified the construction of the railway, the Committee approved of the proposed work.
10 Dec. to 13 May, 1891.	Hospital Buildings, Macquarie-street.	140,000	56,000	.....	84,000	In this case, two sets of plans for the buildings were submitted to the Committee, one representing a design that was estimated to cost £140,000, and the other a design to cost £56,000, and the Committee approved of the latter.
1891. 11 Feb. to 25 Mar.	College for the Training of Teachers of Public Schools.	37,500	37,500	.....	.. ..	Recommended as proposed.
1 Feb. to 21 April.	Extension of the Kiama to Nowra Railway into the town of Nowra.	75,000	75,000	.....	.....	Recommended as proposed.
24 Feb. to 14 May.	Railway from Cobar to Cockburn.	1,168,000	1,018,000	.....	150,000	The Committee recommended the construction of this railway as far as Broken Hill only, which would reduce the proposed expenditure by £150,000.
22 Jan., 1890, to 19 May, 1891.	Cable Tramway from King-st., *via* William-street, to Ocean-street.	80,000	80,000	.....	....	Recommended as proposed.
25 Nov., 1890, to 3 June, 1891.	Cable Tramway through George, Pitt, and Harris Streets, Sydney.	120,000	.....	.....	120,000	The Committee considered that it was not expedient at present, for reasons stated in their report, that this tramway should be constructed.
	Carried forward .....£	9,525,818	6,947,112	34,938	2,613,644	

List of Proposed Public Works inquired into by the Committee, &c.—*continued.*

Date of inquiry.	Proposed Work.	Expenditure proposed by the Government.	Expenditure recommended by the Committee.	Amount in excess of that proposed.	Amount in reduction of that proposed.	Remarks.
		£	£	£	£	
1892.	Brought forward .. £	9,525,818	6,947,112	34,938	2,613,644	
5 May to 2 June.	Improvements at Darling Island.	142,000	.....	.....	142,000	The Committee considered that the proposed works might be postponed for the present without inconvenience, and that a more suitable design might be submitted.
7 June to 12 July.	Stormwater sewers discharging into Johnstone's Bay.	51,352	51,352	.....	.....	Recommended as proposed.
15 June to 4 Aug.	Reservoir at Centennial Park for Sydney Water Supply.	83,000	83,000	.....	.....	Recommended with an alteration of site.
14 July to 24 Aug.	Water Supply for Wollongong and the surrounding districts.	66,000	30,000	.....	36,000	The Committee found that the Water Supply proposed for the surrounding districts was not needed, and that the estimate of cost for supplying Wollongong might be reduced to £30,000.
28 July to 24 Aug.	Second pipe-line from Walka to Buttai, for Hunter River District Water Supply.	50,000	50,000	.....	.....	Recommended as proposed.
26 July to 9 Aug.	Sewerage works at Cottage Creek.	25,000	13,000	.....	12,000	The amount of £25,000 provided for a covered sewer; but the Committee found that a cover was not necessary at present, and that by constructing an open sewer the cost could be reduced by £12,000.
21 April, 1891, to 27 May, 1892.	Railway from Glen Innes to Inverell.*	427,400	.....	.....	427,400	The evidence in this case showed that the estimated cost of constructing the railway was excessive, and indicated the probability of a serious annual loss in the working of the line. In addition to this, the Committee were not as fully informed as desirable with regard to connecting Inverell not only with the Great Northern Railway but with the coast, a matter of considerable importance in the inquiry.
31 May to 18 Aug.	Railway from Jerilderie to Deniliquin.	148,000	....	.. ..	148,000	The Committee were of opinion that the consideration of this proposed work should be postponed until it should be determined by Parliament as a matter of public policy to purchase the Deniliquin to Moama Railway.
12 July to 24 Aug.	Lunatic Asylum at Kenmore, near Goulburn.* (Second Reference).	150,000	150,000	.....	.....	Recommended as proposed.
14 June to 28 Sept.	Railway from Grafton to Lismore.*	662,000 (or £8,000 per mile.)	108,000 (or £6,000 per mile.)	.....	554,000	The Committee decided that, for the present, only the Lismore to Casino section of the proposed railway should be constructed, that the cost should not exceed £6,000 per mile, and that the betterment principle be applied to the land to be served by the proposed line.
10 July to 26 Oct.	Railway from Eden to Bega.	564,000 (or £15,350 per mile.)	.....	.....	564,000	The Committee considered that the present resources of the district did not warrant the construction of such an expensive line, but they were of opinion that a cheaply constructed railway might be favorably considered.
22 June to 4 Oct.	Sewerage Works for Parramatta.*	75,926	.....	.....	75,926	The Committee were of opinion that the sewage farm included in the scheme was too small for the purpose, and that the sewage should be dealt with by precipitation and filtration or other effective modern process at a proposed pumping station at Clay Cliff Creek.
12 Oct. to 21 Dec.	Water Supply for Tamworth.	22,500	22,500	.....	.....	Recommended as proposed, with a provision as to the quantity of water obtainable, and the resumption of land surrounding the well in the drift forming the source of supply.
14 Sept. to 16 Nov.	Water Supply for Lithgow	15,000	15,000	.....	.....	Recommended as proposed.
15 Sept. to 16 Nov.	Water Supply for Armidale.	43,500	43,500	.....	.....	Recommended as proposed.
17 Nov. to 10 Jan. 1893.	Railway from Glen Innes to Inverell.* (Second Reference).	421,400 (or £7,975 per mile).	369,862 (or £7,000 per mile).	.....	51,538	The Committee considered it expedient this railway should be constructed, provided that the cost did not exceed £7,000 per mile, that special local rates were charged until the railway paid working expenses and interest on cost of construction, and that the betterment principle was applied to the land served by the railway.
14 Feb. to 8 Mar.	Waterworks for the town of Junee.	45,000	45,000	.....	.....	The Committee recommended that these works should be carried out, conditionally upon the Railway Commissioners undertaking to enter into an agreement for a period of not less than ten years to pay a minimum of £1,900 per annum for water supplied for railway purposes at Junee and Bethungra.
14 Nov., 1893, to 11 Jan., 1894.	Railway from Narrabri to Moree.	153,000	153,000	.....	.....	Recommended as proposed, with the condition that the work be not undertaken until a Betterment Act is passed.
	Carried forward.....£	12,670,896	8,081,326	34,938	4,624,508	

LIST of Proposed Public Works inquired into by the Committee, &c.—*continued.*

Date of inquiry.	Proposed Work.	Expenditure proposed by the Government.	Expenditure recommended by the Committee.	Amount in excess of that proposed.	Amount in reduction of that proposed.	Remarks.
		£	£	£	£	
1894.	Brought forward ...£	12,670,896	8,081,326	34,938	4,624,508	
7 Feb. to 22 Mar.	Sewerage Works for Parramatta.* (Second reference.)	75,926	.....	.....	75,926	The Committee decided that it was not expedient the proposed works should be carried out, for the reasons that the scheme had not been adequately considered, and that, according to the evidence, Parramatta was neither willing nor able to pay the rate necessary to provide the interest on the expenditure, and did not want the proposed works.
6 Mar. to 16 April.	Deviation to avoid the Lithgow Zigzag.	181,072	.....	.....	181,072	The Committee were of opinion that as the professional evidence, as well as much of the evidence generally, indicated that the proposed deviation was not a matter of urgency it was not expedient the work should be carried out.
9 April, to 22 May.	Railway from Temora to Wyalong.*	104,430	.....	.....	104,430	The Committee were of opinion that the decision upon the proposal should be deferred for six months.
11 April, to 20 June.	Removal of Pyrmont and Glebe Island Bridges.*	296,500	.....	.....	296,500	The Committee recommended that when renewal becomes necessary the existing bridges at Darling Harbour and Glebe Island should be replaced by timber structures of a kind specified in their report, which report, however, in consequence of the sudden dissolution of Parliament was not presented to the Legislative Assembly.
3 Oct. to 14 Nov.	Removal of Pyrmont and Glebe Island Bridges.* (Second reference.)	296,500	82,500	.....	214,000	The Committee recommended that the Pyrmont Bridge be replaced by a timber bridge with steel span, to cost £82,500, and decided that the Glebe Island Bridge did not at present require renewal.
19 Dec. to 27 Feb., 1895.	Railway from Jerilderie to Berrigan.	43,543	43,543	.....	.....	The construction of this railway was recommended, with the condition that the estimated cost, £2,000 per mile, should include goods and grain sheds, engineering charges, and all contingencies.
7 Mar. to 10 May.	Railway from Parkes to Condobolin.	127,000	127,000	....	.....	In this inquiry the Committee, while considering it expedient the railway should be constructed, resolved that the cost should not exceed £2,100 per mile, including the cost of land resumptions.
17 May to 28 June.	Railway from Temora to Wyalong.* (Second reference.)	92,000	.....	.....	92,000	The Committee, in deciding against this proposed work, were of opinion that at the present time there is no justification for its construction, and the prospects of Wyalong's future are not such as to lead them to conclude that the line should be built in anticipation of what may be the condition of the gold-field and the district some years hence.
20 Mar. to 7 May.	Harbour Improvements at Newcastle.	141,000	141,000	.....	.....	In this inquiry the Committee recommended a modification of the works proposed by the Department and an additional work, the cost of the works as recommended by the Committee being about the same as that of the works proposed by the Department.
26 June, to 4 July.	Tramway from Woolwich to the Field of Mars Common.*	19,300	....	.....	19,300	This proposed work was referred to the Fifth Committee who, at the termination of their existence, had inquired partly into it. A motion in the Legislative Assembly to refer the proposal to the Sixth Committee was, however, negatived on 11 December, 1895.
12 Dec. to 14 Dec.	Deviation at Locksley, Great Western Railway.	47,500	47,500	.....	.....	The Committee considered this work to be an urgent and necessary one, and recommended that it be carried out without delay.
17 Dec. to 24 Jan. 1896.	Water Supply for the Town of Tamworth.	32,824	32,824	....	.....	The Committee recommended that this work be carried out, with the proviso that the capacity of the storage reservoir be increased from 35,000,000 to 50,000,000 gallons.
18 Mar. to 8 May.	Electric Tramway from Circular Quay, Sydney, to the Redfern Railway Station; and also along Harris-street to the intersection of John-street.	130,500	130,500	....	.....	Recommended as proposed.
	Carried forward.....£	14,258,991	8,686,193	34,938	5,607,736	

List of Proposed Public Works inquired into by the Committee, &c.—*continued.*

Date of inquiry.	Proposed Work.	Expenditure proposed by the Government.	Expenditure recommended by the Committee.	Amount in excess of that proposed.	Amount in reduction of that proposed.	Remarks.
		£	£	£	£	
1896.	Brought forward	14,258,991	8,686,193	34,938	5,607,736	
1 Jan. to 10 Mar.	Erection of Buildings at Rookwood for Infirm and Destitute Persons.	118,285	62,900	....	55,385	The Committee decided that it was not expedient the proposed works should be carried out, deeming it inadvisable, for reasons stated in their Report, to concentrate the infirm and destitute at Rookwood. The Government estimate for the proposed buildings was £108,350 without, and £118,285 with, provision for sewage. The Committee recommended that the inmates of the Parramatta Asylums be removed, the healthy patients being housed at Rookwood and Liverpool, provision for the chronic and acute sick to be made on Crown lands near Campbelltown.
9 Jan. to 17 July.	Additions to the Treasury Buildings.	21,500	21,500	.....	.....	Recommended as proposed.
20 Feb. to 1 Oct.	Railway from Tamworth to Manilla.	72,150	71,875	.....	275	The Committee's recommendation provided for an amended route, the cost of the railway not to exceed £2,500 per mile.
21 April, to 20 May.	Railway from Nevertire to Warren.	32,730	32,730	.....	.....	Recommended as proposed.
12 May, to 31 July.	Construction of Locks and Weirs on the River Darling.	121,100	.....	.....	121,100	The Committee negatived this proposed work.
5 June, to 19 Aug.	Railway from Berrigan to Finley.	27,250	27,250	.....	.....	The Committee recommended that this proposed railway should be constructed, the cost not to exceed £2,000 per mile.
16 June to 24 July.	Improvement of Cook's River.	36,400	15,000	.....	21,400	As recommended by the Committee the construction of the proposed works would involve an expenditure of £15,000—a reduction on the Departmental estimate of £21,400—which, in the opinion of the Committee, would meet the requirements of the case.
1 Sept. 1896. to April, 1897.	Railway from Moree to Inverell.	279,500	279,500	.....	.....	The Committee resolved that it was expedient this railway should be constructed as proposed.
28 Oct. 1896, to 10 Feb., 1897.	Construction of a Deep-water Harbour at Port Kembla.	440,000	200,000	.....	240,000	The Departmental estimate of cost provided for the construction of two breakwaters, known respectively as the northern and eastern, and the necessary equipment of the port for coal-shipping and general commercial purposes. The Committee were of opinion, however, that the proposed harbour would be rendered sufficiently secure to meet present requirements if the eastern breakwater only were carried out, and the estimated cost reduced by £240,000.
5 Aug. to 10 Dec., 1896.	Railway from Condobolin to Broken Hill.	955,063	.....	....	955,063	The Committee, while having regard to the various aspects of this proposed work, and considering also that the annual loss on the working of the railway would amount to £60,000, were of opinion that it should not, at present, be proceeded with.
11 Feb., 1897, to 13 April.	*Sewerage Works for Parramatta. (Third Reference).	60,000	60,000	.....	.....	This work was passed by the Committee with the provision that the cost should not exceed the Departmental estimate, and that the carrying out of the work should be subject to a guarantee (by the Municipal Council of Parramatta) of the annual payment required to cover maintenance and interest, and redemption of the principal outlay.
	£	16,422,969	9,456,948	34,938	7,000,959*	

* Works marked with an asterisk have been referred to the Committee more than once, and allowing for these repeated references, and for the expenditure recommended in two instances in excess of that proposed, the actual saving effected amounts to £4,941,839.

Work respecting which the Inquiry is proceeding.

New Houses of Parliament for the Colony—£530,000.

Work respecting which the Inquiry has not yet been commenced.

Duplicate Main from Prospect to Potts' Hill—£100,000 (as voted).

PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS.

RETURN SHOWING THE COURSE OF THE COMMITTEES' INQUIRIES FROM THE REFERENCE OF THE WORKS TO THE ULTIMATE ACTION RESPECTING THEM.

FIRST COMMITTEE—FROM 12 JUNE, 1888, TO 22 OCTOBER, 1888.

MEMBERS OF THE COMMITTEE.

Legislative Council.

The Honorable John Lackey, Chairman.
The Honorable George Campbell.
The Honorable William Henry Suttor.
The Honorable James Watson.
The Honorable Frederick Thomas Humphery.

Legislative Assembly.

Joseph Palmer Abbott, Esquire, Vice-Chairman.
James Nixon Brunker, Esquire.*
Henry Copeland, Esquire.
Alexander Kethel, Esquire.
John Rendell Street, Esquire.
Thomas Michael Slattery, Esquire.
Jacob Garrard, Esquire.
Sydney Smith, Esquire.

* James Nixon Brunker, Esquire, by reason of his accepting the office of Minister for Lands, did not take his seat as a member of the Committee.

Proposed Work.	Date of reference to Committee.	Date upon which inquiry was opened.	Date upon which Sectional Committee was appointed.	Date of Sectional Committee's Report.	Date of Committee's Report.	Statement of Committee's recommendation.	How dealt with by Parliament.	Date o Parliamentary action.
Wharfage Accommodation, Woolloomooloo Bay.	1888. 23 July..... ...	1888. 19 September	.....	.....	1888. Inquiry completed by Second Committee.	See Second Committee.	See Second Committee.	See Second Committee.
Improvements to the Circular Quay.	23 ,, ...	4 ,, ...	.....	.....	22 October ...	The Committee recommended an alteration in the plan of these improvements, by which the estimated total cost would be increased from £120,000 to £125,000.	Passed.	Legislative Assembly—11 April, 1889—Bill read third time. Legislative Council—24 April, 1889—Bill read third time; 30 April, 1889—Assent reported.
Storage Reservoir at Potts' Hill	23 ,, ...	26 ,, ...	.....	.....	22 ,, ...	Recommended as proposed.	Passed.	Legislative Assembly—17 May, 1889—Bill read third time. Legislative Council—30 May, 1889—Bill read third time; 5 June, 1889—Assent reported.

FIRST COMMITTEE—*continued.*

Proposed Work.	Date of reference to Committee.	Date upon which inquiry was opened.	Date upon which Sectional Committee was appointed.	Date of Sectional Committee's Report.	Date of Committee's Report.	Statement of Committee's recommendation.	How dealt with by Parliament.	Date of Parliamentary action
Second Pipe between Potts' Hill and Crown-street.	1888. 23 July.....	1888. 26 September	.....	....	1888. 22 October ...	Recommended as proposed.	Passed [Sydney Water Supply (Partial Reduplication) Bill].	Legislative Assembly—24 July, 1889—Bill read third time. Legislative Council—17 Sept., 1889—Bill read third time; 30 Sept., 1889—Assent reported.
Dredge and Plant for Sydney Harbour.	23 ,, ...	Dealt with by Third Committee.	.....	... .	....	See Third Committee.	See Third Committee.	See Third Committee.
Improvements to the Entrance of the Richmond River.	23 ,, ...	,, ,,	.. ..	.. ..	.. ..	,, ,,	,, ,,	,, ,,
Bridge at the Spit, Middle Harbour.	23 ,, ...	Dealt with by Second Committee.	.....	.. ..	....	See Second Committee.	See Second Committee.	See Second Committee.
New Central Police Court	23 ,, ...	13 September	.....	....	22 October ...	Recommended as proposed.	Passed.	Legislative Assembly—15 May, 1889—Bill read third time. Legislative Council—23 May, 1889—Bill read third time; 30 May, 1889—Assent reported.
Improvements to the Entrance of the Clarence River.	23 ,, ...	Dealt with by Third Committee.	.....	.....	.....	See Third Committee.	See Third Committee.	See Third Committee.
Drainage Works, Manly	23 ,, ...	4 October ...	.....	.....	22 October ...	The Committee recommended the adoption of a modified plan of these drainage works, by which the estimated total cost would not exceed £22,000, or £12,114 less than the original estimate.	Passed.	Legislative Assembly—23 May, 1889—Bill read third time; 3 Sept., 1889—Bill finally passed. Legislative Council—20 June, 1889—Bill read third time; 12 Sept., 1889—Assent reported.
Drainage Works, North Shore	23 ,, ...	10 ,, ...	.....	.....	22 ,, ..	The Committee recommended the adoption of the complete scheme proposed in relation to this work, the estimated cost of which, as shown by the evidence, was £107,000.	Passed.	Legislative Assembly—17 April, 1889—Bill read third time; 15 May, 1889—Bill finally passed. Legislative Council—9 May, 1889—Bill read third time; 22 May, 1889—Assent reported.
Drainage Works for the Western Suburbs.	23 ,, ...	Dealt with by Second and Third Committees.	.....	.....	.....	See Third Committee.	See Third Committee.	See Third Committee.
Harbour Improvements at Newcastle.	23 ,, ...	31 August ...	.. ..	....	22 October ...	Recommended as proposed.	Passed.	Legislative Assembly—11 April, 1889—Bill read third time. Legislative Council—24 April, 1889—Bill read third time; 30 April, 1889—Assent reported.

SECOND COMMITTEE—FROM 24 OCTOBER, 1888, TO 19 JANUARY, 1889.

MEMBERS OF THE COMMITTEE.

LEGISLATIVE COUNCIL.

The Honorable JOHN LACKEY, Chairman.
The Honorable GEORGE CAMPBELL.
The Honorable WILLIAM HENRY SUTTOR.
The Honorable JAMES WATSON.
The Honorable FREDERICK THOMAS HUMPHERY.

LEGISLATIVE ASSEMBLY.

JOSEPH PALMER ABBOTT, Esquire, Vice-Chairman.
HENRY COPELAND, Esquire.
JACOB GARRARD, Esquire.
ALEXANDER KETHEL, Esquire.
SYDNEY SMITH, Esquire.
THOMAS MICHAEL SLATTERY, Esquire.
JOHN RENDELL STREET, Esquire.
DANIEL O'CONNOR, Esquire.

Proposed Work	Date of reference to Committee.	Date upon which inquiry was opened.	Date upon which Sectional Committee was appointed.	Date of Sectional Committee's Report.	Date of Committee's Report.	Statement of Committee's recommendation.	How dealt with by Parliament.	Date of Parliamentary action.
	1888.	1888.			1889.			
Wharfage Accommodation, Woolloomooloo Bay.	23 July.....	19 September	.....	.....	10 January	The Committee were of opinion that the proposed expenditure was not justified either by the requirements in connection with the wharfage accommodation of the port, or by the nature of the proposal if regarded as a scheme for the improvement of a very valuable Government property.	Not dealt with.	....
Dredge and Plant for Sydney Harbour.	23 ,, ...	Dealt with by Third Committee.	.....	.....	.....	See Third Committee.	See Third Committee.	See Third Committee.
Improvements to the Entrance of the Richmond River.	23 ,, ...	,, ,,	.....	.....	.....	,, ,,	,, ,,	,, ,,
Bridge at the Spit, Middle Harbour.	23 ,, ...	16 November	.....	....	11 January ...	The Committee decided that the proposed expenditure was not justified by the evidence, and that a steam-punt would meet the requirements of the district in the vicinity of the proposed work for some years to come.	Not dealt with.	....
Improvements to the entrance of the Clarence River.	23 ,, ...	Dealt with by Third Committee.	.....	....	.....	See Third Committee.	See Third Committee.	See Third Committee.
Drainage Works for the Western Suburbs.	23 ,, ...	7 December	.. ..	.....	Inquiry completed by Third Committee.	,, ,,	,, ,,	,, ,,

THIRD COMMITTEE—FROM 7 JUNE, 1889, TO 6 JUNE, 1891.

MEMBERS OF THE COMMITTEE.

Legislative Council.

* The Honorable John Lackey, Chairman.
The Honorable Andrew Garran.
* The Honorable James Watson.
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, Vice-Chairman.
Henry Copeland, Esquire.
James Ebenezer Tonkin, Esquire.
William Springthorpe Dowel, Esquire.
* John Sutherland, Esquire.
Edward William O'Sullivan, Esquire.
* John Hurley, Esquire.
* Charles Alfred Lee, Esquire.
* William McCourt, Esquire.
* James Patrick Garvan, Esquire.

[* Shortly after the first meeting of the third Committee, John Sutherland, Esquire, died, and his place was filled by the appointment of Charles Alfred Lee, Esquire. Subsequently the Honorable James Watson resigned his seat on the Committee, and the Honorable George Henry Cox was appointed in his place. On 22nd October, 1890, Mr. Joseph Palmer Abbott, having been appointed Speaker of the Legislative Assembly, resigned his position as Chairman and member of the Committee. The Honorable John Lackey, who at that time was Vice-Chairman of the Committee, was appointed Chairman in Mr. Abbott's place, and Mr. Jacob Garrard was chosen as Vice-Chairman. Mr. William McCourt was appointed a member of the Committee on 16th July, 1890, in the place of Mr. John Hurley, whose seat became vacant by reason of his resignation from the Legislative Assembly; and Mr. James Patrick Garvan was appointed a member on the 6th November, 1890, in the room of Mr. Joseph Palmer Abbott.]

Proposed Work.	Date of reference to Committee.	Date upon which inquiry was opened.	Date upon which Sectional Committee was appointed.	Date of Sectional Committee's Report.	Date of Committee's Report.	Statement of Committee's recommendation.	How dealt with by Parliament.	Date of Parliamentary action.
Dredge and Plant for Sydney Harbour.	23 July, 1888	22 Jan., 1890	.....	....	6 Feb., 1890	The evidence showed that this class of dredge was not required.	Not dealt with.	....
Improvements to the Entrance of the Richmond River.	23 ,, ,,	26 June, 1889	.....	.....	30 Sept., 1889	The Committee recommended that the proposed works should be carried out in a certain order, so that the results from the works first constructed might be ascertained before others were proceeded with.	Passed.	Legislative Assembly—23 July, 1890—Bill read third time. Legislative Council—28 Aug., 1890—Bill read third time; 3Sept., 1890—Assent reported.
Improvements to the Entrance of the Clarence River.	23 ,, ,,	23 Oct., ,,	14 Nov., 1889	28 Jan., 1890	2 April, 1890	In this case the Committee recommended the construction of only a portion of the works proposed, as they were of opinion that when this portion had been constructed it might be found that the remainder would not be required.	Passed.	Legislative Assembly—23 July, 1890—Bill read third time. Legislative Council—17 Sept., 1890—Bill read third time; 1 Oct., 1890—Assent reported.
Drainage Works for the Western Suburbs.	23 ,, ,,	7 Dec., 1888	.....	.....	27 Aug., 1889	Recommended as proposed.	Passed.	Legislative Assembly—26 Sept., 1889—Bill read third time. Legislative Council—26 Sept., 1889—Bill read third time; 30 Sept., 1889—Assent reported.

THIRD COMMITTEE—*continued.*

Proposed Work.	Date of reference to Committee.	Date upon which inquiry was opened.	Date upon which Sectional Committee was appointed.	Date of Sectional Committee's Report.	Date of Committee's Report.	Statement of Committee's recommendation.	How dealt with by Parliament.	Date of Parliamentary action.
Railway from Goulburn to Crookwell.	31 July, 1889	22 Aug., 1889	29 Aug., 1889	17 Sept., 1889	19 Dec., 1889	The Committee considered that the cost of this railway should not exceed £4,500 per mile, and that a saving should also be effected by utilizing a certain portion of the present main line instead of taking the propcsed railway through a part of the city of Goulburn.	Negatived by the Legislative Council.	Legislative Assembly—25 Sept., 1895—Bill read third time. Legislative Council—12 Nov., 1895—Second reading resolved in the negative.
Railway from Nyngan to Cobar	1 Aug., ,,	25 Sept., ,,	24 Sept., ,,	31 Oct., ,,	18 Feb., 1890	The Committee recommended the construction of this railway as part of a line which should be extended to Wilcannia and Broken Hill.	Passed.	Legislative Assembly—10 July, 1890—Bill read third time. Legislative Council—17 July, 1890—Bill read third time; 23 July, 1890—Assent reported.
Railway from Kiama to Nowra	1 ,, ,,	4 Dec., ,,	14 Jan., 1890	30 Jan., 1890	22 April, ,,	In this case there was an original estimate of £441,663. The amount recommended by the Committee was £381,390. The reduction was due to an amended estimate made by the Acting Engineer-in-Chief for Railways after the railway was referred to the Committee.	Passed.	Legislative Assembly—10 July, 1890—Bill read third time. Legislative Council—7 Aug., 1890—Bill read third time; 13 Aug., 1890—Assent reported.
Railway from Marrickville to the Burwood Road.	1 ,, ,,	19 Nov., ,,	.. ..	.....	2 ,, ,,	Recommended as proposed.	Passed.	Legislative Assembly—11 Dec., 1890—Bill read third time. Legislative Council—18 Dec., 1890—Bill read third time; 19 May, 1891—Assent reported.
Railway from Culcairn to Corowa.	6 ,, ,,	29 Aug., ,,	29 Aug., 1889	11 Sept., 1889	12 Dec., 1889	The Committee were of opinion that this line should be constructed at a cost not exceeding £3,500 per mile.	Passed.	Legislative Assembly—10 July, 1890—Bill read third time. Legislative Council—31 July, 1890—Bill read third time; 6 Aug., 1890—Assent reported.
Breakwater at Byron Bay	6 ,, ,,	31 Oct., ,,	14 Nov., ,,	28 Jan., 1890	15 April, 1890	The original estimate for this work was £162,000. The estimate placed before the Committee, which they adopted in their recommendation, was £241,723. The increase was due to a difficulty in obtaining stone.	Negatived by the Legislative Council.	Legislative Assembly—17 July, 1890—Bill read third time. Legislative Council—15 Oct., 1890—Bill negatived in Council on motion, "That it be read the second time this day six months."
Railway to connect North Shore Railway with Port Jackson, at Milson's Point.	7 ,, ,,	9 ,, ,,	.....	.....	11 Dec., 1889	The Committee considered, for various reasons stated in their report on the subject, that the work as proposed should not be carried out.	See second reference.	See second reference.
Railway from Grafton to the Tweed.	27 Sept., ,,	12 Nov., ,,	14 Nov., ,,	28 Jan., ,,	15 April, 1890	The Committee recommended that this railway should be constructed from Lismore to Murwillumbah, instead of from Grafton to Murwillumbah, the Committee's recommendation involving a length of about 60½ miles as compared with 140 miles 76 chains, the length of the line as referred to them by the Legislative Assembly.	Passed.	Legislative Assembly—17 July, 1890—Bill (Lismore to the Tweed Railway Bill) read third time. Legislative Council—10 Sept., 1890—Bill read third time; 24 Sept., 1890—Assent reported.
Railway from Cootamundra to Temora.	27 ,, ,,	15 Jan., 1890	16 Jan., 1890	11 Feb., ,,	23 ,, ,,	The Committee considered that the cost of constructing this railway should not exceed £3,300 per mile.	Passed.	Legislative Assembly—23 July, 1890—Bill read third time. Legislative Council—17 Sept., 1890—Bill read third time; 1 Oct., 1890—Assent reported.

THIRD COMMITTEE—*continued.*

Proposed Work.	Date of reference to Committee.	Date upon which inquiry was opened.	Date upon which Sectional Committee was appointed.	Date of Sectional Committee's Report.	Date of Committee's Report.	Statement of Committee's recommendation.	How dealt with by Parliament.	Date of Parliamentary action.
Railway from Mudgee to Gulgong.	27 Sept., 1889	23 Jan., 1890	12 Mar., 1890	26 Mar., 1890	6 May, 1890	The Committee decided against this work on the ground that any extension of the Mudgee Railway should form part of a more comprehensive proposal, the consideration of which should be deferred until after the suggestion for the connection of the Northern and Western systems, by a line between Dubbo and Werris Creek, had been dealt with.	Not dealt with.	.....
Railway from Moss Vale to Robertson.	1 Oct., ,,	23 ,, ,,	30 Jan., ,,	12 Feb., ,,	29 April, ,,	The Committee negatived this proposal because they considered another route, described in their report, was preferable.	,,	....
Railway from Molong to Parkes and Forbes.	1 ,, ,,	22 ,, ,,	12 Feb., ,,	19 Mar., ,,	21 May, ,,	Recommended as proposed.	Passed.	Legislative Assembly—23 July, 1890—Bill read third time. Legislative Council—21 Aug., 1890—Bill read third time; 27 Aug., 1890—Assent reported.
Bridge over Tarban Creek, Parramatta River.	1 ,, ,,	12 Feb., ,,	.....	....	15 April, ,,	The Committee considered this bridge to be unnecessary.	Not dealt with.	....
Bridge over the Hunter River, at Jerry's Plains.	1 ,, ,,	20 ,, ,,	4 Mar., ,,	11 Mar., ,,	15 ,, ,,	The Committee considered that a less expensive bridge would be sufficient to meet requirements.	,, ,,	.. ..
Bridge to connect Bullock Island with the Mainland at Newcastle.	1 ,, ,,	25 ,, ,,	4 ,, ,,	11 ,, ,,	29 ,, ,,	The Committee considered that this proposed expenditure was premature, pending the carrying out of certain reclamation works.	,, ,,	... .
Iron Bridge at Cowra	1 ,, ,,	12 ,,	18 Feb., ,,	19 ,, ,,	21 May, ,,	The original proposal represented an expenditure of £69,971, which amount was afterwards reduced to £26,537, as the result of a revision of the system of bridge-building in the Colony, and the construction of the bridge at the reduced cost was recommended by the Committee.	Passed.	Legislative Assembly—23 July, 1890—Bill read third time. Legislative Council—21 Aug., 1890—Bill read third time; 27 Aug., 1890—Assent reported.
Hospital for the Insane upon the Kenmore Estate, near Goulburn.	1 ,, ,,	28 May, ,,	.....	.....	Inquiry not completed.	This proposed work, after being partly considered, was withdrawn from the Committee by resolution of the Assembly.	Rescinded.	Legislative Assembly—2 July, 1890—Resolution passed rescinding previous resolution referring proposed work to the Committee.
Offices for Board of Water Supply and Sewerage.	1 ,, ,,	14 Jan., ,,	.....	....	11 Feb., 1890	Recommended as proposed.	Passed.	Legislative Assembly—7 Nov., 1890—Bill read third time. Legislative Council—20 Nov., 1890—Bill read third time; 27 Nov., 1890—Assent reported.
Reticulation of Western Suburbs Drainage Scheme.	1 ,, ,,	14 ,, ,,	.....	.....	6 ,, ,,	,, ,,	,,	Legislative Assembly—23 July, 1890—Bill read third time. Legislative Council—24 Sept., 1890—Bill read third time; 8 Oct., 1890—Assent reported.

THIRD COMMITTEE—*continued.*

Proposed Work]	Date of reference to Committee.	Date upon which inquiry was opened.	Date upon which Sectional Committee was appointed.	Date of Sectional Committee's Report.	Date of Committee's Report.	Statement of Committee's recommendation.	How dealt with by Parliament.	Date of Parliamentary action.
Extension of Sydney Water Supply to Southern Suburbs —Hurstville, Rockdale.	1 Oct., 1889	14 Jan., 1890	.....	.....	11 Feb., 1890	This expenditure was rendered unnecessary by reason of a temporary water-supply scheme being sufficient to meet requirements for some years.	Not dealt with.	....
Cable Tramway from King-street, *via* William-street, to Ocean-street.	,, ,,	22 ,, ,,	....	....	2 June, 1891	Recommended as proposed.	Passed.	Legislative Assembly—8 March, 1892—Bill read third time. Legislative Council—10 March, 1892—Bill read third time; 17 March, 1892—Assent reported.
Cable Tramway through George, Pitt, and Harris Streets, Sydney	1 ,, ,,	25 Nov. ,,	.....	.....	4 ,, ,,	The Committee considered that it was not expedient, for reasons stated in their report, that this tramway should be constructed.	Not dealt with.	....
Railway to connect North Shore Railway with the deep waters of Port Jackson, at Milson's Point (second reference).	8 May, 1890	28 May, ,,	.. ..	.....	21 Aug., 1890	This proposal was before the Committee on a previous occasion when it was negatived; but having been referred to the Committee for further consideration, and circumstances appearing in the second inquiry which justified the construction of the railway, the Committee approved of the proposed work.	Passed.	Legislative Assembly—12 Nov., 1890—Bill read third time. Legislative Council—20 Nov., 1890—Bill read third time; 27 Nov., 1890—Assent reported.
College for the Training of Teachers of Public Schools.	21 Nov., ,,	11 Feb., 1891	.....	.....	19 Mar., 1891	Recommended as proposed.	Not dealt with.	....
Hospital Buildings, Macquarie-street.	3 Dec., ,,	10 Dec., 1890	.....	.....	12 May, ,,	In this case two sets of plans for the buildings were submitted to the Committee, one representing a design that was estimated to cost £140,000, and the other a design to cost £56,000, and the Committee approved of the latter.	Passed.	Legislative Assembly—9 March, 1892—Bill read third time. Legislative Council—17 March, 1892—Bill read third time; 29 March, 1892—Assent reported.
Railway from Cobar to Cockburn.	19 ,, ,,	24 Feb., 1891	.. ..	.....	14 ,, ,,	The Committee recommended the construction of this railway as far as Broken Hill only, thereby reducing the proposed expenditure (£1,168,000) by £150,000.	....	Legislative Assembly—25 June, 1895—Motion to go into Committee to bring in a Bill.
Railway from Glen Innes to Inverell.	19 ,, ,,	21 April, ,,	23 April, 1891	2 June, 1891	See Fourth Committee.	See Fourth Committee.	See Fourth Committee.	....
Extension of the Kiama to Nowra Railway into the town of Nowra.	19 ,, ,,	19 Feb., ,,	.....	.....	21 April, 1891	Recommended as proposed.	Not dealt with.	....

FOURTH COMMITTEE—FROM 31 MARCH, 1892, TO 25 JUNE, 1894.

MEMBERS OF THE COMMITTEE.

LEGISLATIVE COUNCIL.

The Honorable WILLIAM HENRY SUTTOR, Vice-Chairman.
The Honorable JAMES HOSKINS.
The Honorable FREDERICK THOMAS HUMPHERY.
* The Honorable ANDREW GARRAN, LL.D.
The Honorable JOHN DAVIES, C.M.G.
* The Honorable WILLIAM JOSEPH TRICKETT.

LEGISLATIVE ASSEMBLY.

JACOB GARRARD, Esquire, Chairman.
THOMAS THOMSON EWING, Esquire.
WILLIAM CHANDOS WALL, Esquire.
WILLIAM MCCOURT, Esquire.
JOHN CASH NEILD, Esquire.
EDWARD WILLIAM O'SULLIVAN, Esquire.
CHARLES COLLINS, Esquire.
HENRY DAWSON, Esquire.

* The Honorable Andrew Garran, LL.D., on 5th October, 1892, resigned his seat as a member of the Committee, and on 12th October, 1892, the Honorable William Joseph Trickett was appointed to fill the vacancy.]

Proposed Work	Date of reference to Committee.	Date upon which inquiry was opened.	Date upon which Sectional Committee was appointed.	Date of Sectional Committee's Report.	Date of Committee's Report.	Statement of Committee's recommendation.	How dealt with by Parliament.	Date of Parliamentary action.
Improvements at Darling Island	29 Mar., 1892	5 May, 1892	.....	.....	2 June, 1892	The Committee considered that the proposed works might be postponed for the present without inconvenience, and that a more suitable design might be submitted.	Not dealt with.	.....
Water Supply for Tamworth	29 ,, ,,	12 Oct., ,,	12 Oct., 1892	15 Nov., 1892	21 Dec., ,,	Recommended as proposed with a provision as to the quantity of water obtainable, and the resumption of land surrounding the well in the drift forming the source of supply.	Passed.	Legislative Assembly—29 May, 1894—Bill read third time. Legislative Council—31 May, 1894—Bill read third time; 5 June, 1894—Assent reported.
Storm-water Sewers discharging into Johnstone's Bay.	29 ,, ,,	7 June, ,,	.....	.....	12 July, ,,	Recommended as proposed.	,,	Legislative Assembly—7 June, 1894—Bill read third time. Legislative Council—7 June, 1894—Bill read second time and passed through all stages; 7 Aug., 1894—Assent reported
Reservoir at Centennial Park for Sydney Water Supply.	29 ,, ,,	15 ,, ,,	.....	.....		Recommended with an alteration of site.	,,	Legislative Assembly—20 Dec., 1894—Bill read thir time. Legislative Council—21 Dec., 1894—Bill rea third time, 26 Feb., 1895—Assent reported
Water Supply for Wollongong and the Surrounding Districts.	29 ,, ,,	14 July, ,,	.....	.....	4 Aug., ,, 24 ,, ,,	The Committee found that the Water Supply proposed for the surrounding districts was not needed, and that the estimate of cost for supplying Wollongong might be reduced to £30,000.	Not dealt with.	.....
Second Pipe-line from Walka to Buttai, for Hunter River District Water Supply	29 ,, ,,	28 ,, ,,	.....	.....	16 ,, ,,	Recommended as proposed.	.....	Legislative Assembly—2 Oct., 1895—Bill read thir time Legislative Council—12 Nov., 1895—Bill read third time, 9 Nov., 1895—Assent reported.
Sewerage Works at Cottage Creek.	29 ,, ,,	26 ,, ,,	.....	.....	9 ,, ,,	The estimated cost of this work was £25,000, which provided for a covered sewer; but the Committee found that a cover was not necessary, and that by constructing an open sewer the cost could be reduced by £12,000	Passed.	Legislative Assembly—2 May, 1895—Bill read third time. Legislative Council—30 May, 1895—Bill read third time; 25 June, 1895—Assent reported
Water Supply for Lithgow	29 ,, ,,	14 Sept., ,,	22 Oct., ,,	24 Oct., ,,	16 Nov., ,,	Recommended as proposed.	,,	Legislative Assembly—5 April, 1894—Bill read third time. Legislative Council—18 April, 1894—Bill read third time; 1 May, 1894—Assent reported.
Sewerage Works for Parramatta	29 ,, ,,	22 June, ,,	.....	.....	4 Oct., ,,	The construction of this work the Committee did not recommend, as they were of opinion that the sewage farm included in the scheme was too small for the purpose, and that the sewage should be dealt with by precipitation and filtration, or other effective modern process, at a proposed pumping station at Clay Cliff Creek.	See second reference.	See second reference.

FOURTH COMMITTEE—*continued.*

Proposed Work.	Date of reference to Committee.	Date upon which inquiry was opened.	Date upon which Sectional Committee was appointed.	Date of Sectional Committee's Report.	Date of Committee's Report.	Statement of Committee's recommendation.	How dealt with by Parliament.	Date of Parliamentary action.
Water Supply for Armidale ...	29 Mar., 1892	15 Sept., 1892	12 Oct., 1892	20 Oct., 1892	16 Nov., 1892	Recommended as proposed.	Passed.	Legislative Assembly—22 May, 1894—Bill read third time. Legislative Council—31 May, 1894—Bill read third time; 5 June, 1894—Assent reported.
Railway from Eden to Bega ...	29 ,, ,,	10 July, ,,	11 Aug., ,,	7 Sept., ,,	26 Oct., ,,	The Committee considered that the resources of the district did not warrant the construction of such an expensive line, but they were of opinion that a cheaply constructed railway might be favourably considered.	Not dealt with.	....
Railway from Grafton to Lismore.	29 ,, ,,	14 June, ,,	15 June, ,,	10 Aug., ,,	28 Sept., ,,	The Committee decided that, for the present, only the Lismore to Casino section of the proposed railway should be constructed, that the cost should not exceed £6,000 per mile, and that the betterment principle be applied to the land to be served by the proposed line.	,, ,,	....
Railway from Glen Innes to Inverell.	29 ,, ,,	6 April, ,,	23 April, 1891 (See Third Committee.)	2 June, 1891 (See Third Committee.)	27 May, ,,	The evidence in this case, which was partly inquired into by the Third Committee and partly by the Fourth Committee, showed that the estimated cost of constructing the railway was excessive, and indicated the probability of a serious annual loss in the working of the line. In addition to this, the Committee were not as fully informed as desirable with regard to connecting Inverell not only with the Great Northern Railway but with the coast, a matter of considerable importance in the inquiry. The Committee therefore did not recommend that the railway should be constructed.	See second reference.	....
Railway from Jerilderie to Deniliquin.	29 ,, ,,	31 May, ,,	2 June, 1892	23 June, 1892	18 Aug., ,,	The Committee were of opinion that the consideration of this proposed work should be postponed until it should be determined by Parliament as a matter of public policy to purchase the Deniliquin to Moama Railway.	Not dealt with.	....
Lunatic Asylum at Kenmore, near Goulburn (second reference).	31 ,, ,,	12 July, ,,	.....	....	24 ,, ,,	Recommended as proposed.	Passed.	Legislative Assembly—18 October, 1894—Bill read third time. Legislative Council—1 November, 1894 Bill read third time; 14 November, 1894—Assent reported.
Railway from Glen Innes to Inverell (second reference).	27 Oct., ,,	17 Nov., ,,	23 Nov., ,,	13 Dec., ,,	10 Jan., 1893	The Committee considered it expedient this railway should be constructed, provided that the cost did not exceed £7,000 per mile, that special local rates were charged until the railway paid working expenses and interest on cost of construction, and that the betterment principle was applied to the land served by the railway.	Negatived.	Legislative Assembly—18 April, 1894—Bill read third time. Legislative Council—7 June 1894—Bill negatived on motion for second reading.
Waterworks for the town of Junee.	2 Feb., 1893	14 Feb., 1893	15 Feb., 1893	28 Feb., 1893	14 Mar., ,,	The Committee recommended that the proposed works should be carried out, conditionally on the Railway Commissioners entering into an agreement for a period of not less than ten years to pay a minimum of £1,900 per annum for water supplied for railway purposes at Junee and Bethungra.	Passed.	Legislative Assembly—4 April, 1894—Bill read third time. Legislative Council—18 April, 1894—Bill read third time; 1 May, 1894—Assent reported.

FOURTH COMMITTEE—*continued.*

Proposed Work.	Date of reference to Committee.	Date upon which inquiry was opened.	Date upon which Sectional Committee was appointed.	Date of Sectional Committee's Report.	Date of Committee's Report.	Statement of Committee's recommendation.	How dealt with by Parliament.	Date of Parliamentary action.
Railway from Narrabri to Moree.	1 Nov., 1893	14 Nov., 1893	15 Nov., 1893	5 Dec., 1893	12 Jan., 1894	Recommended as proposed, with the condition that the work be not undertaken until a Betterment Act is passed.	Passed.	Legislative Assembly—20 March, 1895—Bill read third time. Legislative Council—4 April, 1895—Bill read third time; April—Assent reported.
Sewerage Works for Parramatta (second reference).	1 Feb., 1894	7 Feb., 1894	.....	.....	22 Mar., ,,	The Committee decided that it was not expedient the proposed works should be carried out, for the reasons that the scheme had not been adequately considered, and that, according to the evidence, Parramatta was neither willing nor able to pay the rate necessary to provide the interest on the expenditure, and did not want the proposed works.	See Sixth Committee.	.....
Deviation to avoid the Lithgow Zigzag.	25 Jan., ,,	6 Mar., ,,	.....	.....	16 April, ,,	The Committee were of opinion that as the professional evidence, as well as much of the evidence generally, indicated that the proposed deviation was not a matter of urgency, it was not expedient the work should be carried out.	Not dealt with.	.....
Railway from Temora to Wyalong.	29 Mar., ,,	9 April, ,,	9 April, 1894	24 April, 1894	28 May, ,,	The Committee were of opinion that owing to the uncertainty of the permanence of the Wyalong goldfield, the decision upon the proposed Railway should be deferred for six months.	See Fifth Committee.	.....
Removal of Pyrmont and Glebe Island Bridges.	25 Jan., ,,	11 ,, ,,	.....	.....	25 June, ,,	The Committee negatived the Departmental scheme, but recommended that when renewal becomes necessary the existing bridges at Darling Harbour and Glebe Island should be replaced by timber structures of a kind specified in their report, which report, however, in consequence of the sudden dissolution of Parliament was not presented to the Legislative Assembly.	,, ,,	.....

FIFTH COMMITTEE—FROM 19 SEPTEMBER, 1894, TO 5 JULY, 1895.

MEMBERS OF THE COMMITTEE.

LEGISLATIVE COUNCIL.

The Honorable FREDERICK THOMAS HUMPHERY, Vice-Chairman.
The Honorable WILLIAM JOSEPH TRICKETT.
The Honorable JAMES HOSKINS.
The Honorable JOHN DAVIES, C.M.G.
The Honorable CHARLES JAMES ROBERTS, C.M.G.

LEGISLATIVE ASSEMBLY.

* VARNEY PARKES, Esquire, Chairman.
* THOMAS THOMSON EWING, Esquire, Chairman.
JAMES HAYES, Esquire.
ROBERT HENRY LEVIEN, Esquire.
JOHN MOORE CHANTER, Esquire.
CHARLES ALFRED LEE, Esquire.
JAMES GORMLY, Esquire.
EDMUND WILLIAM MOLESWORTH, Esquire.

* On 15th November, 1894, Varney Parkes, Esquire, resigned his seat on the Committee, and on 20th November, 1894, Thomas Thomson Ewing, Esquire, was elected Chairman.

Proposed Work.	Date of reference to Committee.	Date upon which inquiry was opened.	Date upon which Sectional Committee was appointed.	Date of Sectional Committee's Report.	Date of Committee's Report.	Statement of Committee's recommendation.	How dealt with by Parliament.	Date of Parliamentary action.
Removal of Pyrmont and Glebe Island Bridges (second reference).	27 Sept., 1894	3 Oct., 1894	.....	.....	21 Nov., 1894	The Committee recommended that the Pyrmont Bridge be replaced by a timber bridge, with steel span, to cost £82,500; the Glebe Island Bridge, they decided, did not at present require renewal.	.....	Legislative Assembly—8 May, 1895—Motion in Committee to bring in a Bill.
Railway from Jerilderie to Berrigan.	18 Dec., ,,	19 Dec., ,,	8 Jan., 1895	22 Jan., 1895	28 Feb., 1895	The construction of this railway was recommended, with the condition that the estimated cost, £2,000 per mile, should include goods and grain sheds, engineering charges, and all contingencies.	Passed.	Legislative Assembly—7 May, 1895—Bill read third time. Legislative Council—12 June, 1895—Bill read third time; 25 June, 1895—Assent reported.
Railway from Parkes to Condobolin.	6 Mar., 1895	7 Mar., 1895	19 Mar., ,,	3 April, ,,	21 May, ,,	In this inquiry the Committee, while considering it expedient the railway should be constructed, resolved that the cost should not exceed £2,100 per mile, including the cost of land resumption.	,,	Legislative Assembly—27 June, 1895—Bil read third time. Legislative Council—3 July, 1895—Bill read third time; 14 August, 1895—Assent reported.
Railway from Temora to Wyalong (second reference).	7 ,, ,,	17 May ,,	5 June, ,,	19 June, ,,	27 June, ,,	The Committee negatived this proposed work, being of opinion that at the present time there is no justification for the construction of this railway, and that the prospects of Wyalong's future are not such as to lead them to conclude that the line should be built in anticipation of what may be the condition of the goldfield and the district some years hence.	Not dealt with.	.....
Harbour Improvements at Newcastle.	14 ,, ,,	20 Mar. ,,	28 Mar., ,,	9 April, ,,	16 May, ,,	In this inquiry the Committee recommended a modification of the works proposed by the Department and an additional work, the cost of the works as recommended by the Committee being about the same as that of the works proposed by the Department.	Passed.	Legislative Assembly—17 September, 1895—Bill read third time. Legislative Council—6 November, 1895—Bill read third time; 13 November, 1895—Assent reported.
Tramway from Woolwich to the Field of Mars Common.	20 June, ,,	25 June ,,	.....	....	Inquiry not completed.	.. ..	Withdrawn.	Motion to refer work to Sixth Committee negatived—11 December, 1895.

SIXTH COMMITTEE—FROM 11 DECEMBER, 1895.

MEMBERS OF THE COMMITTEE.

Legislative Council.

The Honorable Frederick Thomas Humphery, Vice-Chairman.
*The Honorable John Davies, C.M.G.
The Honorable William Joseph Trickett.
The Honorable James Hoskins.
The Honorable Charles James Roberts, C.M.G.
*The Honorable Daniel O'Connor.

Legislative Assembly.

Thomas Thomson Ewing, Esquire, Chairman.
Henry Clarke, Esquire.
Charles Alfred Lee, Esquire.
John Lionel Fegan, Esquire.
* Angus Cameron, Esquire.
Thomas Henry Hassall, Esquire.
George Black, Esquire.
Francis Augustus Wright, Esquire.
*Frank Farnell, Esquire.

* Since the appointment of the Committee vacancies were caused by the decease of the Honorable John Davies, C.M.G., and Angus Cameron, Esquire. These were subsequently filled by the appointment of the Honorable Daniel O Connor and Frank Farnell, Esquire.

Proposed Work.	Date of reference to Committee.	Date upon which inquiry was opened.	Date upon which Sectional Committee was appointed.	Date of Sectional Committee's Report.	Date of Committee's Report.	Statement of Committee's recommendation.	How dealt with by Parliament.	Date of Parliamentary action.
Deviation at Locksley, Great Western Railway.	11 Dec., 1895	12 Dec., 1895	13 Dec., 1895	14 Dec., 1895	17 Dec., 1895	Recommended as proposed	Passed.	Legislative Assembly—17 December, 1895—Bill passed through all its stages. Legislative Council—18 December, 1895—Bill passed through all its stages.
Water Supply for the Town of Tamworth.	11 Dec., 1895	17 Dec., 1895	8 Jan., 1896	16 Jan., 1896	30 Jan., 1896	The Committee recommended that the proposed work should be carried out, with the proviso that the capacity of the storage reservoir be increased from 35,000,000 to 50,000,000 gallons.	Passed.	Legislative Assembly—27 October, 1896—Bill read third time. Legislative Council—4 November, 1896—Bill read third time; 11 November, 1896—Assent reported.
Electric Tramway from Circular Quay, Sydney, to the Redfern Railway Station; and also along Harris-street to the intersection of John-street.	11 Dec., 1895	18 Mar., 1896	.....	.....	8 May, 1896	Recommended as proposed	Passed.	Legislative Assembly—2 September, 1896—Bill read third time. Legislative Council—10 September, 1896—Bill read third time; 16 September, 1896—Assent reported.

SIXTH COMMITTEE—*continued.*

Proposed Work.	Date of reference to Committee.	Date upon which inquiry was opened.	Date upon which Sectional Committee was appointed.	Date of Sectional Committee's Report.	Date of Committee's Report	Statement of Committee's recommendation	How dealt with by Parliament.	Date of Parliamentary action.
Erection of Buildings at Rookwood for Infirm and Destitute Persons.	11 Dec., 1895	21 Jan., 1896	....		13 Mar., 1896	In this case the Committee deemed it inexpedient that the proposed buildings should be erected, but they recommended that the inmates of the Asylums in Macquarie, George, and Harris Streets, Parramatta, be removed as speedily as possible, and that the healthy destitute be housed at Rookwood and Liverpool; and further that suitable accommodation be provided near Campbelltown on available Crown lands for the chronic and acute sick.	Not dealt with.	....
Additions to the Treasury Building.	18 ,, ,,	9 ,, ,,		..	17 July, ,,	Recommended as proposed	Passed.	Legislative Assembly—2 September, 1896—Bill read third time. Legislative Council—16 September, 1896—Bill read third time; 22 September, 1896—Assent reported.
Construction of Locks and Weirs on the River Darling.	19 ,, ,,	12 May, ,,	15 June, 1896	7 July, 1896	31 July, ,,	Negatived	Not dealt with.	....
Railway from Tamworth to Manilla.	11 ,, ,,	20 Feb., ,,	17 Mar., ,,	31 Mar., ,, 19 June, ,,	1 Oct., ,,		Passed.	Legislative Assembly—4 November, 1896—Bill read third time. Legislative Council—11 November, 1896—Bill read third time; Assent reported, 13 November, 1896.
Railway from Nevertire to Warren.	11 ,, ,,	21 April, ,,	6 May, ,,	14 May, ,,	20 May, ,,	Recommended as proposed	,,	Legislative Assembly—13 August, 1896—Bill read third time. Legislative Council—27 August, 1896—Bill read third time; 9 September, 1896—Assent reported.
Railway from Berrigan to Finley.	28 May, 1896	5 June, ,,	14 July, ,,	28 July, ,,	19 Aug., ,,	The Committee recommended that this work should be carried out, with the proviso that the cost should not exceed £2,000 per mile.	,,	Legislative Assembly—27 October, 1896—Bill read third time. Legislative Council—4 November, 1896—Bill read third time; 11 November, 1896—Assent reported.
Improvement of Cook's River	28 ,, ,,	16 ,, ,,	.....	..	24 July, ,,	As recommended by the Committee the construction of the proposed works would involve an expenditure of £15,000, a reduction on the Departmental estimate of £25,000, and which, in their opinion, would meet the requirements of the case.	Not dealt with.	....

* Supplementary Report

SIXTH COMMITTEE—*continued.*

Proposed Work.	Date of reference to Committee.	Date upon which inquiry was opened.	Date upon which Sectional Committee was appointed.	Date of Sectional Committee's Report.	Date of Committee's Report.	Statement of Committee's recommendation.	How dealt with by Parliament.	Date of Parliamentary action.
Railway from Moree to Inverell	26 Aug., 1896	1 Sept., 1896	29 Sept., 1896	15 Oct., 1896	....	The Committee resolved that it was expedient this railway should be carried out.	Not dealt with	....
Construction of a Deep-water Harbour at Port Kembla.	20 Oct., ,,	28 Oct., ,,	13 Jan., 1897	25 Jan., 1897	10 Feb., 1897	The Committee were of opinion that the proposed harbour would be rendered sufficiently secure to meet present requirements if the eastern breakwater only were carried out, and the estimated cost reduced by £240,000.	,,	....
Railway from Condobolin to Broken Hill.	1 July, ,,	5 Aug., ,,	19 Aug., 1896	15 Oct., 1896	.....	The Committee, while having regard to the various aspects of this proposed work, and considering also that the annual loss on the working of the railway would amount to £60,000, were of opinion that it should not, at present, be proceeded with.	,,	....
Sewerage Works for Parramatta (third reference).	10 Nov., ,,	11 Feb., 1897	....	....	.....	This work was passed by the Committee with the provision that the cost should not exceed the Departmental estimate, and that the carrying out of the work should be subject to a guarantee (by the Municipal Council of Parramatta) of the annual payment required to cover maintenance and interest and redemption of the principal outlay.	,,	....
New Houses of Parliament for the Colony.	,,	14 April, ,,	.....	.....	.....	... .	.....	....
Duplicate Main from Prospect to Potts' Hill.	11 Nov., ,,	.....	....	.....	.....	....	.....	....

PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS.

MINUTES OF PROCEEDINGS.

TUESDAY, 12 *MAY*, 1896.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
Henry Clarke, Esq.,	George Black, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered the proposed Railway from Tamworth to Manilla.

Henry Deane, Esq., Engineer-in-Chief, Railway Construction Branch, Department of Public Works, was sworn, and further examined.

The Committee proceeded to consider the proposed Construction of Locks and Weirs on the River Darling.

Hugh Giffen McKinney, Esq., M.I.C.E., Chief Engineer, Water Conservation Branch, Department of Mines, was sworn, and examined.

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Wednesday, the following day.

WEDNESDAY, 13 *MAY*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
Henry Clarke, Esq.,	George Black, Esq.,

Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered the proposed Locks and Weirs on the River Darling.

Hugh Giffen McKinney, Esq., M.I.C.E., Chief Engineer, Water Conservation Branch, Department of Mines, was sworn, and further examined.

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Thursday, the following day.

THURSDAY, 14 *MAY*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
Henry Clarke, Esq.,	George Black, Esq.,

Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Secretary read the following correspondence:—

Letter from the Secretary to the Railway Commissioners with reference to the Committee's inquiry into the proposed Locks and Weirs on the River Darling, stating that the Commissioners were strongly of opinion that it would be to the advantage of the Colony if the streams lying north of Bourke were to be made as efficient water-ways as possible, so that they might act as feeders to the railway line.

The correspondence was received.

The following account was passed for payment:—

John Fairfax & Sons (*S. M. Herald*)—Advertising Committee's inquiry respecting proposed Electric Tramway from Circular Quay, Sydney, to the Redfern Railway Station; and also along Harris-street to the intersection of John-street ... £1 4 0

The

The Committee further considered the proposed Railway from Nevertire to Warren.

Mr. Trickett, as Chairman of the Sectional Committee appointed to inspect, take evidence, and report with reference to the proposed Railway, brought up the Sectional Committee's Report, and moved that it be received and printed with the minutes of evidence taken before the Sectional Committee.

The motion was agreed to.

The Committee further considered the proposed Locks and Weirs on the River Darling.

Hugh Giffen McKinney, Esq., M.I.C.E., Chief Engineer, Water Conservation Branch, Department of Mines, was sworn, and further examined.

Mr. Lee gave notice that he would move, on Tuesday, 19th May:—"That the Committee proceed to consider the evidence on the proposed Railway from Nevertire to Warren, with a view to reporting on the subject to the Legislative Assembly."

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Friday, the following day.

FRIDAY, 15 *MAY*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
Henry Clarke, Esq.,	George Black, Esq.,

Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Secretary read the following correspondence:—

Letters from Mr. G. R. S. Pickhills, Bourke, and Mr. Charles L. Shainwald (Messrs. E. Rich & Co., Ltd., Sydney and Bourke), offering to give evidence in the Committee's inquiry into the proposed Locks and Weirs on the River Darling.

The correspondence was received.

The following accounts were passed for payment:—

	£	s.	d.
William Drake, shorthand-writer—Accompanying Sectional Committee on the proposed Railway from Nevertire to Warren...	7	15	0
Solomon Joseph (*Tamworth News*)—Advertising visit of Sectional Committee appointed to inspect, take evidence, and report with reference to the proposed Railway from Tamworth to Manilla	1	13	0
Total	£9	8	0

The Committee further considered the proposed Locks and Weirs on the River Darling.

John Harper, Esq., Goods Superintendent, Department of Railways, was sworn, and examined.

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Tuesday, 19th May.

TUESDAY, 19 *MAY*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
Henry Clarke, Esq.,	George Black, Esq.,

Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

Mr. Lee's notice of motion for the consideration of the evidence on the proposed Railway from Nevertire to Warren was postponed.

The Committee further considered the proposed Locks and Weirs on the River Darling.

Charles L. Shainwald, Esq. (Inspector of Branches, Messrs. E. Rich & Co., Ltd., Sydney and Bourke), was sworn, and examined.

The Committee adjourned at fifteen minutes past 4, until 2 o'clock p.m. on Wednesday, the following day.

WEDNESDAY, 20 *MAY*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
Henry Clarke, Esq.,	George Black, Esq.,

Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Secretary read the following correspondence:—

Letter from farmers and selectors of the Bective resumed areas and neighbourhood, with reference to the Committee's inquiry into the proposed Railway from Tamworth to Manilla.

The correspondence was received.

The

The Committee further considered the proposed Railway from Nevertire to Warren.

Mr. Lee moved,—"That the Committee proceed to consider the evidence on the proposed Railway from Nevertire to Warren, with a view to reporting on the subject to the Legislative Assembly."

The motion was seconded by Mr. Trickett, and passed.

Mr. Lee moved,—"That, in the opinion of the Committee, it is expedient that the proposed Railway from Nevertire to Warren, as referred to the Committee by the Legislative Assembly, be carried out."

The motion was seconded by Mr. Trickett, and passed.

The Committee proceeded to consider their Report to the Legislative Assembly on the proposed Railway from Nevertire to Warren.

The Report was adopted, and the Chairman was authorised to sign it for presentation to the Legislative Assembly.

The Committee adjourned at ten minutes past 4, until 2 o'clock p.m. on Thursday, the following day.

THURSDAY, 21 *MAY*, 1896.

The Committee met at 2 p m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
Henry Clarke, Esq.,	George Black, Esq.,

Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered the proposed Locks and Weirs on the River Darling.

Richard Davis Jones, Esq., Acting Chief Inspector of Stock, was sworn, and examined.

Hugh Giffen McKinney, Esq., Chief Engineer, Water Conservation Branch, Department of Mines, was sworn, and further examined.

The Committee adjourned at 4 o'clock, until 2 o'clock p.m., on Friday, the following day.

FRIDAY, 22 *MAY*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
Henry Clarke, Esq.,	George Black, Esq.,

Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered the proposed Locks and Weirs on the River Darling.

Hugh Giffen McKinney, Esq., Chief Engineer, Water Conservation Branch, Department of Mines, was sworn, and further examined.

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Tuesday, 26th May.

TUESDAY, 26 *MAY*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
Henry Clarke, Esq.,	Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

Mr. Humphery moved,—"That the members of the Committee, in recording a vacancy by reason of the decease of the Hon. John Davies, C.M.G., M.L.C., desire to express their sense of the loss sustained by Mr. Davies' death, and also to convey to his family deep sympathy with them in their sad bereavement."

The motion was seconded by Mr. Lee, and passed unanimously.

The Committee further considered the proposed Locks and Weirs on the River Darling.

Henry Chamberlaine Russell, Esq., C.M.G., B.A., Government Astronomer, and James William Boultbee, Esq., Superintendent of Public Watering Places and Artesian Water Supply, Department of Mines, were sworn, and examined.

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Wednesday, the following day.

WEDNESDAY,

WEDNESDAY, 27 *MAY*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
Henry Clarke, Esq.,	George Black, Esq.,

Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Secretary read the following correspondence:—

Letter from Mr. Charles L. Shainwald, forwarding return showing the number of days in each year from 1882 to 1895, both inclusive, that the Darling River was navigable between Bourke and Brewarrina.

The correspondence was received, and it was ordered that the return be printed as an appendix to the evidence given by Mr. Shainwald in the Committee's inquiry into the proposed Locks and Weirs on the River Darling.

The Committee further considered the proposed Locks and Weirs on the River Darling.

Tannatt William Edgeworth David, Esq., B.A., Professor of Geology, University of Sydney, was sworn, and examined.

James William Boultbee, Esq., Superintendent of Public Watering Places and Artesian Water Supply, was sworn, and further examined.

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Thursday, the following day.

THURSDAY, 28 *MAY*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
Henry Clarke, Esq.,	George Black, Esq.,

Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered the proposed Locks and Weirs on the River Darling.

George Maiden, Esq., Manager, Messrs. Goldsbrough, Mort, & Co., was sworn, and examined.

James William Boultbee, Esq., Superintendent of Public Watering Places and Artesian Water Supply, was sworn, and further examined.

The Committee adjourned at ten minutes past 4, until 2 o'clock p.m. on Friday, the following day.

FRIDAY, 29 *MAY*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
Henry Clarke, Esq.,	George Black, Esq.,

Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Secretary read the following correspondence:—

Letter from the Clerk of the Legislative Assembly, informing the Committee of the passing by the Legislative Assembly of resolutions, referring to the Committee for consideration and report the following proposed public works:—

Railway from Berrigan to Finley;

Works for the Improvement of Cook's River, near Tempe, with the object of providing for the better discharge of flood-waters.

The correspondence was received.

The Committee further considered the proposed Locks and Weirs on the River Darling.

Edward Fisher Pittman, Esq., A.R.S.M., Government Geologist, Department of Mines, and John Charles Henderson Mingaye, Esq., F.C.S., Assayer and Analyst, Geological Branch, Department of Mines, were sworn, and examined.

James William Boultbee, Esq., Superintendent of Public Watering Places and Artesian Water Supply, Department of Mines, was sworn, and further examined.

The Committee adjourned at ten minutes past 4, until 2 o'clock p.m. on Tuesday, 2nd June.

TUESDAY,

TUESDAY, 2 *JUNE*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
Henry Clarke, Esq.,	George Black, Esq.,

Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered the proposed Locks and Weirs on the River Darling.

Frederick Bickell Guthrie, Esq, F.C.S., Chemist, Agriculture and Forestry Branch, Department of Mines; Percy Scarr, Esq, Principal Assistant Engineer, Roads and Bridges Branch, Department of Public Works; and James Burt, Esq., Draftsman-in-Charge, Information Bureau, Department of Lands, were sworn, and examined.

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Wednesday, the following day.

WEDNESDAY, 3 *JUNE*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
Henry Clarke, Esq.,	George Black, Esq,

Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered the proposed Locks and Weirs on the River Darling.

Hugh Giffen McKinney, Esq., M.I.C.E., Chief Engineer, Water Conservation Branch, Department of Mines, was sworn, and further examined.

Mr. Wright gave notice that he would move, on Tuesday, 9th June:—"That Mr. Humphery, Mr. Lee, Mr. Hassall, Mr. Black, and Mr. Wright be appointed a Sectional Committee to inspect, take evidence, and report with reference to the proposed Construction of Locks and Weirs on the River Darling."

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Thursday, the following day.

THURSDAY, 4 *JUNE*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
Henry Clarke, Esq.,	George Black, Esq.,

Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered the proposed Construction of Locks and Weirs on the River Darling.

John Charles Henderson Mingaye, Esq., F.C.S., Analyst and Assayer, Department of Mines, and James William Boultbee, Esq., Superintendent of Public Watering Places and Artesian Water Supply, Department of Mines, were sworn, and further examined.

Walter Scott Campbell, Esq., Chief Clerk, Department of Agriculture, was sworn, and examined.

The Committee adjourned at ten minutes past 4, until 2 o'clock p.m. on Friday, the following day.

FRIDAY, 5 *JUNE*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	John Lionel Fegan, Esq.,
The Hon. Charles James Roberts, C.M.G.,	Thomas Henry Hassall, Esq.,
The Hon. William Joseph Trickett,	George Black, Esq.,
Henry Clarke, Esq.,	Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee proceeded to consider the proposed Railway from Berrigan to Finley.

Henry Deane, Esq., Engineer-in-Chief, Railway Construction Branch, Department of Public Works, was sworn, and examined.

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Tuesday, 9th June.

TUESDAY,

TUESDAY, 9 *JUNE*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.
Henry Clarke, Esq.,	George Black, Esq.,

Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The following account was passed for payment:—

Australian Newspaper Co. (Limited) *Star*—Advertising £0 18 0

The Committee further considered the proposed Construction of Locks and Weirs on the River Darling.

Cecil West Darley, Esq., Engineer-in-Chief for Public Works, Department of Public Works, was sworn, and examined.

Mr. Wright's notice of motion for the appointment of a Sectional Committee to inspect, take evidence, and report with reference to the proposed Construction of Locks and Weirs on the River Darling, was postponed.

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Wednesday, the following day.

WEDNESDAY, 10 *JUNE*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
Henry Clarke, Esq.,	George Black, Esq.,

Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

Mr. Wright moved,—"That Mr. Humphery, Mr. Lee, Mr. Hassall, Mr. Black, and Mr. Wright be appointed a Sectional Committee to inspect, take evidence, and report with reference to the proposed Construction of Locks and Weirs on the River Darling."

Mr. Trickett seconded the motion.

Mr. Lee moved as an amendment,—"That the further consideration of the motion be postponed until Tuesday, 16th June."

The amendment was seconded by Mr. Hassall, and passed.

The following account was passed for payment:—

S. Bennett (*Evening News*)—Advertising £0 17 6

The Committee further considered the proposed Construction of Locks and Weirs on the River Darling.

Cecil West Darley, Esq., Engineer-in-Chief for Public Works, Department of Public Works, was sworn, and further examined.

The Committee adjourned at five minutes to 4, until 2 o'clock p.m. on Thursday, the following day.

THURSDAY, 11 *JUNE*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
Henry Clarke, Esq.,	George Black, Esq.,

Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Secretary read the following correspondence:—

Letter from the Secretary of the Public Service Board stating that the Board were not yet in a position to supply the Committee with information as to the number of officers likely to require accommodation in the Treasury Building, in connection with the Committee's inquiry into the proposed Additions to the Treasury Building.

The correspondence was received.

The Committee further considered the proposed Construction of Locks and Weirs on the River Darling.

Hugh Giffen McKinney, Esq., M.I.C.E., Chief Engineer, Water Conservation Branch, Department of Mines, was sworn, and further examined.

The Committee adjourned at ten minutes past 4, until 2 o'clock p.m. on Friday, the following day.

FRIDAY,

FRIDAY, 12 *JUNE*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
Henry Clarke, Esq.,	George Black, Esq.,

Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered the proposed Railway from Berrigan to Finley.

Hugh McLachlan, Esq., Secretary to the Railway Commissioners, was sworn, and examined.

The Committee adjourned at ten minutes to 4, until 2 o'clock p.m. on Tuesday, 16th June.

TUESDAY, 16 *JUNE*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
Henry Clarke, Esq.,	George Black, Esq.,

Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered the proposed Construction of Locks and Weirs on the River Darling.

Mr. Wright moved,—"That Mr. Humphery, Mr. Trickett, Mr. Lee, Mr. Hassall, Mr. Black, and Mr. Wright be appointed a Sectional Committee to inspect, take evidence, and report with reference to the proposed Construction of Locks and Weirs on the River Darling."

The motion was seconded by Mr. C. J. Roberts, and passed.

The Committee proceeded to consider the proposed Improvement of Cook's River.

Cecil West Darley, Esq., Engineer-in-Chief for Public Works, Department of Public Works, was sworn, and examined.

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Wednesday, the following day.

WEDNESDAY, 17 *JUNE*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
Henry Clarke, Esq.,	George Black, Esq.,

Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Secretary read the following correspondence:—

Letter from the Honorable G. H. Reid, Premier and Colonial Treasurer, stating that, after consultation with the Honorable the Secretary for Public Works, it had been decided to transfer the staff of the Committee from the control of the Secretary for Public Works to that of the Honorable the President of the Legislative Council and the Honorable the Speaker of the Legislative Assembly.

The correspondence was received.

The Committee further considered the proposed Construction of Locks and Weirs on the River Darling.

George Colquhoun, Esq., Crown Solicitor, was sworn, and examined.

The Committee further considered the proposed Improvement of Cook's River.

The Secretary read to the Committee a number of appendices handed in by Mr. C. W. Darley, Engineer-in-Chief for Public Works, Department of Public Works, with reference to the proposed Improvement of Cook's River.

The Committee adjourned at ten minutes to 4, until 2 o'clock p.m. on Thursday, the following day.

THURSDAY,

THURSDAY, 18 *JUNE*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	John Lionel Fegan, Esq.,
The Hon. Charles James Roberts, C.M.G.,	Thomas Henry Hassall, Esq.,
The Hon. William Joseph Trickett,	George Black, Esq.,
Henry Clarke, Esq.,	Francis Augustus Wright, Esq.
Charles Alfred Lee, Esq.,	Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

Mr. Frank Farnell handed in the declaration necessary under the sixth clause of the Public Works Act, and took his seat as a member of the Committee.

The following accounts were passed for payment:—

Professor Threlfall—Services as an expert witness in the Committee's inquiry into the proposed Electric Tramway from Circular Quay, Sydney, to the Redfern Railway Station; and also along Harris-street to the intersection of John-street...	£15	15	0
Daily Telegraph Newspaper Co. (Ltd.)—Advertising Committee's inquiry respecting the proposed Construction of Locks and Weirs on the River Darling	1	1	0
Green Bros. (*Warren Herald*)—Advertising visit of Sectional Committee appointed with reference to the proposed Railway from Nevertire to Warren	0	9	0
Total...	£17	5	0

The Committee further considered the proposed Improvement of Cook's River.

Cecil West Darley, Esq., Engineer-in-Chief for Public Works, Department of Public Works, was sworn, and further examined.

The Committee further considered the proposed Railway from Tamworth to Manilla.

George Laurence Wilkins, Esq., Surveyor, Railway Construction Branch, Department of Public Works, was sworn, and examined.

Mr. Lee gave notice that he would move at the next meeting of the Committee,—"That the Committee proceed to consider the evidence on the proposed Railway from Tamworth to Manilla, with a view to reporting on the subject to the Legislative Assembly."

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Friday, the following day.

FRIDAY, 19 *JUNE*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	John Lionel Fegan, Esq.,
The Hon. Charles James Roberts, C.M.G.,	Thomas Henry Hassall, Esq.,
The Hon. William Joseph Trickett,	George Black, Esq.,
Henry Clarke, Esq.,	Francis Augustus Wright, Esq.,
Charles Alfred Lee, Esq.,	Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The following account was passed for payment:—

John Fairfax & Sons (*Sydney Morning Herald*)—Advertising the Committee's inquiry respecting the proposed Construction of Locks and Weirs on the River Darling	£1	1	0

The Committee further considered the proposed Railway from Tamworth to Manilla.

Mr. Ewing, as Chairman of the Sectional Committee appointed to inspect, take evidence, and report with reference to the proposed Railway from Tamworth to Manilla, brought up the Supplementary Report of the Sectional Committee, and moved that the same be received and printed.

The motion was seconded by Mr. Lee and passed.

The Supplementary Report was then read by the Secretary.

Mr. Lee moved,—"That the Committee proceed to consider the evidence on the proposed Railway from Tamworth to Manilla, with a view to reporting on the subject to the Legislative Assembly."

The motion was seconded by Mr. Fegan, and passed.

Mr. Lee moved,—"That in the opinion of the Committee, it is expedient the proposed Railway from Tamworth to Manilla, referred to the Committee by the Legislative Assembly, be carried out; but instead of starting from Tamworth proper to deviate from the Great Northern line at West Tamworth, and passing on the southern side of the Peel River to a crossing below Attunga Creek, thence following, approximately parallel, the main road to the crest of the ridge, and thence by the western side of the road, but not adjacent to it, to the site selected as the terminus at Manilla, at a cost not exceeding £2,500 per mile, including land resumption."

The motion was seconded by Mr. Fegan, and passed on the following division:—

Ayes, 7.	Noes, 3.
Mr. Ewing,	Mr. Trickett,
Mr. Humphery,	Mr. Clarke,
Mr. Roberts,	Mr. Hassall.
Mr. Lee,	
Mr. Fegan,	
Mr. Black,	
Mr. Farnell.	

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Tuesday, the 23rd June.

TUESDAY,

TUESDAY, 23 *JUNE*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
Henry Clarke, Esq.,	Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The Secretary read the following correspondence:—

Telegram from the Secretary to the Sectional Committee appointed to inspect, take evidence, and report with reference to the proposed Construction of Locks and Weirs on the River Darling, reporting the progress made by the Sectional Committee in their inquiry.

The correspondence was received.

The following account was passed for payment:—

A. C. McLeod (Tamworth)—Services as a valuer in connection with the inquiry of the Sectional Committee appointed to inspect, take evidence, and report with reference to the proposed Railway from Tamworth to Manilla ... £1 1 0

The Committee further considered the proposed Railway from Berrigan to Finley.

John Harper, Esq., Goods Superintendent, Department of Railways, was sworn, and examined.

The Committee adjourned at 4 o'clock, until a quarter to 2 o'clock p.m. on Wednesday, the following day.

WEDNESDAY, 24 *JUNE*, 1896.

The Committee met at 1·45 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
Henry Clarke, Esq.,	Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee, accompanied by Mr. C. W. Darley, Engineer-in-Chief for Public Works, then proceeded to Cook's River, where an inspection was made of the dam and the works connected therewith.

Subsequently, the Committee visited the low-lying land above the dam, and by the aid of plans, which were explained by Mr. Darley, made themselves acquainted with the details of the proposed scheme, and the alternative proposal for dealing with the flooded areas in the vicinity of the river.

THURSDAY, 25 *JUNE*, 1896.

The Committee met at 1·30 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Charles James Roberts, C.M.G.,	Henry Clarke, Esq.,
The Hon. Daniel O'Connor,	John Lionel Fegan, Esq.,
Frank Farnell, Esq.	

The minutes of the previous meeting were read, and confirmed.

The Hon. Daniel O'Connor handed in the declaration necessary under the sixth clause of the Public Works Act, and took his seat as a member of the Committee.

The Committee, accompanied by Mr. C. W. Darley, Engineer-in-Chief for Public Works, then proceeded to Shea's Creek, and inspected the works in progress at that place, subsequently steaming down Cook's River for the purpose of further acquainting themselves with the nature and extent of the works intended to be carried out, in relation to their inquiry into the proposed Improvement of Cook's River.

FRIDAY, 26 *JUNE*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Charles James Roberts, C.M.G.,	Henry Clarke, Esq.,
The Hon. Daniel O'Connor,	John Lionel Fegan, Esq.,
Frank Farnell, Esq.	

The minutes of the previous meeting were read, and confirmed.

The Secretary read the following correspondence:—

Letter from Mr. John P. Sharkey, Civil and Hydraulic Engineer, offering to give evidence in the Committee's inquiry into the proposed Improvement of Cook's River.

The correspondence was received.

The

The following account was passed for payment:—

J. de V. Lamb—Hire of vehicles in connection with Committee's visits of inspection respecting the proposed Improvement of Cook's River £4 0 0

The Committee further considered the proposed Improvement of Cook's River.

John Ashburton Thompson, Esq., M.D., Deputy Medical Adviser to the Government, and John Moore Smail, Esq., Engineer-in-Chief, Metropolitan Board of Water Supply and Sewerage, were sworn, and examined.

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Tuesday, 30th June.

TUESDAY, 30 *JUNE*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Charles James Roberts, C.M.G., | Henry Clarke, Esq.,
The Hon. Daniel O'Connor, | John Lionel Fegan, Esq.,
Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The Secretary read the following correspondence:—

Telegram from the Secretary to the Sectional Committee appointed to inspect, take evidence, and report with reference to the proposed Construction of Locks and Weirs on the River Darling, reporting the progress made by the Sectional Committee in their inquiry.

The correspondence was received.

The Committee further considered the proposed Improvement of Cook's River.

Richard Watson Walker M'Coy, Esq., Mayor of Marrickville; William Robson Benson, Esq., Alderman, Borough of Marrickville; George Alfred Morehouse, Esq., Alderman, Borough of Marrickville; Charles Moyes, Esq., Marrickville; and Edward Campbell, Esq., M.A., Solicitor, Richmond, were sworn, and examined.

The Committee adjourned at ten minutes past 4, until 2 o'clock p.m. on Wednesday, the following day.

WEDNESDAY, 1 *JULY*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Charles James Roberts, C.M.G., | Henry Clarke, Esq.,
The Hon. Daniel O'Connor, | John Lionel Fegan, Esq.,
Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The Secretary read the following correspondence:—

Telegram from the Secretary to the Sectional Committee appointed to inspect, take evidence, and report with reference to the proposed Construction of Locks and Weirs on the River Darling, reporting the progress made by the Sectional Committee in their inquiry.

The correspondence was received.

The Committee further considered the proposed Improvement of Cook's River.

James Phillip Webster, Esq., A.M.I.C.E., Engineer to the Borough of Marrickville, and Tom Stanley, Esq., Marrickville, were sworn, and examined.

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Thursday, the following day.

THURSDAY, 2 *JULY*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Charles James Roberts, C.M.G., | Henry Clarke, Esq.,
The Hon. Daniel O'Connor, | John Lionel Fegan, Esq.,
Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The Secretary read the following correspondence:—

Letter from the Mayor of Canterbury, stating it was his desire and the desire of certain alderman of that borough to give evidence before the Committee in their inquiry into the proposed Improvement of Cook's River.

The correspondence was received.

The Committee further considered the proposed Improvement of Cook's River.

John Phillip Sharkey, Esq., Civil and Hydraulic Engineer; Frederick Gannon, Esq., Solicitor; and Alfred Edward Perkins, Esq., M.A., M.B., M.Ch., Marrickville, were sworn, and examined.

The Committee adjourned at ten minutes past 4, until 2 o'clock p m. on Friday, the following day.

FRIDAY, 3 *JULY*, 1896.

The Committee met at 2 p.m., at the Redfern Railway Station, and proceeded by train to Tempe.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Charles James Roberts, C.M.G.,	Henry Clarke, Esq.,
The Hon. Daniel O'Connor,	John Lionel Fegan, Esq.

The minutes of the previous meeting were read, and confirmed.

The Secretary read the following correspondence:—

Letter from the Council Clerk, Borough of Rockdale, forwarding the names of certain aldermen and others desirous of giving evidence in the Committee's inquiry into the proposed Improvement of Cook's River.

Letter from the Clerk of the Legislative Assembly, informing the Committee of the passing by the Legislative Assembly of a resolution referring to the Committee for consideration and report the expediency of constructing a line of railway from Condobolin to Broken Hill.

The correspondence was received.

The Committee, accompanied by Mr. C. W. Darley, Engineer-in-Chief for Public Works, then inspected Woolli Creek and the low-lying areas in its vicinity, in connection with their inquiry into the proposed Improvement of Cook's River.

TUESDAY, 7 *JULY*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,
Henry Clarke, Esq.,	Francis Augustus Wright, Esq.,

Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The Secretary read the following correspondence:—

Letter from Mr. H. C. Russell, C.M.G., B.A., Government Astronomer, forwarding information regarding the rainfall upon the metropolitan catchment area.

Letter from Mr. J. M. Smail, Engineer-in-Chief, Metropolitan Board of Water Supply and Sewerage, respecting the interception of storm-waters at Marrickville, in relation to the Committee's inquiry into the proposed Improvement of Cook's River.

The correspondence was received, and it was ordered that the documents be printed as appendices to the evidence taken in the inquiry.

Mr. Humphery, as Chairman of the Sectional Committee, appointed to inspect, take evidence, and report with reference to the proposed Construction of Locks and Weirs on the River Darling, brought up the Report of the Sectional Committee, and moved that it be received and printed with the minutes of evidence taken before the Sectional Committee.

The motion was agreed to.

The Committee further considered the proposed Improvement of Cook's River.

Alderman Sydney Robert Lorking, Mayor of Canterbury; Alderman Jeffrey Denniss, Canterbury; Alderman John Quigg, Canterbury; Alderman James McBean, Canterbury; Mr. Joseph Wren, Canterbury; and Mr. Frederick Davis, Inspector of Nuisances, Canterbury, were sworn, and examined.

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Wednesday, the following day.

WEDNESDAY, 8 *JULY*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,
Henry Clarke, Esq.,	Francis Augustus Wright, Esq.,

Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered the proposed Improvement of Cook's River.

Miss Mary Louisa Campbell, Wanstead, Cook's River, and Joshua Percy Josephson, Esq., Civil Engineer, were sworn, and examined.

Frederic Gannon, Esq., Solicitor, was sworn, and further examined.

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Thursday, the following day.

THURSDAY,

THURSDAY, 9 *JULY*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,
Henry Clarke, Esq.,	Francis Augustus Wright, Esq.

Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The Secretary read the following correspondence:—

Statement forwarded to the Committee by the Honorable the Minister for Public Works, giving the result of an analysis made by the Government Analyst of a sample of water taken from Wolli Creek, in relation to the Committee's inquiry into the proposed Improvement of Cook's River.

Letter from Alderman W. R. Benson, Marrickville, forwarding copies of resolutions adopted at public meetings held at Marrickville and Canterbury, relative to the insanitary condition of Cook's River.

The correspondence was received.

The Committee further considered the proposed Improvement of Cook's River.

Alderman John Horatio Clayton, Mayor of Rockdale; Alderman William George Judd, Rockdale; Mr. John Bowme, Rockdale; Mr. John Goode, Rockdale; Alderman Edwin Godfrey, Rockdale; Alderman Henry Cooke, Rockdale; and Mr. John Curtis, Rockdale, were sworn, and examined.

Mr. Farnell gave notice that he would move at the next meeting of the Committee:—"That Mr. Trickett, Mr. O'Connor, Mr. Clarke, and Mr. Black be appointed a Sectional Committee to inspect, take evidence, and report with reference to the proposed Railway from Berrigan to Finley."

The Committee adjourned at ten minutes past 4, until 2 o'clock p.m. on Friday, the following day.

FRIDAY, 10 *JULY*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,
Henry Clarke, Esq.,	Francis Augustus Wright, Esq.

Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The Secretary read the following correspondence:—

Letters from the Manager of the Sydney Permanent Freehold Land and Building Company (Limited), notifying the Committee that two of the directors of the Company were desirous of giving evidence before the Committee in their inquiry into the proposed Improvement of Cook's River.

The correspondence was received.

The following accounts were passed for payment:—

Australian Newspaper Co. (Ltd.), *Star*—Advertising in connection with Committee's inquiry respecting proposed Improvement of Cook's River	£1	0	0
Daily Telegraph Newspaper Co. (Ltd.)—Advertising in connection with Committee's inquiry respecting proposed Electric Tramway from Circular Quay, Sydney, to the Redfern Railway Station; and also along Harris-street to the intersection of John-street	1	2	0
Daily Telegraph Newspaper Co. (Ltd.)—Advertising in connection with Committee's Inquiry respecting proposed Improvement of Cook's River	1	2	0
John Fairfax & Sons (*S. M. Herald*)—Advertising in connection with Committee's inquiry respecting proposed Improvement of Cook's River	1	0	0
S. Bennett (*Evening News*)—Advertising in connection with Committee's inquiry respecting proposed Improvement of Cook's River...	0	15	0
George Baumann—Expenses in connection with Committee's visit of inspection respecting proposed Improvement of Cook's River	1	10	0
Herbert Robinson, shorthand-writer—Accompanying Sectional Committee on proposed Construction of Locks and Weirs on the River Darling	25	3	0
Total	£31	12	0

The Committee further considered the proposed Improvement of Cook's River.

Cecil West Darley, Esq., Engineer-in-Chief for Public Works, Department of Public Works, was sworn, and further examined.

D'Arcy Hubert Bucknell, Esq., Solicitor, Arncliffe, was sworn, and examined.

Mr. Farnell's notice of motion for the appointment of a Sectional Committee with reference to the proposed Railway from Berrigan to Finley was postponed.

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Tuesday, the 14th July.

TUESDAY,

TUESDAY, 14 *JULY*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	Francis Augustus Wright, Esq.,
Henry Clarke, Esq.,	Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The Secretary read the following correspondence:—

Letter from the Secretary to the Public Service Board, intimating that necessary information respecting the number of officers who would require accommodation in the Treasury Building would be supplied to the Committee, in connection with their inquiry into the proposed Additions to the Treasury Building.

The correspondence was received.

The Committee further considered the proposed Railway from Berrigan to Finley.

Mr. Farnell moved:—"That Mr. O'Connor, Mr. Black, and Mr. Farnell be appointed a Sectional Committee to inspect, take evidence, and report with reference to the proposed Railway from Berrigan to Finley."

The motion was seconded by Mr. Trickett, and passed.

The Committee further considered the proposed Improvement of Cook's River.

John Wesley Watkin, Esq., and Benjamin Lee, Esq., Directors of the Sydney Permanent Freehold Land and Building Company (Limited), were sworn, and examined.

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Wednesday, the following day.

WEDNESDAY, 15 *JULY*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	Francis Augustus Wright, Esq.,
Henry Clarke, Esq.,	Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered the proposed Improvement of Cook's River.

James Phillip Webster, Esq., A.M.I.C.E., Engineer to the Borough of Marrickville, was sworn, and further examined.

Mr. C. J. Roberts gave notice that he would move at the next meeting of the Committee:—"That the Committee proceed to consider the evidence on the proposed Improvement of Cook's River, with a view to reporting on the subject to the Legislative Assembly."

The Committee further considered the proposed Additions to the Treasury Building.

Charles Lyne, Esq., Secretary to the Public Service Board, was sworn, and examined.

Mr. Fegan (with consent) moved:—"That the Committee proceed to consider the evidence on the proposed Additions to the Treasury Building, with a view to reporting on the subject to the Legislative Assembly."

The motion was seconded by Mr. Wright, and passed.

Mr. Fegan moved:—"That, in the opinion of the Committee, it is expedient the proposed Additions to the Treasury Building, as referred to the Committee by the Legislative Assembly, be carried out."

The motion was seconded by Mr. Wright, and passed.

The Committee adjourned at a quarter to 4, until 2 o'clock p.m. on Thursday, the following day.

THURSDAY, 16 *JULY*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	Francis Augustus Wright, Esq.,
Henry Clarke, Esq.,	Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee proceeded to consider their Report to the Legislative Assembly upon the proposed Additions to the Treasury Building.

The draft Report was read by the Secretary.

The further consideration of the Report was postponed.

The Committee further considered the proposed Improvement of Cook's River.

Mr. Roberts moved:—"That the Committee proceed to consider the evidence on the proposed Improvement of Cook's River, with a view to reporting on the subject to the Legislative Assembly."

The motion was seconded by Mr. Lee, and passed.

Mr.

Mr. Fegan gave notice that he would move at the meeting of the Committee on Tuesday, 21st July:—"That the consideration of the Report of the Sectional Committee, and the Report of the Committee of the Whole, on the proposed Construction of Locks and Weirs on the River Darling, be postponed until the evidence of Colonel Home (who has been engaged by the Government) has been taken."

Mr. Wright gave notice that he would move at the meeting of the Committee on Tuesday, 21st July:—"That the Committee proceed to consider the evidence on the proposed Construction of Locks and Weirs on the River Darling, with a view to reporting on the subject to the Legislative Assembly."

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Friday, the following day.

FRIDAY, 17 *JULY*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,
Henry Clarke, Esq.	Francis Augustus Wright, Esq.,

Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered their Report to the Legislative Assembly on the proposed Additions to the Treasury Building.

The preamble and clauses 1 to 5 were passed.

Clause 6—Opinion of the Committee—was omitted.

Mr. Trickett moved,—"That the following stand as clause 6 of the Report: 'Undesirable proximity of tram terminus.—It will be observed that the Under Secretary for Finance and Trade and the Government Architect speak of the noise, dirt, annoyance, and danger from fire consequent upon the proximity of the tram terminus to the Treasury; and the Colonial Architect, in a report to the Government, urged that some definite understanding should be come to with the Railway Commissioners respecting the entire removal of the tram terminus.'"

The amendment was seconded by Mr. C. J. Roberts, and negatived on the following division upon the question,—"That the clause proposed to be inserted stand clause 6 of the Report":—

Ayes, 4.	Noes, 5.
Mr. Ewing,	Mr. Clarke,
Mr. Humphery,	Mr. Lee,
Mr. Roberts,	Mr. Fegan,
Mr. Trickett.	Mr. Hassall,
	Mr. Wright.

Clause 7—Necessity for the proposed work—was passed.

Clause 8—Decision of the Committee.

Mr. Humphery moved,—"That the following stand as clause 8 of the Report: 'New Treasury and Audit Offices on more central site.—The strong-room accommodation which it is proposed to provide appears to be in excess of requirements, having regard to the evidence of the Auditor-General, that most of the Treasury books contain merely duplicate information; and it is the opinion of the Committee that public convenience would be studied by the erection of new Treasury and Audit Offices upon one of several available sites more central than the site of the present Treasury Building; but so utterly inadequate and unsatisfactory is the accommodation at the Treasury that the Committee reluctantly affirm the expediency of carrying out the alterations and additions as proposed.'"

The Committee divided upon the question,—"That the clause proposed to be inserted stand clause 8 of the Report."

Ayes, 5.	Noes, 5.
Mr. Humphery,	Mr. Ewing,
Mr. Roberts,	Mr. Clarke,
Mr. Trickett,	Mr. Lee,
Mr. Hassall,	Mr. Fegan,
Mr. Wright.	Mr. Black.

The division being equal, the Chairman gave his casting vote with the Noes, and the amendment was therefore negatived.

Mr. Fegan moved,—"That the following stand as clause 8 of the Report: 'Cause of delay in presentation of Report.—The Committee have been forced to defer the presentation of their Report upon this subject to the Legislative Assembly owing to the absence of definite and necessary information respecting the number of officers who would require accommodation in the Treasury Building, which information was unobtainable until the Public Service Board had completed their inquiries with regard to the Treasury.'"

The amendment was negatived on the following division upon the question,—"That the clause proposed to be inserted stand clause 8 of the Report":—

Ayes, 4.	Noes, 6.
Mr. Ewing,	Mr. Humphery,
Mr. Roberts,	Mr. Trickett,
Mr. Fegan,	Mr. Clarke,
Mr. Wright.	Mr. Lee,
	Mr. Hassall,
	Mr. Black,

The clause was then passed.

The

The Report, as amended, was adopted, and the Chairman was authorised to sign it for presentation to the Legislative Assembly, on the following division :—

Ayes, 7.	Noes, 3.
Mr. Ewing,	Mr. Humphery,
Mr. Clarke,	Mr. Roberts,
Mr. Lee,	Mr. Trickett.
Mr. Fegan,	
Mr. Hassall,	
Mr. Black,	
Mr. Wright.	

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Tuesday, 21st July.

TUESDAY, 21 *JULY*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT :—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Henry Clarke, Esq.,
The Hon. Charles James Roberts, C.M.G.,	Charles Alfred Lee, Esq.,
The Hon. William Joseph Trickett,	John Lionel Fegan, Esq.,

Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Secretary read the following correspondence :—

Telegram from the Chairman of the Sectional Committee appointed to inspect, take evidence, and report with reference to the proposed Railway from Berrigan to Finley, reporting the progress made by the Sectional Committee in their inquiry.

The correspondence was received.

The Committee further considered the proposed Construction of Locks and Weirs on the River Darling.

Alexander Oliver, Esq., M.A., President of the Land Court of New South Wales, was sworn, and examined.

Mr. Fegan's notice of motion,—"That the consideration of the Report of the Sectional Committee, and the Report of the Committee of the Whole, on the proposed Construction of Locks and Weirs on the River Darling, be postponed until the evidence of Colonel Home (who has been engaged by the Government) has been taken,"—was, after discussion, and with concurrence, withdrawn.

Mr. Wright's notice of motion,—"That the Committee proceed to consider the evidence on the proposed Construction of Locks and Weirs on the River Darling, with a view to reporting on the subject to the Legislative Assembly,"—was postponed.

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Wednesday, the following day.

WEDNESDAY, 22 *JULY*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT :—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
Henry Clarke, Esq.,	Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered the proposed Improvement of Cook's River.

Mr. Roberts (with consent) moved,—"That the Committee are of opinion it is not expedient the proposed Improvement of Cook's River, at a cost of £36,400, as referred to the Committee by the Legislative Assembly, nor the alternative Departmental scheme, at a cost of £25,000, be carried out; but they recommend that a portion of such work be undertaken by the Government, viz.: (1) Lowering the sills at the southern end of Cook's River Dam, and extending the sluice-gates to the necessary width; (2) Dredging Cook's River and Wolli Creek; (3) Constructing an embankment, with proper escape for storm-waters, across the entrance to Marrickville Creek. The total cost not to exceed £15,000. The storm-water channel down the centre of Marrickville Creek should be carried out in accordance with the provisions of the Metropolitan Water and Sewerage Act Extension Act of 1894."

Mr. Fegan seconded the motion.

Mr. Hassall moved,—"That the motion be amended by the omission of all the words after the words 'Wolli Creek.'"

The amendment was seconded by Mr. Wright, and negatived on the following division, upon the question,—"That the words proposed to be omitted stand part of the motion" :—

Ayes, 6.	Noes, 2.
Mr. Ewing,	Mr. Hassall,
Mr. Humphery,	Mr. Wright.
Mr. Roberts,	
Mr. Clarke,	
Mr. Lee,	
Mr. Fegan.	

The motion was then passed on the following division :—

Ayes, 6.	Noes, 2.
Mr. Ewing,	Mr. Hassall,
Mr. Humphery,	Mr. Wright.
Mr. Roberts,	
Mr. Clarke,	
Mr. Lee,	
Mr. Fegan.	

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Thursday, the following day.

THURSDAY,

THURSDAY, 23 *JULY*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
Henry Clarke, Esq.,	Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Secretary read the following correspondence:—

Telegram from the Chairman of the Sectional Committee appointed to inspect, take evidence, and report with reference to the proposed Railway from Berrigan to Finley, reporting the progress made by the Sectional Committee in their inquiry.

The correspondence was received.

The Committee proceeded to consider their Report to the Legislative Assembly on the proposed Improvement of Cook's River.

The preamble and clauses 1 to 11 were passed.

The further consideration of the Report was postponed.

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Friday, the following day.

FRIDAY, 24 *JULY*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
Henry Clarke, Esq.,	Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered their Report to the Legislative Assembly on the proposed Improvement of Cook's River.

Clauses 12 to 17 were passed.

Mr. Trickett moved,—"That the following stand as clause 18 of the Report,—'Proposal to remove Cook's River Dam.—Many witnesses, amongst whom were several municipal representatives, were of opinion that the removal of the dam at Cook's River, and the consequent ebb and flow of the tide, would be the best means of purifying both Cook's River and Wolli Creek, but they do not appear to have considered the damage that would thereby be caused by the submergence with salt water of the low-lying lands. Owners of land so situated gave evidence that they would suffer great loss, and the Department recognise the possible claims for damage that might arise if salt water were let into the river.'"

The amendment was seconded by Mr. Fegan, and passed.

Clauses 19 to 23 were passed.

The Report, as amended, was adopted, and the Chairman was authorised to sign it for presentation to the Legislative Assembly.

The Committee adjourned at half-past 3, until 2 o'clock p.m. on Tuesday, 28 July.

TUESDAY, 28 *JULY*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,
Henry Clarke, Esq.,	Francis Augustus Wright, Esq.,

Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The following account was passed for payment:—

R. R. Carrington, shorthand-writer—Accompanying Sectional Committee on proposed Railway from Berrigan to Finley £12 3 9

Mr. Farnell, as Chairman of the Sectional Committee appointed to inspect, take evidence, and report with reference to the proposed Railway from Berrigan to Finley, brought up the report of the Sectional Committee, and moved that it be received and printed with the minutes of evidence taken before the Sectional Committee.

The motion was agreed to.

Mr. Lee (with consent) moved,—"That the transcription of evidence taken by the General Committee and Sectional Committees in deposition form does not meet with the requirements of the Parliamentary Standing Committee on Public Works, and that the old system of reporting the evidence in question and answer form be adhered to."

The motion was seconded by Mr. Fegan, and passed.

The Committee further considered the proposed Construction of Locks and Weirs on the River Darling.

Mr.

Mr. Wright moved,—"That the Committee proceed to consider the evidence on the proposed Construction of Locks and Weirs on the River Darling, with a view to reporting on the subject to the Legislative Assembly."

The motion was seconded by Mr. Humphery, and passed.

Mr. Wright moved,—"That, in the opinion of the Committee, it is not expedient the proposed Construction of Locks and Weirs on the River Darling, as referred to the Committee by the Legislative Assembly, be carried out."

Mr. Humphery seconded the motion.

The debate upon the motion was adjourned.

The Committee adjourned at five minutes past 4, until 2 o'clock p.m. on Wednesday, the following day.

WEDNESDAY, 29 *JULY*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,
Henry Clarke, Esq.,	Francis Augustus Wright, Esq.,

Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered the proposed Construction of Locks and Weirs on the River Darling.

The adjourned debate upon Mr. Wright's motion,—"That, in the opinion of the Committee, it is not expedient the proposed Construction of Locks and Weirs on the River Darling, as referred to the Committee by the Legislative Assembly, be carried out,"—was resumed.

The motion, after further discussion, was passed.

The Committee proceeded to consider their Report to the Legislative Assembly on the proposed Construction of Locks and Weirs on the River Darling.

The draft Report was read by the Secretary.

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Thursday, the following day.

THURSDAY, 30 *JULY*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,
Henry Clarke, Esq.,	Francis Augustus Wright, Esq.,

Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered their Report to the Legislative Assembly on the proposed Construction of Locks and Weirs on the River Darling.

Clauses 1 to 7 were passed.

The further consideration of the Report was postponed.

The Committee adjourned at five minutes past 4, until 2 o'clock p.m. on Friday, the following day.

FRIDAY, 31 *JULY*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,
Henry Clarke, Esq.,	Francis Augustus Wright, Esq.,

Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered their Report to the Legislative Assembly on the proposed Construction of Locks and Weirs on the River Darling.

Clauses 8 to 23 were passed.

The Report was adopted, and the Chairman was authorised to sign it for presentation to the Legislative Assembly.

Mr. Black gave notice that he would move at the next meeting of the Committee:—"That the Committee proceed to consider the evidence on the proposed Railway from Berrigan to Finley, with a view to reporting on the subject to the Legislative Assembly."

The Committee adjourned at twenty minutes past 4, until 2 o'clock p.m. on Tuesday, 4th August.

TUESDAY,

TUESDAY, 4 *AUGUST*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq ,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,
Henry Clarke, Esq.,	Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered the proposed Railway from Berrigan to Finley.

Mr. Black moved,—"That the Committee proceed to consider the evidence on the proposed Railway from Berrigan to Finley, with a view to reporting on the subject to the Legislative Assembly."

The motion was seconded by Mr. O'Connor, and passed.

Mr. Black moved,—"That, in the opinion of the Committee, it is expedient the proposed Railway from Berrigan to Finley, as referred to the Committee by the Legislative Assembly, be carried out."

Mr. O'Connor seconded the motion.

Mr. Humphery moved,—"That the motion be amended by the omission of all the words after the word 'expedient,' with a view to the insertion of the following words: 'that the decision as to the proposed Railway from Berrigan to Finley, as referred to the Committee by the Legislative Assembly, be deferred for twelve months.'"

Mr. Wright seconded the amendment.

The debate on the motion and amendment was adjourned until Thursday, 6th August.

The Committee adjourned at a quarter to 4, until 2 o'clock p.m. on Wednesday, the following day.

WEDNESDAY, 5 *AUGUST*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,
Henry Clarke, Esq.,	Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee proceeded to consider the proposed Railway from Condobolin to Broken Hill.

Henry Deane, Esq., Engineer-in-Chief, Railway Construction Branch, Department of Public Works, was sworn, and examined.

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Thursday, the following day.

THURSDAY, 6 *AUGUST*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts ,C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,
Henry Clarke, Esq.,	Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered the proposed Railway from Berrigan to Finley.

The adjourned debate upon Mr. Black's motion,—"That, in the opinion of the Committee, it is expedient the proposed Railway from Berrigan to Finley, as referred to the Committee by the Legislative Assembly, be carried out"—upon which Mr. Humphery had moved as an amendment,—"That the motion be amended by the omission of all the words after the word 'expedient,' with a view to the insertion of the following words: 'that the decision as to the proposed Railway from Berrigan to Finley, as referred to the Committee by the Legislative Assembly, be deferred for twelve months,'"—was further postponed.

The Committee further considered the proposed Railway from Condobolin to Broken Hill.

Henry Deane, Esq., Engineer-in-Chief, Railway Construction Branch, Department of Public Works, was sworn, and further examined.

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Friday, the following day.

FRIDAY,

FRIDAY, 7 *AUGUST*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,
Henry Clarke, Esq.,	Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Secretary read the following correspondence:—

Letter from the Principal Shorthand-writer, Parliamentary Reporting Staff, forwarding a copy of a Report by him, and a Minute thereon by the Honorable the Speaker of the Legislative Assemby, with reference to the manner in which the Minutes of Evidence taken before the Committee and Sectional Committees had been transcribed.

The correspondence was received.

The Committee further considered the proposed Railway from Condobolin to Broken Hill.

Henry Deane, Esq., Engineer-in-Chief, Railway Construction Branch, Department of Public Works, was sworn, and further examined.

Edward Fisher Pittman, Esq., A.R.S.M., Government Geologist, was sworn, and examined.

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Tuesday, 11th August.

TUESDAY, 11 *AUGUST*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,
Henry Clarke, Esq.,	Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered the proposed Railway from Condobolin to Broken Hill.

Hugh McLachlan, Esq., Secretary to the Railway Commissioners, was sworn, and examined.

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Wednesday, the following day.

WEDNESDAY, 12 *AUGUST*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,
Henry Clarke, Esq.,	Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered the proposed Railway from Condobolin to Broken Hill.

Hugh McLachlan, Esq., Secretary to the Railway Commissioners, was sworn, and further examined.

James Burt, Esq., Draftsman-in-Charge, Information Bureau, Department of Lands, was sworn, and examined.

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Thursday, the following day.

THURSDAY, 13 *AUGUST*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,
Henry Clarke, Esq.,	Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered the proposed Railway from Berrigan to Finley.

The adjourned debate upon Mr. Black's motion,—"That, in the opinion of the Committee, it is expedient the proposed Railway from Berrigan to Finley, as referred to the Committee by the Legislative Assembly, be carried out"—upon which Mr. Humphery had moved as an amendment,—"That the motion be amended by the omission of all the words after the word 'expedient,' with a view to the insertion of the following words: 'that the decision as to the proposed Railway from Berrigan to Finley, as referred to the Committee by the Legislative Assembly, be deferred for twelve months,'"—was resumed.

The debate, after discussion, was further adjourned.

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Friday, the following day.

FRIDAY,

FRIDAY, 14 *AUGUST*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,
Henry Clarke, Esq.,	Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered the proposed Railway from Berrigan to Finley.

The adjourned debate upon Mr. Black's motion,—"That, in the opinion of the Committee, it is expedient the proposed Railway from Berrigan to Finley, as referred to the Committee by the Legislative Assembly, be carried out"—upon which Mr. Humphery had moved as an amendment,—"That the motion be amended by the omission of all the words after the word 'expedient,' with a view to the insertion of the following words: 'that the decision as to the proposed Railway from Berrigan to Finley, as referred to the Committee by the Legislative Assembly, be deferred for twelve months,'"—was resumed.

Upon the question,—"That the words proposed to be omitted stand part of the motion," the Committee divided as follows:—

Ayes, 8.	Noes, 3.
Mr. Ewing,	Mr. Humphery,
Mr. Roberts,	Mr. Trickett,
Mr. O'Connor,	Mr. Wright.
Mr. Clarke,	
Mr. Lee,	
Mr. Fegan,	
Mr. Hassall,	
Mr. Black.	

The amendment was, therefore, negatived.

The original question having (with concurrence) been amended by the addition of the words "at a cost not exceeding £2,000 per mile," was then passed on the following division:—

Ayes, 8.	Noes, 3.
Mr. Ewing,	Mr. Humphery,
Mr. Roberts,	Mr. Trickett,
Mr. O'Connor,	Mr. Wright.
Mr. Clarke,	
Mr. Lee,	
Mr. Fegan,	
Mr. Hassall,	
Mr. Black.	

Mr. Humphery gave notice that he would move, at the next meeting of the Committee,—"That a Sectional Committee, consisting of Mr. Ewing, Mr. C. J. Roberts, Mr. Fegan, and Mr. Hassall be appointed to inspect, take evidence, and report with reference to the proposed Railway from Condobolin to Broken Hill."

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Tuesday, 18th August.

TUESDAY, 18 *AUGUST*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,
Henry Clarke, Esq.,	Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered the proposed Railway from Condobolin to Broken Hill.

Mr. Humphery's notice of motion for the appointment of a Sectional Committee to inspect, take evidence, and report with reference to the proposed Railway from Condobolin to Broken Hill was postponed.

John Howell, Esq., Managing Director, The Smelting Company of Australia (Limited), and George Skelton Yuill, Esq. (G. S. Yuill & Company, Limited), were sworn and examined.

The Committee adjourned at ten minutes past 4, until 2 o'clock p.m. on Wednesday, the following day.

WEDNESDAY,

WEDNESDAY, 19 *AUGUST*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,
Henry Clarke, Esq.,	Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Secretary read the following correspondence:—

Letter from Mr. James Burt, Draftsman-in-charge, Information Bureau, Department of Lands, forwarding information regarding land within a radius of 20 miles on either side of the proposed Railway from Condobolin to Broken Hill, in connection with the Committee's inquiry respecting the proposed Railway from Condobolin to Broken Hill.

The correspondence was received, and it was ordered that the documents be printed as an Appendix to the evidence given by Mr. Burt in the Committee's inquiry respecting the proposed Railway from Condobolin to Broken Hill.

The Committee proceeded to consider their Report to the Legislative Assembly on the proposed Railway from Berrigan to Finley.

The preamble and clauses 1 to 9 were passed.

Mr. Lee moved,—"That the following stand as clause 10 of the Report: 'Estimated traffic on line Jerilderie to Berrigan is likely to be realised.—The evidence given before the Sectional Committee on the proposed Railway from Jerilderie to Berrigan was to the effect that the Departmental estimate of the wheat traffic was correct, and that increased areas would be brought under cultivation if that line were sanctioned. The evidence given before the Sectional Committee on the proposed Extension from Berrigan to Finley fully bears out that expectation, and there is reason to suppose that the increased earnings on the Jerilderie-Berrigan line will largely compensate for the estimated deficiency on that to Finley.'"

The amendment was seconded by Mr. Black, and passed.

Clauses 11 to 13 were passed.

The Report, as amended, was adopted, and the Chairman was authorised to sign it for presentation to the Legislative Assembly.

The Committee further considered the proposed Railway from Condobolin to Broken Hill.

Mr. Humphery moved,—"That a Sectional Committee, consisting of Mr. Ewing, Mr. C. J. Roberts, Mr. Fegan, and Mr. Hassall, be appointed to inspect, take evidence, and report with reference to the proposed Railway from Condobolin to Broken Hill."

Mr. Clarke seconded the motion.

Mr. Lee moved,—"That the name of Mr. Trickett be inserted in lieu of that of Mr. C. J. Roberts, owing to his inability to leave Sydney at the present time."

Mr. Wright seconded the amendment, and it was passed.

The motion, as amended, was then passed.

Mr. O'Connor gave notice that he would move at the next meeting of the Committee,—"That the resolution of the Committee passed on Wednesday, 19th August, viz.:—'That a Sectional Committee, consisting of Mr. Ewing, Mr. Trickett, Mr. Fegan, and Mr. Hassall, be appointed to inspect, take evidence, and report with reference to the proposed Railway from Condobolin to Broken Hill,'—be rescinded."

The Committee adjourned at a quarter past 4, until 2 o'clock p.m. on Thursday, the following day.

THURSDAY, 20 *AUGUST*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,
Henry Clarke, Esq.,	Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered the proposed Railway from Condobolin to Broken Hill.

John Harper, Esq., Goods Superintendent, Department of Railways, was sworn, and examined.

Mr. O'Connor's notice of motion,—"That the resolution of the Committee, passed on Wednesday, 19th August, viz.:—'That a Sectional Committee, consisting of Mr. Ewing, Mr. Trickett, Mr. Fegan, and Mr. Hassall, be appointed to inspect, take evidence, and report with reference to the proposed Railway from Condobolin to Broken Hill,'—be rescinded,"—was postponed.

The Committee adjourned at fifteen minutes past 4, until 2 o'clock p.m. on Friday, the following day.

FRIDAY,

FRIDAY, 21 *AUGUST*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,
Henry Clarke, Esq.,	Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered the proposed Railway from Condobolin to Broken Hill.

Mr. O'Connor moved,—"That the resolution of the Committee passed on Wednesday, 19th August, viz.:—'That a Sectional Committee, consisting of Mr. Ewing, Mr. Trickett, Mr. Fegan, and Mr. Hassall, be appointed to inspect, take evidence, and report with reference to the proposed Railway from Condobolin to Broken Hill'—be rescinded."

The motion, not having been seconded, lapsed.

Henry Deane, Esq., Engineer-in-Chief, Railway Construction Branch, Department of Public Works, was sworn, and further examined.

Percy Scarr, Esq., Principal Assistant Engineer, Roads and Bridges Branch, Department of Public Works, was sworn, and examined.

The Committee adjourned at twenty minutes past 3, until 2 o'clock p.m. on Tuesday, 25th August.

TUESDAY, 25 *AUGUST*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,
Henry Clarke, Esq.,	Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered the proposed Railway from Condobolin to Broken Hill.

Ebenezer Glencross Grant, Esq., and William Henry John Slee, Esq., F.G.S., Chief Inspector of Mines and Superintendent of Diamond Drills, Department of Mines, were sworn, and examined.

The Committee adjourned at a quarter past 4, until 2 o'clock p.m. on Wednesday, the following day.

WEDNESDAY, 26 *AUGUST*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,
Henry Clarke, Esq.,	Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered the proposed Railway from Condobolin to Broken Hill.

William Briggs, Esq., Chairman, Lithgow Coal Association; William McIntyre, Esq., Chief Electoral Officer, Chief Secretary's Department; and Alexander Bruce, Esq., Chief Inspector of Stock, Department of Mines, were sworn, and examined.

William Henry John Slee, Esq., F.G.S., Chief Inspector of Mines and Superintendent of Diamond Drills, Department of Mines, was sworn, and further examined.

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Thursday, the following day.

THURSDAY, 27 *AUGUST*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,
Henry Clarke, Esq.,	Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered the proposed Railway from Condobolin to Broken Hill.

Henry Chamberlaine Russell, Esq., C.M.G., B.A., Government Astronomer; Henry Taylor, Esq., Officer-in-Charge, Rabbit Branch, Department of Lands; and James George Carroll, Esq., M.P., were sworn, and examined.

The Committee adjourned at 4 o'clock, until 2 o'clock, p.m. on Friday, the following day.

FRIDAY,

FRIDAY, 28 *AUGUST*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,
Henry Clarke, Esq.,	Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Secretary read the following correspondence:—

Letter from the Clerk of the Legislative Assembly, forwarding, for the information of the Committee, a copy of a letter from the Chairman of the Parliamentary Printing Committee to the Honorable the Speaker of the Legislative Assembly, and the opinion of the Honorable the Speaker thereon, with reference to certain appendices and plans relating to the Committee's Report on the proposed Construction of Locks and Weirs on the River Darling having been laid on the Table of the Legislative Assembly, already printed.

The correspondence was received.

The Committee further considered the proposed Railway from Condobolin to Broken Hill.

Hugh Giffen M'Kinney, Esq., M.I.C.E., Principal Assistant Engineer in charge of the Water Conservation Branch, Department of Public Works, and the Honorable Charles Augustus Goodchap, M.L.C., were sworn, and examined.

Edward Fisher Pittman, Esq., A.R.S.M., Government Geologist, was sworn, and further examined.

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Tuesday, 1st September.

TUESDAY, 1 *SEPTEMBER*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,
Henry Clarke, Esq.,	Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Secretary read the following correspondence:—

Letter from the Clerk of the Legislative Assembly, informing the Committee of the passing by the Legislative Assembly of a resolution referring to the Committee for consideration and report the expediency of constructing a line of railway from Moree to Inverell.

The correspondence was received.

The Committee proceeded to consider the proposed Railway from Moree to Inverell.

Henry Deane, Esq., Engineer-in-Chief, Railway Construction Branch, Department of Public Works, was sworn, and examined.

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Wednesday, the following day.

WEDNESDAY, 2 *SEPTEMBER*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,
Henry Clarke, Esq.,	Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered the proposed Railway from Tamworth to Manilla.

The Hon. Philip Gidley King, M.L.C., was sworn, and examined.

Henry Deane, Esq., Engineer-in-Chief, Railway Construction Branch, Department of Public Works, was sworn, and further examined.

Mr. Lee gave notice that he would move at the next meeting of the Committee,—"That the resolution of the Committee passed on 19th June, 1896, viz.:—'That, in the opinion of the Committee, it is expedient the proposed Railway from Tamworth to Manilla, referred to the Committee by the Legislative Assembly, be carried out; but instead of starting from Tamworth proper, to deviate from the Great Northern line at West Tamworth, and passing on the southern side of the Peel River to a crossing below Attunga Creek; thence following approximately parallel the main road to the crest of the ridge; and thence by the western side of the road, but not adjacent to it, to the site selected as the terminus at Manilla, at a cost not exceeding £2,500 per mile, including land resumption,'—be rescinded."

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Thursday, the following day.

THURSDAY,

THURSDAY, 3 *SEPTEMBER*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.
The Hon. Daniel O'Connor,	George Black, Esq.,
Henry Clarke, Esq.,	Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

Mr. Lee's notice of motion,—"That the resolution of the Committee passed on 19th June, 1896, viz.:—'That, in the opinion of the Committee, it is expedient the proposed Railway from Tamworth to Manilla, referred to the Committee by the Legislative Assembly, be carried out; but instead of starting from Tamworth proper, to deviate from the Great Northern line at West Tamworth, and passing on the southern side of the Peel River to a crossing below Attunga Creek; thence following approximately parallel the main road to the crest of the ridge; and thence by the western side of the road, but not adjacent to it, to the site selected as the terminus at Manilla, at a cost not exceeding £2,500 per mile, including land resumption,'—be rescinded,"—was postponed.

The Committee further considered the proposed Railway from Moree to Inverell.

Hugh McLachlan, Esq., Secretary to the Railway Commissioners, was sworn, and examined.

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Friday, the following day.

FRIDAY, 4 *SEPTEMBER*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,
Henry Clarke, Esq.,	Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered the proposed Railway from Tamworth to Manilla.

Henry Deane, Esq., Engineer-in-Chief, Railway Construction Branch, Department of Public Works, was sworn, and further examined.

Mr. Lee moved,—"That the resolution of the Committee passed on 19th June, 1896, viz.:—'That, in the opinion of the Committee, it is expedient the proposed Railway from Tamworth to Manilla, referred to the Committee by the Legislative Assembly, be carried out; but instead of starting from Tamworth proper, to deviate from the Great Northern line at West Tamworth, and passing on the southern side of the Peel River to a crossing below Attunga Creek; thence following approximately parallel the main road to the crest of the ridge; and thence by the western side of the road, but not adjacent to it, to the site selected as the terminus at Manilla, at a cost not exceeding £2,500 per mile, including land resumption,'—be rescinded."

The motion was seconded by Mr. Trickett, and passed.

Mr. Lee (with consent) moved,—"That, in the opinion of the Committee, it is expedient the proposed Railway from Tamworth to Manilla, referred to the Committee by the Legislative Assembly, be carried out; but instead of starting from Tamworth, it should leave the Great Northern line at West Tamworth, pass on the southern side of the Peel River to a crossing below Attunga Creek; and thence follow approximately parallel the main road to Manilla, at a cost not exceeding £2,500 per mile, the total cost of land resumption not to be greater than that within the municipal boundary of Tamworth, as proposed by the Railway Commissioners."

Mr. C. J. Roberts seconded the motion.

Mr. Humphery moved,—"That the motion be amended by the omission of all the words after the words 'per mile,' with a view to the insertion of the following words: 'and that, in terms of the Railway Commissioners' Report, it be made a *sine qua non* that all the alienated land required for the line should be conveyed to the Government free of any payment for the same, or for compensation; the Government doing all the legal work in connection therewith.'"

The amendment was seconded by Mr. Hassall, and negatived on the following division upon the question,—"That the words proposed to be omitted stand part of the motion":—

Ayes, 6.	Noes, 5.
Mr. Ewing,	Mr. Humphery,
Mr. Roberts,	Mr. Trickett,
Mr. O'Connor,	Mr. Clarke,
Mr. Lee,	Mr. Hassall,
Mr. Fegan,	Mr. Wright.
Mr. Black.	

The

The motion was then passed on the following division:—

Ayes, 6.	Noes, 5.
Mr. Ewing,	Mr. Humphery,
Mr. Roberts,	Mr. Trickett,
Mr. O'Connor,	Mr. Clarke,
Mr. Lee,	Mr. Hassall,
Mr. Fegan,	Mr. Wright.
Mr. Black.	

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Tuesday, 8th September.

TUESDAY, 8 *SEPTEMBER*, 1896.

The Committee met at 2 p m.

MEMBERS PRESENT:—

The Hon. Frederick Thomas Humphery, Vice-Chairman.

The Hon. Charles James Roberts, C.M.G.,	Charles Alfred Lee, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,
Henry Clarke, Esq.,	Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.
The Committee further considered the proposed Railway from Moree to Inverell.
Hugh McLachlan, Esq., Secretary to the Railway Commissioners, was sworn, and further examined.
The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Wednesday, the following day.

WEDNESDAY, 9 *SEPTEMBER*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

The Hon. Frederick Thomas Humphery, Vice-Chairman.

The Hon. Charles James Roberts, C.M.G.,	Charles Alfred Lee, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,
Henry Clarke, Esq.,	Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.
The Secretary read the following correspondence:—
Telegram from the Secretary to the Sectional Committee appointed to inspect, take evidence, and report with reference to the proposed Railway from Condobolin to Broken Hill, reporting the progress made by the Sectional Committee in their inquiry.
The correspondence was received.
The Committee further considered the proposed Railway from Moree to Inverell.
John Harper, Esq., Goods Superintendent, Department of Railways, was sworn, and examined.
The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Thursday, the following day.

THURSDAY, 10 *SEPTEMBER*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

The Hon. Frederick Thomas Humphery, Vice-Chairman.

The Hon. Charles James Roberts, C.M.G.,	Charles Alfred Lee, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,
Henry Clarke, Esq.,	Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.
The Committee further considered the proposed Railway from Moree to Inverell.
Henry Deane, Esq., Engineer-in-Chief, Railway Construction Branch, Department of Public Works, was sworn, and further examined.
The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Friday, the following day.

FRIDAY, 11 *SEPTEMBER*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

The Hon. Frederick Thomas Humphery, Vice-Chairman.

The Hon. Charles James Roberts, C.M.G.,	Charles Alfred Lee, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,
Henry Clarke, Esq.,	Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.
The Secretary read the following correspondence:—
Letter from the Acting Under Secretary, Department of Lands, informing the Committee that a map, together with certain particulars respecting the conditions and tenure under which the land in the vicinity of the proposed Railway from Moree to Inverell is held, would be forwarded to the Committee on Tuesday, 15th instant, in connection with their inquiry into the proposed Railway from Moree to Inverell.
The correspondence was received.

The

The Committee further considered the proposed Railway from Moree to Inverell.

Joseph Clarke, Esq., Inland Mail Clerk, Postal and Electric Telegraph Department, was sworn, and examined.

Henry Deane, Esq., Engineer-in-Chief, Railway Construction Branch, Department of Public Works, was sworn, and further examined.

The Committee adjourned at 10 minutes past 4, until 2 o'clock p.m. on Tuesday, the 15th September.

TUESDAY, 15 *SEPTEMBER*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

The Hon. Frederick Thomas Humphery, Vice-Chairman.

The Hon. Charles James Roberts, C.M.G.,	Charles Alfred Lee, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,
Henry Clarke, Esq.,	Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Secretary read the following correspondence:—

Telegram from the Chairman of the Sectional Committee appointed to inspect, take evidence, and report with reference to the proposed Railway from Condobolin to Broken Hill, reporting the progress made by the Sectional Committee in their inquiry.

The correspondence was received.

The Committee further considered the proposed Railway from Moree to Inverell.

John McFarlane, Esq., M.P., Charles Edward Rennie, Esq., Chief Draftsman, Department of Lands, and Charles McDonald Stuart, Esq., Supervising Engineer, Railway Construction Branch, Department of Public Works, were sworn, and examined.

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Wednesday, the following day.

WEDNESDAY, 16 *SEPTEMBER*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

The Hon. Frederick Thomas Humphery, Vice-Chairman.

The Hon. Charles James Roberts, C.M.G.,	Charles Alfred Lee, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,
Henry Clarke, Esq.,	Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Secretary read the following correspondence:—

Telegram from the Secretary to the Sectional Committee appointed to inspect, take evidence, and report with reference to the proposed Railway from Condobolin to Broken Hill, reporting the progress made by the Sectional Committee in their inquiry.

The correspondence was received.

The Committee further considered the proposed Railway from Moree to Inverell.

John McFarlane, Esq., M.P., and Charles McDonald Stuart, Esq., Supervising Engineer, Railway Construction Branch, Department of Public Works, were sworn, and further examined.

Percy Scarr, Esq., Principal Assistant Engineer, Roads and Bridges Branch, Department of Public Works, was sworn, and examined.

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Thursday, the following day.

THURSDAY, 17 *SEPTEMBER*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

The Hon. Frederick Thomas Humphery, Vice-Chairman.

The Hon. Charles James Roberts, C.M.G.,	Charles Alfred Lee, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,
Henry Clarke, Esq.,	Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Secretary read the following correspondence:—

Letter from the Secretary to the Railway Commissioners, forwarding, in response to a request by the Committee, a report by the Chief Mechanical Engineer, Department of Railways, with reference to a model of a system for overcoming the break of gauge difficulty in connection with the railway systems of the different colonies.

The correspondence was received.

The Committee further considered the proposed Railway from Moree to Inverell.

John See, Esq., M.P., was sworn, and examined.

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Friday, the following day.

FRIDAY, 18 *SEPTEMBER*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

The Hon. Frederick Thomas Humphery, Vice-Chairman.

The Hon. Charles James Roberts, C.M.G.,	Charles Alfred Lee, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,
Henry Clarke, Esq.,	Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered the proposed Railway from Moree to Inverell.

John See, Esq., M.P., was sworn, and further examined.

Stephen Belcher Burge, Esq., was sworn, and examined.

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Tuesday, 22nd September.

TUESDAY, 22 *SEPTEMBER*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

The Hon. Frederick Thomas Humphery, Vice-Chairman.

The Hon. Charles James Roberts, C.M.G.,	Charles Alfred Lee, Esq.,
Henry Clarke, Esq.,	George Black, Esq.,

Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Secretary read the following correspondence:—

Letter from Mr. H. Deane, Engineer-in-Chief, Railway Construction Branch, Department of Public Works, forwarding particulars as to ownership of land on the Moree to Inverell line, in relation to the Committee's inquiry into the proposed Railway from Moree to Inverell.

Telegram from the Chairman of the Sectional Committee appointed to inspect, take evidence, and report with reference to the proposed Railway from Condobolin to Broken Hill, reporting the progress made by the Sectional Committee in their inquiry.

The correspondence was received, and it was ordered that the letter forwarded by Mr. Deane be printed as an appendix to the evidence given by him in the Committee's inquiry into the proposed Railway from Moree to Inverell.

The following accounts were passed for payment:—

	£	s.	d.
Australian Newspaper Co., Ltd. (*Star*)—Advertising...	0	9	0
S. Bennett (*Evening News*)—Advertising	0	7	6
Daily Telegraph Newspaper Co. (Ltd.)—Advertising	0	10	6
Millen and Chapman (*Western Herald*)—Advertising...	0	14	0
Herbert Robinson, shorthand-writer—Accompanying Sectional Committee appointed with reference to the proposed Railway from Condobolin to Broken Hill ...	7	0	0
	£9	1	0

The Committee further considered the proposed Railway from Moree to Inverell.

Stephen Belcher Burge, Esq., was sworn, and further examined.

Henry Copeland, Esq., M.P., was sworn, and examined.

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Wednesday, the following day.

WEDNESDAY, 23 *SEPTEMBER*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

The Hon. Frederick Thomas Humphery, Vice-Chairman.

The Hon. Charles James Roberts, C.M.G.,	Charles Alfred Lee, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,
Henry Clarke, Esq.,	Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered the proposed Railway from Moree to Inverell.

David Kirkcaldie, Esq., Chief Traffic Manager, Department of Railways, was sworn, and examined.

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Thursday, the following day.

THURSDAY, 24 *SEPTEMBER*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

The Hon. Frederick Thomas Humphery, Vice-Chairman.

The Hon. Charles James Roberts, C.M.G.,	Charles Alfred Lee, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,
Henry Clarke, Esq.,	Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered the proposed Railway from Moree to Inverell.

Charles Edward Rennie, Esq., Chief Draftsman, Department of Lands, and Percy Scarr, Esq., Principal Assistant Engineer, Roads and Bridges Branch, Department of Public Works, were sworn, and further examined.

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Friday, the following day.

FRIDAY,

FRIDAY, 25 *SEPTEMBER*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

The Hon. Frederick Thomas Humphery, Vice-Chairman.

The Hon. Charles James Roberts, C.M.G.,	Charles Alfred Lee, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,
Henry Clarke, Esq.,	Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Secretary read the following correspondence:—

Telegram from the Chairman of the Sectional Committee appointed to inspect, take evidence, and report with reference to the proposed Railway from Condobolin to Broken Hill, reporting the progress made by the Sectional Committee in their inquiry.

The correspondence was received.

The Committee further considered the proposed Railway from Moree to Inverell.

Percy Scarr, Esq., Principal Assistant Engineer, Roads and Bridges Branch, Department of Public Works, was sworn, and further examined.

Edmund Lonsdale, Esq., M.P., was sworn, and examined.

Mr. Wright gave notice that he would move at the next meeting of the Committee,—"That Mr. C. J. Roberts, Mr. O'Connor, Mr. Clarke, Mr. Lee, and Mr. Black be appointed a Sectional Committee to inspect, take evidence, and report with reference to the proposed Railway from Moree to Inverell."

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Tuesday, 29th September.

TUESDAY, 29 *SEPTEMBER*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

The Hon. Frederick Thomas Humphery, Vice-Chairman.

The Hon. Charles James Roberts, C.M.G.,	Charles Alfred Lee, Esq.,
The Hon, Daniel O'Connor,	George Black, Esq.,
Henry Clarke, Esq.,	Francis Augustus Wright Esq.

The minutes of the previous meeting were read, and confirmed.

The Secretary read the following correspondence:—

Telegram from the Chairman of the Sectional Committee appointed to inspect, take evidence, and report with reference to the proposed railway from Condobolin to Broken Hill, reporting the progress made by the Sectional Committee in their inquiry.

Letter from Mr. Andrew Murray, Bannockburn, near Inverell, forwarded to the Committee for their information by the Under Secretary for Public Works, with reference to a suggested deviation in the route of the proposed railway from Moree to Inverell, in relation to the Committee's inquiry respecting the proposed railway from Moree to Inverell.

Letter from the Chief Draftsman, Department of Lands, forwarding, for the information of the Committee, a return respecting lands in the vicinity of the proposed railway from Moree to Inverell, in relation to the Committee's inquiry respecting the proposed railway from Moree to Inverell.

Return, together with a map, forwarded for the information of the Committee by the Principal Assistant Engineer, Roads and Bridges Branch, Department of Public Works, giving details of the expenditure upon roads adjacent to the proposed railway from Moree to Inverell, in relation to the Committee's inquiry into the proposed railway from Moree to Inverell.

The correspondence was received, and it was ordered that the letter forwarded by the Under Secretary for Public Works be referred to the Sectional Committee appointed to inspect, take evidence, and report with reference to the proposed Railway from Moree to Inverell; and that the returns forwarded by the Chief Draftsman, Department of Lands, and the Principal Assistant Engineer, Roads and Bridges Branch, Department of Public Works, be printed as appendices to the evidence given by them in the Committee's inquiry into the proposed Railway from Moree to Inverell.

The following account was passed for payment:—

Northey and Patterson (*Brewarrina Argus*)—Advertising... ... ... 10s. 6d.

Mr. Wright moved,—"That Mr. C. J. Roberts, Mr. O'Connor, Mr. Clarke, Mr. Lee, and Mr. Black be appointed a Sectional Committee to inspect, take evidence, and report with reference to the proposed Railway from Moree to Inverell."

The motion was seconded by Mr. Lee, and passed.

The Committee further considered the proposed Railway from Moree to Inverell.

John Robert Smith, Esq., and Edward Bellingham Price, Esq., Assistant Engineer, Harbours and Rivers Branch, Department of Public Works, were sworn, and examined.

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Wednesday, the following day.

WEDNESDAY,

WEDNESDAY, 30 *SEPTEMBER*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

The Hon. Frederick Thomas Humphery, Vice-Chairman.

The Hon. Charles James Roberts, C.M.G.,	Charles Alfred Lee, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,
Henry Clarke, Esq,	Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered the proposed Railway from Moree to Inverell.

William Alexander Manning, Esq, solicitor, Parramatta, and William McIntyre, Esq., Chief Electoral Officer, Chief Secretary's Department, were sworn, and examined.

The Committee proceeded to consider their Report to the Legislative Assembly on the proposed Railway from Tamworth to Manilla.

The Draft Report was read by the Secretary.

The Committee adjourned at ten minutes past 4, until 2 o'clock p.m. on Thursday, the following day.

THURSDAY, 1 *OCTOBER*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

The Hon. Frederick Thomas Humphery, Vice-Chairman.

The Hon. Charles James Roberts, C.M.G.,	Charles Alfred Lee, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,
Henry Clarke, Esq.,	Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered their Report to the Legislative Assembly on the proposed Railway from Tamworth to Manilla.

The Report was adopted, and the Vice-Chairman was authorised to sign it for presentation to the Legislative Assembly, upon the following division:—

Ayes, 4.	Noes, 3.
Mr. Roberts,	Mr. Humphery,
Mr. O'Connor,	Mr. Clarke,
Mr. Lee,	Mr. Wright.
Mr. Black.	

The Committee adjourned at half-past 3 o'clock.

WEDNESDAY, 14 *OCTOBER*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	John Lionel Fegan, Esq.,
The Hon. James Hoskins,	Thomas Henry Hassall, Esq.,
William Joseph Trickett,	Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Secretary read the following correspondence:—

Letter from the Honorable the Postmaster-General, forwarding, for the information of the Committee, sworn statements by Mr. William Haigh, of Portland, and Mr. David Lawson, in connection with the Committee's inquiry into the proposed Railway from Condobolin to Broken Hill.

The correspondence was received.

The following accounts were passed for payment:—

	£	s.	d.
Edward Downey, shorthand-writer—Accompanying Sectional Committee appointed with reference to the proposed Railway from Condobolin to Broken Hill ...	26	11	5
William Elliott (*Jerilderie Herald*)—Advertising	0	10	6
Condobolin Argus and Lachlan Advertiser Newspaper Co. (Ltd.)—Advertising	0	9	0
John Fairfax and Sons (*Sydney Morning Herald*)—Advertising	0	10	0
Total	£28	0	11

The Committee further considered the proposed Railway from Condobolin to Broken Hill.

Richard Sleath, Esq., M.P., was sworn, and examined.

Henry Deane, Esq., Engineer-in-Chief, Railway Construction Branch, Department of Public Works, was sworn, and further examined.

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Thursday, the following day.

THURSDAY,

THURSDAY, 15 *OCTOBER*, 1896.

The Committe met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon Frederick Thomas Humphery,	John Lionel Fegan, Esq,
The Hon. James Hoskins,	Thomas Henry Hassall, Esq.,
The Hon. William Joseph Trickett,	Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered the proposed Railway from Condobolin to Broken Hill.

Thomas Waddell, Esq., M.P., was sworn, and examined.

Hugh McLachlan, Esq, Secretary to the Railway Commissioners, was sworn, and further examined.

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Friday, the following day.

FRIDAY, 16 *OCTOBER*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	John Lionel Fegan, Esq.,
The Hon. James Hoskins,	Thomas Henry Hassall, Esq.,
The Hon. William Joseph Trickett,	Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The following account was passed for payment:—

Herbert Robinson, shorthand-writer—Accompanying Sectional Committee on proposed Railway from Condobolin to Broken Hill £50 16 2

The Committee further considered the proposed Railway from Condobolin to Broken Hill.

Alexander Wilson, Esq., was sworn, and examined.

Charles Edward Rennie, Esq., Chief Draftsman, Department of Lands, was sworn, and further examined.

The Committee adjourned at half-past 3, until 2 o'clock p.m. on Tuesday, 20th October.

TUESDAY, 20 *OCTOBER*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. James Hoskins,	Henry Clarke, Esq.,
The Hon. Charles James Roberts, C.M.G,	John Lionel Fegan, Esq,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq,
The Hon. Daniel O'Connor,	George Black, Esq.,

Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Secretary read the following correspondence:—

Letter from the Secretary to the Railway Commissioners forwarding, for the information of the Committee, an extract from the Report of the Railway Commissioners of Victoria (1893), with respect to the rates for the carriage of coal, in relation to the Committee's inquiry into the proposed Railway from Condobolin to Broken Hill.

Letter from the Chief Draftsman, Department of Lands, forwarding, for the information of the Committee, returns showing the abandoned resumed areas between the Lachlan and the Murrumbidgee, and the Lachlan and the Darling, in relation to the Committee's inquiry into the proposed Railway from Condobolin to Broken Hill.

The correspondence was received, and it was ordered that the letter forwarded by the Secretary to the Railway Commissioners, and the returns forwarded by the Chief Draftsman, Department of Lands, be published as appendices to the evidence given by them in the Committee's inquiry into the proposed Railway from Condobolin to Broken Hill.

The following account was passed for payment:— £ s. d.

Arthur Blenkin, shorthand-writer—Accompanying the Sectional Committee appointed to inspect, take evidence, and report with reference to the proposed Railway from Moree to Inverell 22 18 0

The Committee further considered the proposed Railway from Condobolin to Broken Hill.

Mr. Ewing, as Chairman of the Sectional Committee appointed to inspect, take evidence, and report with reference to the proposed Railway from Condobolin to Broken Hill, brought up the Report of the Sectional Committee, and moved that it be received and printed, together with the minutes of evidence taken before the Sectional Committee.

The motion was agreed to.

The Report was then read by the Secretary.

Mr. Black (for Mr. Lee, Chairman of the Sectional Committee appointed to inspect, take evidence, and report with reference to the proposed Railway from Moree to Inverell) brought up the Report of the Sectional Committee, and moved that it be received and printed, together with the minutes of evidence taken before the Sectional Committee.

The motion was agreed to.

Mr. Trickett gave notice that he would move at the next meeting of the Committee,—"That the Committee proceed to consider the evidence on the proposed Railway from Condobolin to Broken Hill, with a view to reporting on the subject to the Legislative Assembly."

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Wednesday, the following day.

WEDNESDAY,

WEDNESDAY, 21 *OCTOBER*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. James Hoskins,	Henry Clarke, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,

Francis Augustus Wright, Esq.

The meeting of the previous meeting were read, and confirmed.

The Committee further considered the proposed Railway from Moree to Inverell.

The Report presented by the Sectional Committee appointed to inspect, take evidence, and report with reference to the proposed Railway from Moree to Inverell, was read by the Secretary.

The Committee further considered the proposed Railway from Condobolin to Broken Hill.

Mr. Trickett moved,—"That the Committee proceed to consider the evidence on the proposed Railway from Condobolin to Broken Hill, with a view to reporting on the subject to the Legislative Assembly."

The motion was seconded by Mr. Fegan, and passed.

Mr. Trickett moved,—"That, in the opinion of the Committee, it is not expedient the proposed Railway from Condobolin to Broken Hill, as referred to the Committee by the Legislative Assembly, be carried out."

Mr. Fegan seconded the motion.

The debate upon the motion was adjourned.

The Committee adjourned at a quarter to 4, until 2 o'clock p.m. on Thursday, the following day.

THURSDAY, 22 *OCTOBER*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Henry Clarke, Esq.,
The Hon. James Hoskins,	John Lionel Fegan, Esq.,
The Hon. Charles James Roberts, C.M.G.,	Thomas Henry Hassall, Esq.,
The Hon. William Joseph Trickett,	George Black, Esq.,
The Hon. Daniel O'Connor,	Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Secretary read the following correspondence:—

Letter from the Clerk of the Legislative Assembly, informing the Committee of the passing by the Legislative Assembly of a resolution referring to the Committee for consideration and report the expediency of constructing a Deep-water Harbour at Port Kembla.

The correspondence was received.

The Committee further considered the proposed Railway from Moree to Inverell.

George Alexander Cruickshank, Esq., M.P., was sworn, and examined.

Mr. C. J. Roberts gave notice that he would move at the meeting of the Committee, on Tuesday, 27th October:—"That the Committee proceed to consider the evidence on the proposed Railway from Moree to Inverell, with a view to reporting on the subject to the Legislative Assembly."

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Friday, the following day.

FRIDAY, 23 *OCTOBER*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. James Hoskins,	Henry Clarke, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,

Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered the proposed Railway from Moree to Inverell.

George Alexander Cruickshank, Esq., M.P., was sworn, and further examined.

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Tuesday, 27th October.

TUESDAY,

TUESDAY, 27 *OCTOBER*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Henry Clarke, Esq.,
The Hon. James Hoskins,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,

Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Secretary read the following correspondence:—

Letter from the Collector of Customs, forwarding, for the information of the Committee, in their inquiry into the proposed Railway from Moree to Inverell, a telegram from the Collector of Customs, Brisbane, giving particulars as to the Queensland border export tax on wool, import duty on wheat and potatoes; also the quantity of wheat and potatoes produced in Queensland during the ten years ended 1895.

The correspondence was received.

The Committee further considered the proposed Railway from Moree to Inverell.

George Alexander Cruickshank, Esq., M.P., was sworn, and further examined.

The Hon. Thomas Hawkins Smith, M.L.C., was sworn, and examined.

Mr. Roberts' notice of motion, for the consideration of the evidence on the proposed Railway from Moree to Inverell, was postponed.

The Committee further considered the proposed Railway from Condobolin to Broken Hill.

The adjourned debate upon Mr. Trickett's motion,—"That, in the opinion of the Committee, it is not expedient the proposed Railway from Condobolin to Broken Hill, as referred to the Committee by the Legislative Assembly, be carried out,"—was resumed.

The motion, after discussion, was passed unanimously.

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Wednesday, the following day.

WEDNESDAY, 28 *OCTOBER*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Henry Clarke, Esq.,
The Hon. James Hoskins,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett.	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,

Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Secretary read the following correspondence:—

Letter from Messrs. W. W. Billyard, Andrews, and Moseley, solicitors, representing the Illawarra Harbour and Land Corporation (Limited), requesting that their clients might be allowed to be represented by counsel at any meetings of the Committee during their inquiry into the proposed Construction of a Deep-water Harbour at Port Kembla.

The correspondence was received.

The Committee proceeded to consider the proposed Construction of a Deep-water Harbour at Port Kembla.

Robert R. P. Hickson, Esq., Under Secretary for Public Works and Commissioner for Roads, was sworn, and examined.

The Committee adjourned at half-past 3, until 2 o'clock p.m. on Thursday, the following day.

THURSDAY, 29 *OCTOBER*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Henry Clarke, Esq.,
The Hon. James Hoskins,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,

Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Secretary read the following correspondence:—

Letter from the Associated Coal-owners of the South Coast District, forwarded to the Committee for their information by the Under Secretary for Public Works, with reference to the necessity for providing a Harbour for the South Coast, in relation to the Committee's inquiry into the proposed Construction of a Deep-water Harbour at Port Kembla.

Letter from the Secretary to the Illawarra Harbour and Land Corporation (Limited) directing the attention of the Committee to the Act granted by Parliament to the Corporation, intituled "The Illawarra Harbour and Land Corporation Act of 1890," and "The Illawarra Harbour and Land Corporation Act Amendment Act of 1895," and forwarding copies of same, together with a map of the South Coast, showing the position of works already executed by the Corporation, in relation to the Committee's inquiry into the proposed Construction of a Deep-water Harbour at Port Kembla.

The correspondence was received.

The Committee further considered the proposed construction of a Deep-water Harbour at Port Kembla.

Cecil West Darley, Esq., Engineer-in-Chief for Public Works, Department of Public Works, was sworn, and examined.

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Friday, the following day.

FRIDAY, 30 *OCTOBER*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Henry Clarke, Esq.,
The Hon. James Hoskins,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,

Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered the proposed Construction of a Deep-water Harbour at Port Kembla.

Cecil West Darley, Esq., Engineer-in-Chief for Public Works, Department of Public Works, was sworn, and further examined.

Hugh McLachlan, Esq., Secretary to the Railway Commissioners, was sworn, and examined.

The Committee adjourned at half-past 3, until 2 o'clock p.m. on Tuesday, 3rd November.

TUESDAY, 3 *NOVEMBER*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Henry Clarke, Esq..
The Hon. James Hoskins,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,

Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Secretary read the following correspondence:—

Letter from the Secretary to the Illawarra Harbour and Land Corporation, Limited, giving information respecting the operations of the Company, in relation to the Committee's inquiry into the proposed Construction of a Deep-water Harbour at Port Kembla.

The correspondence was received.

The following accounts were passed for payment:—

	s.	d.
Thomas M. Shakespeare (*Lachlander and Condobolin District Recorder*)—Advertising	6	0
Kate Bond (*Inverell Times*)—Advertising	7	0
Total	13	0

The Committee further considered the proposed Construction of a Deep-water Harbour at Port Kembla.

Cecil West Darley, Esq., Engineer-in-Chief for Public Works, Department of Public Works, and Hugh McLachlan, Esq., Secretary to the Railway Commissioners, were sworn, and further examined.

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Wednesday, the following day.

WEDNESDAY, 4 *NOVEMBER*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Henry Clarke, Esq.,
The Hon. James Hoskins,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,

Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Secretary read the following correspondence:—

Letter from the Council Clerk, Borough of Nowra, requesting the Committee, before closing their inquiry into the proposed Construction of a Deep-water Harbour at Port Kembla, to hear evidence at Nowra with respect to the suitableness of Jervis Bay as a harbour for the South Coast.

The correspondence was received.

The

The Committee further considered the proposed Construction of a Deep-water Harbour at Port Kembla.

David M'Culloch, Esq., Statistical Clerk, Department of Mines, and John Harper, Esq., Goods Superintendent, Department of Railways, were sworn and examined.

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Thursday, the following day.

THURSDAY, 5 *NOVEMBER*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Henry Clarke, Esq.,
The Hon. James Hoskins,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,

Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee proceeded to consider their Report to the Legislative Assembly on the proposed Railway from Condobolin to Broken Hill.

Clauses 1 to 8 were passed.

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Friday, the following day.

FRIDAY, 6 *NOVEMBER*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Henry Clarke, Esq.,
The Hon. James Hoskins,	Charles Alfred Lee, Esq ,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,

Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered their Report to the Legislative Assembly on the proposed Railway from Condobolin to Broken Hill.

Clauses 9 to 16 and the preamble were passed.

The Report was adopted, and the Chairman was authorised to sign it for presentation to the Legislative Assembly.

The Committee adjourned at 4 o'clock, until 2 o'clock, p.m. on Tuesday, 10th November.

TUESDAY, 10 *NOVEMBER*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq,, Chairman.

The Hon. Frederick Thomas Humphery,	The Hon. Daniel O'Connor,
The Hon. James Hoskins,	Henry Clarke, Esq.,
The Hon. Charles James Roberts, C.M.G.,	Charles Alfred Lee, Esq.,
The Hon. William Joseph Trickett,	John Lionel Fegan, Esq.,

Thomas Henry Hassall, Esq.

The minutes of the previous meeting were read, and confirmed.

The following accounts were passed for payment:—

	£	s.	d.
Thomas O'Connor (*Glen Innes Guardian*)—Advertising	0	7	6
Daily Telegraph Newspaper Co. (Limited)—Advertising	0	10	6
S. Bennett (*Evening News*)—Advertising	0	7	6
Australian Newspaper Co., Limited (*Star*)—Advertising	0	9	4
Total	£1	14	10

The Committee further considered the proposed Construction of a Deep-water Harbour at Port Kembla.

George Skelton Yuill, Esq. (G. S. Yuill & Co., Limited), was sworn, and examined.

The Committee adjourned at ten minutes past 4, until 2 o'clock p.m. on Wednesday, the following day.

WEDNESDAY, 11 *NOVEMBER*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Henry Clarke, Esq.,
The Hon. James Hoskins,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,

Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered the proposed Construction of a Deep-water Harbour at Port Kembla.

Archibald Campbell, Esq., M.P., was sworn, and examined.

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Thursday, the following day.

THURSDAY, 12 *NOVEMBER*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Henry Clarke, Esq.,
The Hon. James Hoskins,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,

Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Secretary read the following correspondence:—

Letters from the Clerk of the Legislative Assembly, informing the Committee of the passing by the Legislative Assembly of resolutions referring to the Committee for consideration and report the following proposed public works:—

Sewerage Works for the Town of Parramatta.

Construction of a Duplicate Main from Prospect to Potts' Hill, in connection with the Sydney Water Supply.

The correspondence was received.

The Committee further considered the proposed Construction of a Deep-water Harbour at Port Kembla.

Archibald Campbell, Esq., M.P., was sworn, and further examined.

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Friday, the following day.

FRIDAY, 13 *NOVEMBER*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Henry Clarke, Esq.,
The Hon. James Hoskins,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,

Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Secretary read the following correspondence:—

Letter from the Clerk of the Legislative Assembly, informing the Committee of the passing by the Legislative Assembly of a Resolution referring to the Committee for consideration and report the expediency of erecting New Houses of Parliament for the Colony.

The correspondence was received.

The Committee further considered the proposed Construction of a Deep-water Harbour at Port Kembla.

Frederick Augustus Franklin, Esq., Memb. Inst. C.E., was sworn, and examined.

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Tuesday, the 17th instant.

TUESDAY,

TUESDAY, 17 *NOVEMBER*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Henry Clarke, Esq.,
The Hon. James Hoskins,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,

Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered the proposed Construction of a Deep-water Harbour at Port Kembla.

Tannatt William Edgeworth David, Esq., B.A., Professor of Geology and Mineralogy, University of Sydney, was sworn, and examined.

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Wednesday, the following day.

WEDNESDAY, 18 *NOVEMBER*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Henry Clarke, Esq.,
The Hon. James Hoskins,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,

Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered the proposed Construction of a Deep-water Harbour at Port Kembla.

Edward Nassau Senior, Esq., and the Honorable Ebenezer Vickery, M.L.C., were sworn, and examined.

The Committee adjourned at a quarter past 4, until 2 o'clock p.m. on Thursday, the following day.

THURSDAY, 19 *NOVEMBER*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Henry Clarke, Esq.,
The Hon. James Hoskins,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,

Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered the proposed Construction of a Deep-water Harbour at Port Kembla.

Charles Edward Rennie, Esq., Chief Draftsman, Department of Lands, was sworn, and examined.

The Honorable Ebenezer Vickery, M.L.C., was sworn, and further examined.

The Committee adjourned at a quarter to 5, until 2 o'clock p.m. on Friday, the following day.

FRIDAY, 20 *NOVEMBER*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. James Hoskins,	John Lionel Fegan, Esq.,
The Hon. Charles James Roberts, C.M.G.,	Thomas Henry Hassall, Esq.,
The Hon. William Joseph Trickett,	George Black, Esq.,
Henry Clarke, Esq.,	Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered the proposed Construction of a Deep-water Harbour at Port Kembla.

John Barnes Nicholson, Esq., M.P., was sworn, and examined.

The Committee adjourned at ten minutes to 4, until 2 o'clock p.m. on Tuesday, the 24th instant.

TUESDAY,

TUESDAY, 24 *NOVEMBER*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Henry Clarke, Esq.,
The Hon. James Hoskins,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,

Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered the proposed Construction of a Deep-water Harbour at Port Kembla.

John Barnes Nicholson, Esq., M.P., was sworn and further examined.

The Committee adjourned at ten minutes past 4, until 2 o'clock p.m. on Wednesday, the following day.

WEDNESDAY, 25 *NOVEMBER*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Henry Clarke, Esq.,
The Hon. James Hoskins,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,

Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered the proposed Construction of a Deep-water Harbour at Port Kembla.

David McCulloch, Esq., Statistical Clerk, Department of Mines, was sworn, and further examined.

Charles Joseph Byrnes, Esq., Managing Director, Mount Pleasant Coal Company, and Dr. James Robert Millar Robertson were sworn, and examined.

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Thursday, the following day.

THURSDAY, 26 *NOVEMBER*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Henry Clarke, Esq.,
The Hon. James Hoskins,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,

Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered the proposed Construction of a Deep-water Harbour at Port Kembla.

Dr. James Robert Millar Robertson was sworn, and further examined.

The Committee adjourned at ten minutes past 4, until 2 o'clock p.m. on Friday, the following day.

FRIDAY, 27 *NOVEMBER*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Henry Clarke, Esq.,
The Hon. James Hoskins,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,

Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered the proposed Construction of a Deep-water Harbour at Port Kembla.

Captain Francis Hixson, President of the Marine Board of New South Wales, was sworn, and examined.

Charles Edward Rennie, Esq., Chief Draftsman, Department of Lands, was sworn, and further examined.

The Committee adjourned at twenty minutes to 4, until 2 o'clock p.m. on Tuesday, 1st December.

TUESDAY,

TUESDAY, 1 *DECEMBER*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Henry Clarke, Esq.,
The Hon. James Hoskins,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq,
The Hon. Daniel O'Connor,	George Black, Esq.,

Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Secretary read the following correspondence:—

Letter from Dr. James R. M. Robertson, forwarding, for the information of the Committee, a statement showing the cost of shipping coal from the Mount Kembla Mine, in connection with their inquiry into the proposed Construction of a Deep-water Harbour at Port Kembla.

Returns from the Customs Officer, Wollongong, showing the quantity of coal shipped during the five years ending 30th June, 1896, from the Ports of Bellambi and Port Kembla respectively; also the amount of coke shipped from Port Kembla during the same period, in relation to the Committee's inquiry into the proposed Construction of a Deep-water Harbour at Port Kembla.

The correspondence was received, and it was ordered that the documents in question be published as appendices to the evidence taken by the Committee in their inquiry into the proposed Construction of a Deep-water Harbour at Port Kembla.

The Committee further considered the proposed Construction of a Deep-water Harbour at Port Kembla.

John Barnes Nicholson, Esq., M.P., was sworn, and further examined.

William M'Intyre, Esq., Chief Electoral Officer, Chief Secretary's Department, was sworn, and examined.

The Committee adjourned at ten minutes to 4, until 2 o'clock p.m. on Wednesday, the following day.

WEDNESDAY, 2 *DECEMBER*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Henry Clarke, Esq.,
The Hon. James Hoskins,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,

Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Secretary read the following correspondence:—

Letter from Dr. James R. M. Robertson, forwarding a statement respecting Illawarra coal areas, in connection with the Committee's inquiry into the proposed Construction of a Deep-water Harbour at Port Kembla.

The correspondence was received, and it was ordered that the document be published as an appendix to the evidence given by Dr. Robertson in the Committee's inquiry into the proposed Construction of a Deep-water Harbour at Port Kembla.

The following account was passed for payment:— £ s. d.

Alfred Wiskens (*Warialda Watchman*)—Advertising visit of Sectional Committee appointed to inspect, take evidence, and report with reference to the proposed Railway from Moree to Inverell 0 6 0

The Committee further considered the proposed Construction of a Deep-water Harbour at Port Kembla.

Henry Deane, Esq., Engineer-in-Chief, Railway Construction Branch, Department of Public Works, and Captain James M'George, s.s. "Kurrara," were sworn, and examined.

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Thursday, the following day.

THURSDAY, 3 *DECEMBER*, 1896.

The Committee met at 2 p m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Henry Clarke, Esq.,
The Hon. James Hoskins,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,

Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Secretary read the following correspondence:—

Letter from the Engineer-in-Chief for Public Works, forwarding a statement respecting the jetties at Port Kembla in connection with the Committee's inquiry into the proposed Construction of a Deep-water Harbour at Port Kembla.

The correspondence was received.

The

The Committee further considered the proposed Construction of a Deep-water Harbour at Port Kembla.

Henry Osborne MacCabe, Esq., managing director, Mount Keira Colliery, and Captain Frederick Samuel Agutter, s.s. "Mount Kembla," were sworn, and examined.

The Committee adjourned at a quarter past 4, until 2 o'clock p.m. on Friday, the following day.

FRIDAY, 4 *DECEMBER*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Henry Clarke, Esq.,
The Hon. James Hoskins,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,

Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Secretary read the following correspondence:—

Letter from the Engineer-in-Chief for Public Works, forwarding, for the information of the Committee, a print and two tracings of the lakes entrance, Gippsland, Victoria, in relation to their inquiry into the proposed Construction of a Deep-water Harbour at Port Kembla,

Letter from the Under Secretary and Commissioner for Roads, Department of Public Works, forwarding a copy of a report on the exploration of the country lying between the Blayney-Harden Railway and Grenfell and Wyalong, and stating that the Hon. the Minister for Public Works had approved of a survey for a line of railway being made.

Letter from Dr. James R. M. Robertson, forwarding a further statement respecting the Illawarra coal areas, in connection with the Committee's inquiry into the proposed Construction of a Deep-water Harbour at Port Kembla.

The correspondence was received, and it was ordered that the statement forwarded by Dr. Robertson be published as an appendix to the evidence given by him in the Committee's inquiry into the proposed Construction of a Deep-water Harbour at Port Kembla.

The Committee further considered the proposed Construction of a Deep-water Harbour at Port Kembla.

Captain Hector Allen Boyle, and Frederick George Woolcott-Waley, Esq., manager, Bellambi Coal Company (Limited), were sworn, and examined.

The Committee adjourned at a quarter to 4, until 2 o'clock p.m. on Tuesday, 8th December.

TUESDAY, 8 *DECEMBER*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Henry Clarke, Esq.,
The Hon. James Hoskins,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,

Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered the proposed Construction of a Deep-water Harbour at Port Kembla.

Robert Charles Reed, Esq., manager, Messrs. Gibbs, Bright, and Company, and Captain Stephen George Green, superintendent, Eastern Australian Steamship Company, were sworn, and examined.

The Committee adjourned at 4, until 2 o'clock p.m. on Wednesday, the following day.

WEDNESDAY, 9 *DECEMBER*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Henry Clarke, Esq.,
The Hon. James Hoskins,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,

Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered the proposed Construction of a Deep-water Harbour at Port Kembla.

Captain Jose Horacio Amora, Consul for Chili, and Captain William Henry Mills, were sworn, and examined.

The Committee adjourned at ten minutes past 4, until 2 o'clock p.m. on Thursday, the following day.

THURSDAY,

THURSDAY, 10 *DECEMBER*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Henry Clarke, Esq.,
The Hon. James Hoskins,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,

Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The following account was passed for payment:—

	£	s.	d.
Herbert Robjohns—Map of Illawarra Coal-fields, for the use of the Committee in their inquiry into the proposed Construction of a Deep-water Harbour at Port Kembla	1	11	6

The Committee further considered the proposed Construction of a Deep-water Harbour at Port Kembla.

Captain William Henry Mills was sworn, and further examined.

James Rowan, Esq., Inspector of Collieries, Wollongong, was sworn, and examined.

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Friday, the following day.

FRIDAY, 11 *DECEMBER*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Henry Clarke, Esq.,
The Hon. James Hoskins,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,

Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Secretary read the following correspondence:—

Letter from the Collector of Customs, forwarding, for the information of the Committee, a return showing the number of vessels which have left Sydney in ballast from the year 1891 to the year 1895 inclusive, together with the port of destination of those vessels.

The correspondence was received.

The Committee further considered the proposed Construction of a Deep-water Harbour at Port Kembla.

Andrew Innes Liddell, Esq., civil engineer, and Captain John Sage, were sworn, and examined.

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Tuesday, 15th December.

TUESDAY, 15 *DECEMBER*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Henry Clarke, Esq.,
The Hon. James Hoskins,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,

Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The following account was passed for payment:—

	s.	d.
Vincent Brothers (*Glen Innes Examiner*)—Advertising visit of Sectional Committee appointed to inspect, take evidence, and report with reference to the proposed Railway from Moree to Inverell	8	0

The Committee further considered the proposed Construction of a Deep-water Harbour at Port Kembla.

Stephen Henderson, Esq., was sworn, and examined.

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Wednesday, the following day.

WEDNESDAY,

WEDNESDAY, 16 *DECEMBER*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Henry Clarke, Esq.,
The Hon. James Hoskins,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,

Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered the proposed Construction of a Deep-water Harbour at Port Kembla.

Tannatt William Edgeworth David, Esq., B.A., Professor of Geology, University of Sydney, was sworn, and further examined.

Edward Fisher Pittman, Esq., A.R.S.M., Government Geologist, was sworn, and examined.

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Thursday, the following day.

THURSDAY, 17 *DECEMBER*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Henry Clarke, Esq.,
The Hon. James Hoskins,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,

Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Secretary read the following correspondence:—

Letter from the Collector of Customs, forwarding, for the information of the Committee, a return giving the names and tonnage of vessels leaving Sydney for Newcastle and southern coal-ports in ballast, during the past five years in connection with their inquiry into the proposed Construction of a Deep-water Harbour at Port Kembla.

The correspondence was received.

The Committee further considered the proposed Construction of a Deep-water Harbour at Port Kembla.

Stephen Henderson, Esq., was sworn, and further examined.

Andrew Armstrong, Esq., was sworn, and examined.

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Friday, the following day.

FRIDAY, 18 *DECEMBER*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. James Hoskins,	John Lionel Fegan, Esq.,
The Hon. Charles James Roberts, C.M.G.,	Thomas Henry Hassall, Esq.,
The Hon. William Joseph Trickett,	George Black, Esq.,
The Hon. Daniel O'Connor,	Francis Augustus Wright, Esq.,
Henry Clarke, Esq.,	Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered the proposed Construction of a Deep-water Harbour at Port Kembla.

William Beach, Esq., was sworn, and examined.

Andrew Armstrong, Esq., was sworn, and further examined.

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Tuesday, 22nd December.

TUESDAY, 22 *DECEMBER*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomas Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. James Hoskins,	John Lionel Fegan, Esq.,
The Hon. Charles James Roberts, C.M G.,	Thomas Henry Hassall, Esq.,
The Hon. William Joseph Trickett,	George Black, Esq.,
The Hon. Daniel O'Connor,	Francis Augustus Wright, Esq.,
Henry Clarke, Esq.,	Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The following account was passed for payment:— £ s. d.

Professor David—Services as an expert witness in the Committee's inquiry respecting the proposed Construction of a Deep-water Harbour at Port Kembla ... 10 10 0

The Committee further considered the proposed Construction of a Deep-water Harbour at Port Kembla.

Andrew Armstrong, Esq., was sworn, and further examined.

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Wednesday, the following day.

WEDNESDAY, 23 *DECEMBER*, 1896.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. James Hoskins,	John Lionel Fegan, Esq.,
The Hon. Charles James Roberts, C.M.G.,	Thomas Henry Hassall, Esq.,
The Hon. William Joseph Trickett,	George Black, Esq.,
The Hon. Daniel O'Connor,	Francis Augustus Wright, Esq.,
Henry Clarke, Esq.,	Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered the proposed Construction of a Deep-water Harbour at Port Kembla.

Andrew Armstrong, Esq., was sworn, and further examined.

The Committee adjourned at a quarter to 4, until 12 o'clock noon on Thursday, the following day.

THURSDAY, 24 *DECEMBER*, 1896.

The Committee met at 12 noon.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. James Hoskins,	John Lionel Fegan, Esq.,
The Hon. Charles James Roberts, C.M.G.,	Thomas Henry Hassall, Esq.,
The Hon. William Joseph Trickett,	George Black, Esq.,
The Hon. Daniel O'Connor,	Francis Augustus Wright, Esq.,
Henry Clarke, Esq.,	Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered the proposed Construction of a Deep-water Harbour at Port Kembla.

Henry Deane, Esq., Engineer-in-Chief, Railway Construction Branch, Department of Public Works, was sworn, and further examined.

The Committee adjourned at a quarter past 1, until 2 o'clock p.m. on Tuesday, 12th January, 1897.

TUESDAY, 12 *JANUARY*, 1897.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. James Hoskins,	John Lionel Fegan, Esq.,
The Hon. Charles James Roberts, C.M.G.,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,
Henry Clarke, Esq.,	Francis Augustus Wright, Esq.,

Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The Secretary read the following correspondence:—

Return showing the shipments of coal from all jetties included in the port of Wollongong for the year ending 30th June, 1896, forwarded by the Customs officer, Wollongong; and a return showing the steamship companies using southern coal, forwarded by the Honorable E. Vickery, M.L.C., in relation to the Committee's inquiry respecting the proposed Construction of a Deep-water Harbour at Port Kembla.

The correspondence was received, and it was ordered that the returns be published as appendices to the evidence taken by the Committee in their inquiry respecting the proposed Construction of a Deep-water Harbour at Port Kembla.

The following account was passed for payment:— £ s. d.

John Fairfax and Sons (*Sydney Morning Herald*)—Advertising 0 9 6

The Committee further considered the proposed Construction of a Deep-water Harbour at Port Kembla.

William Andrews, Esq. (Messrs. W. W. Billyard, Andrews, and Moseley, solicitors), was sworn, and examined.

Cecil West Darley, Esq., Engineer-in-Chief for Public Works, was sworn, and further examined.

Mr. Lee gave notice that he would move, at the next meeting of the Committee,—"That a Sectional Committee, comprising the whole of the members of the General Committee, be appointed to inspect, take evidence, and report with reference to the proposed Construction of a Deep-water Harbour at Port Kembla."

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Wednesday, the following day.

WEDNESDAY, 13 *JANUARY*, 1897.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. James Hoskins,	John Lionel Fegan, Esq.,
The Hon. Charles James Roberts, C.M.G.,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,
Henry Clarke, Esq.,	Francis Augustus Wright, Esq.,

Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

Mr. Lee moved,—"That a Sectional Committee, comprising the whole of the members of the General Committee, be appointed to inspect, take evidence, and report with reference to the proposed Construction of a Deep-water Harbour at Port Kembla."

The motion was seconded by Mr. Humphery, and passed.

The Secretary read the following correspondence:—

Letter from the Principal Under Secretary, transmitting a Commission under the Great Seal of the Colony, appointing Thomas Thomson Ewing, Esquire, M.P., President, in conjunction with The Honorable Frederick Thomas Humphery, M.L.C.; The Honorable James Hoskins, M.L.C.; The Honorable Charles James Roberts, C.M.G., M.L.C.; The Honorable William Joseph Trickett, M.L.C.; The Honorable Daniel O'Connor, M.L.C.; Henry Clarke, Esquire, M.P.; Charles Alfred Lee, Esquire, M.P.; John Lionel Fegan, Esquire, M.P.; Thomas Henry Hassall, Esquire, M.P.; George Black, Esquire, M.P.; Francis Augustus Wright, Esquire, M.P.; and Frank Farnell, Esquire, M.P., to be a Royal Commission to make a diligent and full inquiry as to the expediency and best methods of extending the railway system of the Colony into the City of Sydney, or through the City, and to the waters of Port Jackson, (1) for the convenience of passengers, and (2) for the conveyance of goods..

The correspondence was received.

The Committee further considered the proposed Construction of a Deep-water Harbour at Port Kembla.

John Evans, Esq., mining engineer, Bulli, was sworn, and examined.

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Thursday, the following day.

THURSDAY, 14 *JANUARY*, 1897.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. James Hoskins,	John Lionel Fegan, Esq.,
The Hon. Charles James Roberts, C.M.G.,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,
Henry Clarke, Esq.,	Francis Augustus Wright, Esq.,

Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered the proposed Construction of a Deep-water Harbour at Port Kembla.

John Evans, Esq., mining engineer, Bulli, was sworn, and further examined.

Thomas Downie, Esq., wharfinger at Port Kembla, for the Southern Coal Company, and George Sinclair, Esq., wharfinger at Port Kembla, for the Mount Kembla Coal Company, were sworn, and examined.

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Friday, the following day.

FRIDAY, 15 *JANUARY*, 1897.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. James Hoskins,	John Lionel Fegan, Esq.,
The Hon. Charles James Roberts, C.M.G.,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,
Henry Clarke, Esq,	Francis Augustus Wright, Esq.,

Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered the proposed Construction of a Deep-water Harbour at Port Kembla.

Robert Amos, Esq., was sworn, and examined.

Cecil West Darley, Esq., Engineer-in-Chief for Public Works, was sworn, and further examined.

The Committee adjourned at a quarter to 4 o'clock.

WEDNESDAY,

WEDNESDAY, 27 JANUARY, 1897.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. James Hoskins,	John Lionel Fegan, Esq.,
The Hon. Charles James Roberts, C.M.G.,	Thomas Henry Hassall, Esq.,
The Hon. William Joseph Trickett,	George Black, Esq.,
Henry Clarke, Esq.,	Francis Augustus Wright, Esq.,

Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The Secretary read the following correspondence:—

Letter from Mr. W. Lovegrove, offering himself as a witness in the Committee's inquiry respecting the proposed Construction of a Deep-water Harbour at Port Kembla.

Memorandum from Mr. C. W. Darley, Engineer-in-Chief for Public Works, suggesting that an explanation be obtained from the Secretary of the Illawarra Harbour and Land Corporation (Limited), respecting the statement in a recent press cable message that two large dredges were being despatched to Lake Illawarra from London.

The correspondence was received.

The Committee further considered the proposed Construction of a Deep-water Harbour at Port Kembla.

Henry Chamberlaine Russell, Esq., C.M.G., Government Astronomer; Messrs. William Smith Thompson, Evan Robert Evans, and John Reid, residents of Dapto; William Wiseman, Esq., and Andrew Love, Esq., were sworn, and examined.

Mr. Lee gave notice that he would move at the next meeting of the Committee:—"That the Committee proceed to consider the evidence on the proposed Deep-water Harbour at Port Kembla, with a view to reporting on the subject to the Legislative Assembly."

The Committee adjourned at seventeen minutes past 4, until 2 o'clock p.m., on Thursday, the following day.

THURSDAY, 28 JANUARY, 1897.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. James Hoskins,	John Lionel Fegan, Esq.,
The Hon. Charles James Roberts, C.M.G.,	Thomas Henry Hassall, Esq.,
The Hon. William Joseph Trickett,	George Black, Esq.,
The Hon. Daniel O'Connor,	Francis Augustus Wright, Esq.,
Henry Clarke, Esq.,	Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The Secretary read the following correspondence:—

Extract from *Nature* with reference to the force of waves on exposed structures, forwarded by Mr. H. C. Russell, in connection with his evidence in the Committee's inquiry respecting the proposed Construction of a Deep-water Harbour at Port Kembla.

The correspondence was received.

The Committee further considered the proposed Construction of a Deep-water Harbour at Port Kembla.

William Lovegrove, Esq., Phillip Machel, Esq., and Frank Jarvis, Esq., Secretary, Illawarra Harbour and Land Corporation (Limited), were sworn, and examined.

Stephen Henderson, Esq., was sworn, and further examined.

The Committee adjourned at eight minutes past 4, until 2 o'clock p.m. on Friday, the following day.

FRIDAY, 29 JANUARY, 1897.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. James Hoskins,	John Lionel Fegan, Esq.,
The Hon. Charles James Roberts, C.M.G.,	Thomas Henry Hassall, Esq.,
The Hon. William Joseph Trickett,	George Black, Esq.,
The Hon. Daniel O'Connor,	Francis Augustus Wright, Esq.,
Henry Clarke, Esq.	Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered the proposed Construction of a Deep-water Harbour at Port Kembla.

Frank Jarvis, Esq., Secretary, Illawarra Harbour and Land Corporation (Limited), and Edward Fisher Pittman, Esq., A.R.S.M., Government Geologist, were sworn, and further examined.

John James Amess, Esq., lighterman and tugman, and Stanley Alexander, Esq., Acting Inspecting Engineer, Railway Construction Branch, Department of Public Works, were sworn, and examined.

Mr. Lee's notice of motion, for the consideration of the evidence on the proposed Construction of a Deep-water Harbour at Port Kembla, was postponed.

The Committee adjourned at ten minutes to 4, until 2 o'clock p.m. on Tuesday, 2nd February.

TUESDAY,

TUESDAY, 2 FEBRUARY, 1897.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. James Hoskins,	John Lionel Fegan, Esq.,
The Hon. Charles James Roberts, C.M.G.,	Thomas Henry Hassall, Esq.,
The Hon. William Joseph Trickett,	George Black, Esq.,
The Hon. Daniel O'Connor,	Francis Augustus Wright, Esq.,
Henry Clarke, Esq.	Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The following accounts were passed for payment:—

	£	s.	d.
Angelo J. Smith, shorthand-writer—Accompanying the Sectional Committee on the proposed Construction of a Deep-water Harbour at Port Kembla	16	2	0
W. D. White—Expenses, accompanying the Sectional Committee as Secretary ...	7	0	0
Total	£23	2	0

The Committee further considered the proposed Construction of a Deep-water Harbour at Port Kembla.

Fitzwilliam Wentworth, Esq., Trustee of the Wentworth Estate, Port Kembla, and Henry Richard Carleton, Esq., Principal Assistant Engineer, Harbours and Rivers Branch, Department of Public Works, were sworn, and examined.

The Committee adjourned at five minutes past 4, until 2 o'clock p.m. on Wednesday, the following day.

WEDNESDAY, 3 FEBRUARY, 1897.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. James Hoskins,	John Lionel Fegan, Esq.,
The Hon. Charles James Roberts, C.M.G.,	Thomas Henry Hassall, Esq.,
The Hon. William Joseph Trickett,	George Black, Esq.,
The Hon. Daniel O'Connor,	Francis Augustus Wright, Esq.,
Henry Clarke, Esq.,	Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The Secretary read the following correspondence:—

Letter from Mr. W. Ashley, Manager of the Australian Coke Company's Works at Unanderra, with reference to the Committee's inquiry respecting the proposed Construction of a Deep-water Harbour at Port Kembla.

The correspondence was received.

The Committee further considered the proposed Construction of a Deep-water Harbour at Port Kembla.

Louis Richard Gundlach, Esq., was sworn, and examined.

Mr. Lee moved,—"That the Committee proceed to consider the evidence on the proposed Construction of a Deep-water Harbour at Port Kembla, with a view to reporting on the subject to the Legislative Assembly."

The motion was seconded by Mr. Fegan, and passed.

Mr. O'Connor moved,—"That the further consideration of the matter be postponed until to-morrow."

The motion was seconded by Mr. Farnell, and negatived.

Mr. Lee moved,—"That, in the opinion of the Committee, it is expedient the proposed Construction of a Deep-water Harbour at Port Kembla, referred to the Committee by the Legislative Assembly, be carried out by constructing the eastern breakwater only."

Mr. Fegan seconded the motion.

The debate upon the motion was adjourned.

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Thursday, the following day.

THURSDAY, 4 FEBRUARY, 1897.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. James Hoskins,	John Lionel Fegan, Esq.,
The Hon. Charles James Roberts, C.M.G.,	Thomas Henry Hassall, Esq.,
The Hon. William Joseph Trickett,	George Black, Esq.,
The Hon. Daniel O'Connor,	Francis Augustus Wright, Esq.,
Henry Clarke, Esq.,	Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered the proposed Construction of a Deep-water Harbour at Port Kembla.

The

The adjourned debate upon the motion by Mr. Lee,—"That in the opinion of the Committee, it is expedient the proposed Construction of a Deep-water Harbour at Port Kembla, referred to the Committee by the Legislative Assembly, be carried out by constructing the eastern breakwater only,"—was resumed.

The motion was passed on the following division:—

Ayes, 9.	Noes, 4.
Mr. Ewing,	Mr. Hassall,
Mr. Humphery,	Mr. Black,
Mr. Hoskins,	Mr. Wright,
Mr. Roberts,	Mr. Farnell.
Mr. Trickett,	
Mr. O'Connor,	
Mr. Clarke,	
Mr. Lee,	
Mr. Fegan,	

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Friday, the following day.

FRIDAY, 5 *FEBRUARY*, 1897.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. James Hoskins,	John Lionel Fegan, Esq.,
The Hon. Charles James Roberts, C.M.G.,	Thomas Henry Hassall, Esq.,
The Hon. William Joseph Trickett,	George Black, Esq.,
The Hon. Daniel O'Connor,	Francis Augustus Wright, Esq.,
Henry Clarke, Esq.,	Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee proceeded to consider their Report to the Legislative Assembly on the proposed Construction of a Deep-water Harbour at Port Kembla.

Clauses 1 and 2 were passed.

The Committee adjourned at five minutes to 4, until 2 o'clock p.m. on Tuesday, 9th February.

TUESDAY, 9 *FEBRUARY*, 1897.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Henry Clarke, Esq.,
The Hon. James Hoskins,	John Lionel Fegan, Esq.,
The Hon. Charles James Roberts, C.M.G.,	Thomas Henry Hassall, Esq.,
The Hon. William Joseph Trickett,	George Black, Esq.,
The Hon. Daniel O'Connor,	Francis Augustus Wright, Esq.,

Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered their Report to the Legislative Assembly on the proposed Construction of a Deep-water Harbour at Port Kembla.

Clauses 3 to 22 were passed.

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Wednesday, the following day.

WEDNESDAY, 10 *FEBRUARY*, 1897.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. James Hoskins,	John Lionel Fegan, Esq.,
The Hon. Charles James Roberts, C.M.G.,	Thomas Henry Hassall, Esq.,
The Hon. William Joseph Trickett,	George Black, Esq.
The Hon. Daniel O'Connor,	Francis Augustus Wright, Esq.,
Henry Clarke, Esq.,	Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered their Report to the Legislative Assembly on the proposed Construction of a Deep-water Harbour at Port Kembla.

The remaining clauses, and the Preamble of the Report were passed, the Report was adopted, and the Chairman was authorised to sign it for presentation to the Legislative Assembly.

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Thursday, the following day.

THURSDAY,

THURSDAY, 11 *FEBRUARY*, 1897.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Henry Clarke, Esq.,
The Hon. James Hoskins,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,

Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee proceeded to consider the proposed Sewerage Works for Parramatta

Cecil West Darley, Esq., Acting Under Secretary for Public Works, and Joseph Davis, Esq., Engineer for Sewerage Construction, Department of Public Works, were sworn, and examined.

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Friday, the following day.

FRIDAY, 12 *FEBRUARY*, 1897.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Henry Clarke, Esq.,
The Hon. James Hoskins,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,

Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered the proposed Sewerage Works for Parramatta.

Joseph Davis, Esq., Engineer for Sewerage Construction, Department of Public Works, was sworn, and further examined.

The Committee adjourned at fifteen minutes to 4, until 2 o'clock p.m. on Tuesday, 16th February.

TUESDAY, 16 *FEBRUARY*, 1897.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. James Hoskins,	John Lionel Fegan, Esq.,
The Hon. Charles James Roberts, C.M.G.,	Thomas Henry Hassall, Esq.,
The Hon. William Joseph Trickett,	George Black, Esq.,
The Hon. Daniel O'Connor,	Francis Augustus Wright, Esq.,
Henry Clarke, Esq.,	Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The Secretary read the following correspondence:—

Telegram from W. H. O'M. Woods, District Surveyor, Moree, giving the area of Crown lands, exclusive of camping and travelling stock reserves, in the Moree Land District.

The correspondence was received.

The Committee further considered the proposed Railway from Moree to Inverell.

John Harper, Esq., Goods Superintendent, Department of Railways, was sworn, and further examined.

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Wednesday, the following day.

WEDNESDAY, 17 *FEBRUARY*, 1897.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. James Hoskins,	John Lionel Fegan, Esq.,
The Hon. Charles James Roberts, C.M.G.,	Thomas Henry Hassall, Esq.,
The Hon. William Joseph Trickett,	George Black, Esq.,
The Hon. Daniel O'Connor,	Francis Augustus Wright, Esq.,
Henry Clarke, Esq.,	Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The Secretary read the following correspondence:—

Letter from the Secretary of the Illawarra Harbour and Land Corporation (Limited), asking to be supplied with a copy of the Committee's Report on the proposed Construction of a Deep-water Harbour at Port Kembla.

The

The correspondence was received, the Secretary of the Corporation to be informed that the Report cannot be made public until it has been laid before Parliament.

The Committee further considered the proposed Sewerage Works for Parramatta.

Joseph Davis, Esq., Engineer for Sewerage Construction, Department of Public Works, was sworn, and further examined.

The Committee adjourned at ten minutes to 4, until 2 o'clock p.m. on Thursday, the following day.

THURSDAY, 18 *FEBRUARY*, 1897.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. James Hoskins,	John Lionel Fegan, Esq.,
The Hon. Charles James Roberts, C.M.G.,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,
Henry Clarke, Esq.,	Francis Augustus Wright, Esq.,

Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered the proposed Sewerage Works for Parramatta.

James Johnston, Esq., Clerk, Department of Public Works, and Thomas Moxham, Esq., Mayor of Parramatta, were sworn, and examined.

The Committee adjourned at a quarter to 4, until 2 o'clock p.m. on Friday, the following day.

FRIDAY, 19 *FEBRUARY*, 1897.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. James Hoskins,	John Lionel Fegan, Esq.,
The Hon. Charles James Roberts, C.M.G.,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,
Henry Clarke, Esq.,	Francis Augustus Wright, Esq.,

Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered the proposed Sewerage Works for Parramatta.

James Johnston, Esq., Clerk, Department of Public Works, was sworn, and further examined.

The Committee adjourned at half-past 3, until 2 o'clock p.m. on Tuesday, 23rd February.

TUESDAY, 23 *FEBRUARY*, 1897.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Henry Clarke, Esq.,
The Hon. James Hoskins,	John Lionel Fegan, Esq.,
The Hon. Charles James Roberts, C.M.G.,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	Francis Augustus Wright, Esq.,

Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered the proposed Railway from Moree to Inverell.

John Harper, Esq., Goods Superintendent, Department of Railways, was sworn, and further examined.

The Committee adjourned at ten minutes to 4, until 2 o'clock p.m. on Wednesday, the following day

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WEDNESDAY, 24 *FEBRUARY*, 1897.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. James Hoskins,	John Lionel Fegan, Esq.,
The Hon. Charles James Roberts, C.M.G.,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	Francis Augustus Wright, Esq.,
Henry Clarke, Esq.,	Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The Secretary read the following correspondence :—

Letters from Messrs. Henry S. Forsyth, of the Australian Kerosene Oil and Mineral Company (Limited), and D. Fetherstonhaugh, Managing Director, Stockowners' Meat Company of New South Wales (Limited), expressing a desire to give evidence in the Committee's inquiry respecting the proposed Sewerage Works for Parramatta.

The correspondence was received.

The Committee further considered the proposed Sewerage Works for Parramatta.

Thomas Moxham, Mayor of Parramatta, was sworn, and further examined.

The Committee adjourned at five minutes past 4, until 2 o'clock p.m. on Thursday, the following day.

THURSDAY, 25 *FEBRUARY*, 1897.

The Committee met at 2 p.m.

MEMBERS PRESENT :—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. James Hoskins,	John Lionel Fegan, Esq.,
The Hon. Charles James Roberts, C.M.G.,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,
Henry Clarke, Esq.,	Francis Augustus Wright, Esq.,

Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered the proposed Sewerage Works for Parramatta.

Dowell Phillip O'Reilly, Esq., M.P., was sworn, and examined.

James Johnston, Esq., Clerk, Department of Public Works, was sworn, and further examined.

The Committee adjourned at ten minutes to 4, until 2 o'clock p.m. on Friday, the following day.

FRIDAY, 26 *FEBRUARY*, 1897.

The Committee met at 2 p.m.

MEMBERS PRESENT :—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. James Hoskins,	John Lionel Fegan, Esq.,
The Hon. Charles James Roberts, C.M.G.,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,
Henry Clarke, Esq.,	Francis Augustus Wright, Esq.,

Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered the proposed Sewerage Works for Parramatta.

John Ashburton Thompson, M.D., President of the Board of Health, was sworn, and examined.

Joseph Davis, Esq., Engineer for Sewerage Construction, Department of Public Works, was sworn, and further examined.

The Committee adjourned at twenty-five minutes to 4, until 2 o'clock p.m. on Monday, 1st March.

MONDAY, 1 *MARCH*, 1897.

The Committee met at 2 p.m.

MEMBERS PRESENT :—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	John Lionel Fegan, Esq.,
The Hon. James Hoskins,	Thomas Henry Hassall, Esq.,
The Hon. Charles James Roberts, C.M.G.,	George Black, Esq.,
Henry Clarke, Esq.,	Francis Augustus Wright, Esq.,

Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered the proposed Sewerage Works for Parramatta.

Edward James Love, Esq., Borough Engineer and Inspector of Nuisances, Parramatta, was sworn, and examined.

The Committee adjourned at twenty minutes to 4, until 2 o'clock p.m. on Tuesday, the following day.

TUESDAY, 2 *MARCH*, 1897.

The Committee met at 1 p.m.

MEMBERS PRESENT :—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. James Hoskins,	John Lionel Fegan, Esq.,
The Hon. Charles James Roberts, C.M.G.,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,
Henry Clarke, Esq.,	Francis Augustus Wright, Esq.,

Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered the proposed Sewerage Works for Parramatta.

John Ashburton Thompson, M.D., President of the Board of Health, and Joseph Davis, Esq., Engineer for Sewerage Construction, Department of Public Works, were sworn, and further examined.

The Committee adjourned at ten minutes to 4, until 2 o'clock p.m. on Wednesday, the following day.

WEDNESDAY,

WEDNESDAY, 3 MARCH, 1897.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. James Hoskins,	John Lionel Fegan, Esq.,
The Hon. Charles James Roberts, C.M.G.,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,
Henry Clarke, Esq.,	Francis Augustus Wright, Esq.,

Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered the proposed Sewerage Works for Parramatta.

Cuthbert Fetherstonhaugh, Esq., Managing Director, Stockowners' Meat Company of New South Wales (Limited), and Henry Skinner Forsyth, Esq., Manager, Australian Kerosene Oil and Mineral Company (Limited), were sworn, and examined.

The Committee adjourned at twenty-five minutes to 4, until 1 o'clock p.m. on Friday, 5th March.

FRIDAY, 5 MARCH, 1897.

The Committee met at 1 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	John Lionel Fegan, Esq.,
The Hon. Charles James Roberts, C.M.G.,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,
Henry Clarke, Esq.,	Francis Augustus Wright, Esq.,
Charles Alfred Lee, Esq.,	Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee, accompanied by Mr. J. M. Smail, Engineer-in-Chief, Metropolitan Board of Water Supply and Sewerage, then, in pursuance of their inquiry with reference to the proposed Sewerage Works for Parramatta, made a visit of inspection to the Sewage Farm, Webb's Grant, Botany, where they acquainted themselves with the condition of the farm, and the results from the system of sewerage connected with it attained up to the present time.

TUESDAY, 9 MARCH, 1897.

The Committee met at 1 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq , Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. James Hoskins,	John Lionel Fegan, Esq.,
The Hon. Charles James Roberts, C.M.G.,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,
Henry Clarke, Esq.,	Francis Augustus Wright, Esq.,

Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The Secretary read the following correspondence:—

Letter from the Council Clerk, Borough of Granville, protesting, on behalf of the council, against the establishment of a sewage farm on the site recommended in connection with the proposed Sewerage Works for Parramatta.

The correspondence was received.

The following accounts were passed for payment:—

	£	s.	d.
E. W. M'Kenny—Extra clerical assistance	4	10	0
John Ferguson (*Cumberland Times*)—Advertising	0	11	3
Total	5	1	3

The Committee, accompanied by Mr. J. Davis, Engineer for Sewerage Construction, Department of Public Works, and Mr. J. M. Smail, Engineer-in-Chief, Metropolitan Board of Water Supply and Sewerage, then, in pursuance of their inquiry respecting the proposed Sewerage Works for Parramatta, proceeded by steam launch to the site at the junction of the Parramatta River and Duck Creek recommended for the sewage farm. There they were met by the Mayor and the Borough Engineer of Parramatta, and with them inspected the farm site and visited the works in course of erection by the Stockowners' Meat Company of New South Wales (Limited); afterwards they examined the site for the pumping-station at Clay Cliff Creek, and by personal inquiry and inspection further acquainted themselves with the details of other portions of the proposed sewerage scheme.

WEDNESDAY, 10 *MARCH*, 1897.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. James Hoskins,	John Lionel Fegan, Esq.,
The Hon. Charles James Roberts, C.M.G.,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,
Henry Clarke, Esq.,	Francis Augustus Wright, Esq.,

Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered the proposed Sewerage Works for Parramatta.

John Richard Palmer, Esq, Mayor of Granville, was sworn, and examined.

Joseph Davis, Esq., Engineer for Sewerage Construction, Department of Public Works, was sworn, and further examined.

The Committee adjourned at five minutes past 4, until 2 o'clock p.m., on Thursday, the following day.

THURSDAY, 11 *MARCH*, 1897.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. James Hoskins,	John Lionel Fegan, Esq.,
The Hon. Charles James Roberts, C.M.G.,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,
Henry Clarke, Esq.,	Francis Augustus Wright, Esq,

Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered the proposed Sewerage Works for Parramatta.

William Mogford Hamlet, Esq., Government Analyst, and Joseph W. Withers, Esq., were sworn, and examined.

The Committee adjourned at five minutes past 4, until 2 o'clock p.m. on Friday, the following day.

FRIDAY, 12 *MARCH*, 1897.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq,
The Hon. James Hoskins,	John Lionel Fegan, Esq.,
The Hon. Charles James Roberts, C.M.G.,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,
Henry Clarke, Esq.,	Francis Augustus Wright, Esq,

Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The Secretary read the following correspondence:—

Letter from the Mayor of Granville with reference to the Liernur system of sewerage.

The correspondence was received.

The Committee further considered the proposed Sewerage Works for Parramatta.

Joseph Davis, Esq., Engineer for Sewerage Construction, Department of Public Works, was sworn, and further examined.

It was decided that Mr. J. M. Smail, Engineer-in-Chief, Metropolitan Board of Water Supply and Sewerage, should be asked to make a visit of inspection to Parramatta in connection with the proposed sewerage works, on Saturday, the 14th instant, and that he should be accompanied by the Chairman.

The Committee adjourned at ten minutes to 4, until 2 o'clock p.m. on Tuesday, 16th March.

TUESDAY, 16 *MARCH*, 1897.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. James Hoskins,	John Lionel Fegan, Esq.,
The Hon. Charles James Roberts, C.M.G.,	Thomas Henry Hassall, Esq,
The Hon. Daniel O'Connor,	George Black, Esq.,
Henry Clarke, Esq.,	Francis Augustus Wright, Esq.,

Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The Secretary read the following correspondence:—

Letter from the Registrar General of Queensland, enclosing, in relation to the Committee's inquiry respecting the proposed Railway from Moree to Inverell, a statement of the area under wheat for the past five years in the district of Darling Downs, and diagrams showing the rainfall in the localities where the crop is principally cultivated.

The correspondence was received.

The

The Chairman reported that, in company with Mr. J. M. Smail, Engineer-in-Chief, Metropolitan Board of Water Supply and Sewerage, he had, on Saturday, visited Parramatta, and inquired into various matters connected with the proposed sewerage scheme.

The Committee further considered the proposed Railway from Moree to Inverell.

John Harper, Esq., Goods Superintendent, Department of Railways, was sworn, and further examined.

William M'Intyre, Esq., Chief Electoral Officer, Department of the Chief Secretary, was sworn, and examined.

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Wednesday, the following day.

WEDNESDAY, 17 *MARCH*, 1897.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. James Hoskins,	John Lionel Fegan, Esq.,
The Hon. Charles James Roberts, C.M.G.,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,
Henry Clarke, Esq.	Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The Secretary read the following correspondence:—

Letters from Dr. Ashburton Thompson—(1) with reference to his evidence in the Committee's inquiry respecting the proposed Sewerage Works for Parramatta, and (2) as to the effect of the discharge of soup into the Parramatta River from the Auburn Meat Preserving Works.

The correspondence was received.

The Committee further considered the proposed Sewerage Works for Parramatta.

John Moore Smail, Engineer-in-Chief, Metropolitan Board of Water Supply and Sewerage, was sworn, and examined.

The Committee adjourned at ten minutes past 4, until 2 o'clock p.m. on Thursday, the following day.

THURSDAY, 18 *MARCH*, 1897.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. James Hoskins,	John Lionel Fegan, Esq.,
The Hon. Charles James Roberts, C.M.G.,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,
Henry Clarke, Esq.,	Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered the proposed Sewerage Works for Parramatta.

Joseph Davis, Esq., Engineer for Sewerage Construction, Department of Public Works, was sworn, and further examined.

The Committee adjourned at 4 o'clock, until twenty-five minutes past 9 a.m., at the Redfern Railway Station, on Friday, the following day.

FRIDAY, 19 *MARCH*, 1897.

The Committee met at 9·25 a.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. James Hoskins,	John Lionel Fegan, Esq.,
The Hon. Charles James Roberts, C.M.G.,	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,
Henry Clarke, Esq.,	Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee, accompanied by Mr. J. Davis, Engineer for Sewerage Construction, Department of Public Works, then proceeded by train to Parramatta on a further visit of inspection in connection with their inquiry respecting the proposed Sewerage Works for Parramatta. There they were met by the Borough Engineer and Inspector of Nuisances, and with him visited and examined the parts of the river affected by the discharge of drainage into the stream, the flood-gates, and the Water-works and dam from which the town obtains its water supply.

TUESDAY,

TUESDAY, 23 *MARCH*, 1897.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. James Hoskins,	John Lionel Fegan, Esq.,
The Hon. Charles James Roberts, C.M.G.,	Thomas Henry Hassall, Esq.,
The Hon. William Joseph Trickett,	George Black, Esq.,
The Hon. Daniel O'Connor,	Francis Augustus Wright, Esq.,
Henry Clarke, Esq.,	Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered the proposed Sewerage Works for Parramatta.

William Mogford Hamlet, Esq., Government Analyst, and Joseph Davis, Esq., Engineer for Sewerage Construction, Department of Public Works, were sworn, and further examined.

Mr. Lee gave notice that he would move at the next meeting of the Committee,—"That the Committee proceed to consider the evidence on the proposed Sewerage Works for Parramatta with a view to reporting on the subject to the Legislative Assembly."

The Committee adjourned at five minutes to 4, until 2 o'clock p.m. on Wednesday, the following day.

WEDNESDAY, 24 *MARCH*, 1897.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. James Hoskins,	John Lionel Fegan, Esq.,
The Hon. Charles James Roberts, C.M.G.,	Thomas Henry Hassall, Esq.,
The Hon. William Joseph Trickett,	George Black, Esq.,
The Hon. Daniel O'Connor,	Francis Augustus Wright, Esq.,
Henry Clarke, Esq.,	Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The Secretary read the following correspondence:—

Letters from Mr. John Musson, explaining a system of river purification adopted at Milwaukee, U.S.A., and expressing the opinion that it might be applied with advantage to the Parramatta River.

The correspondence was received.

The Committee further considered the proposed Sewerage Works for Parramatta.

Joseph Davis, Esq., Engineer for Sewerage Construction, Department of Public Works, was sworn, and further examined.

James Conley, Esq., Assistant Accountant, Department of Public Works, and William McIntyre, Esq., Chief Electoral Officer, Chief Secretary's Department, were sworn, and examined.

Mr. Lee's notice of motion for the consideration of the evidence on the proposed Sewerage Works for Parramatta was postponed.

The Committee adjourned at ten minutes past 3, until 2 o'clock p.m. on Thursday, the following day.

THURSDAY, 25 *MARCH*, 1897.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. James Hoskins,	John Lionel Fegan, Esq.
The Hon. Charles James Roberts, C.M.G.,	Thomas Henry Hassall, Esq.,
The Hon. William Joseph Trickett,	George Black, Esq.,
The Hon. Daniel O'Connor,	Francis Augustus Wright, Esq.,
Henry Clarke, Esq.,	Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The following accounts were passed for payment:—

	£	s.	d.
Little & Company, Parramatta—Advertising	0	12	0
Stott and Hoare—Office requisites	0	13	3
John Sands—Directory	1	0	0
C. O. Lamb—Hire of vehicles for visits of inspection by Committee to Sewage Farm, Botany, and to Parramatta	6	0	0
Edward Marshall—Expenses connected with visit of Committee to Parramatta	3	15	0
Total	£12	0	3

The Committee further considered the proposed Sewerage Works for Parramatta.

Cecil West Darley, Esq., Engineer-in-Chief for Public Works, and James Conley, Esq., Assistant Accountant, Department of Public Works, were sworn, and further examined.

The Committee adjourned at twenty minutes to 4, until 2 o'clock p.m. on Friday, the following day.

FRIDAY,

FRIDAY, 26 *MARCH*, 1897.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. James Hoskins,	John Lionel Fegan, Esq.,
The Hon. Charles James Roberts, C.M.G.	Thomas Henry Hassall, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.,
Henry Clarke, Esq.,	Francis Augustus Wright, Esq.,

Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered the proposed Sewerage Works for Parramatta.

John Musson, Esq., Civil Engineer, was sworn, and examined.

The Committee further considered the proposed Railway from Moree to Inverell.

Henry Deane, Esq., Engineer-in-Chief, Railway Construction Branch, Department of Public Works, was sworn, and further examined.

Mr. Lee moved,—"That the Committee proceed to consider the evidence on the proposed Sewerage Works for Parramatta, with a view to reporting on the subject to the Legislative Assembly."

The motion was seconded by Mr. Humphery, and passed.

The Committee adjourned at seven minutes to 4, until 2 o'clock p.m. on Tuesday, 30th March.

TUESDAY, 30 *MARCH*, 1897.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. James Hoskins,	John Lionel Fegan, Esq.,
The Hon. Charles James Roberts, C.M.G.,	Thomas Henry Hassall, Esq.,
The Hon. William Joseph Trickett,	George Black, Esq.,
The Hon. Daniel O'Connor,	Francis Augustus Wright, Esq.,
Henry Clarke, Esq.,	Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The Secretary read the following correspondence:—

Letter from the Council Clerk of Rydalmere and Ermington with reference to the proposed Sewerage Works for Parramatta.

The correspondence was received.

The following account was passed for payment:—

George Baumann—Expenses connected with Committee's visit of inspection to Webb's Grant, Botany £6 2 0

The Committee further considered the proposed Sewerage Works for Parramatta.

Mr. Humphery moved,—"That, in the opinion of the Committee, it is expedient the proposed Sewerage Works for Parramatta, as referred to the Committee by the Legislative Assembly, be carried out, at a cost not exceeding the Departmental estimate, but subject to a guarantee (by the Municipal Council of Parramatta) of the annual payment required to cover maintenance and interest, and redemption of the principal outlay."

Mr. Fegan seconded the motion.

The debate was adjourned.

The Committee further considered the proposed Railway from Moree to Inverell.

John Harper, Esq., Goods Superintendent, Department of Railways, was sworn, and further examined.

The Committee adjourned at ten minutes past 4, until 2 o'clock p.m. on Wednesday, the following day.

WEDNESDAY, 31 *MARCH*, 1897.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. James Hoskins,	John Lionel Fegan, Esq.,
The Hon. Charles James Roberts, C.M G.,	Thomas Henry Hassall, Esq.,
The Hon. William Joseph Trickett,	George Black, Esq.,
The Hon. Daniel O'Connor,	Francis Augustus Wright, Esq.,
Henry Clarke, Esq.,	Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered the proposed Sewerage Works for Parramatta.

The adjourned debate upon the motion moved by Mr. Humphery,—"That, in the opinion of the Committee, it is expedient the proposed Sewerage Works for Parramatta, as referred to the Committee by the Legislative Assembly, be carried out, at a cost not exceeding the Departmental estimate, but subject to a guarantee (by the Municipal Council of Parramatta) of the annual payment required to cover maintenance and interest, and redemption of the principal outlay" was resumed.

Mr.

Mr. Lee moved,—"That the motion be amended by the insertion of the word 'not' between the words 'is' and 'expedient,' and the omission of all the words after the word 'out.'"

The Committee divided upon the question,—"That the motion as moved by Mr. Humphery be passed," with the following result:—

Ayes, 7.	Noes, 6.
Mr. Humphery,	Mr. Ewing,
Mr. Trickett,	Mr. Hoskins,
Mr. Roberts,	Mr. Lee,
Mr. O'Connor,	Mr. Clarke,
Mr. Wright,	Mr. Hassall,
Mr. Fegan,	Mr. Farnell.
Mr. Black,	

The motion was therefore passed.

The Committee further considered the proposed Railway from Moree to Inverell.

Mr. Roberts moved,—"That the Committee proceed to consider the evidence on the proposed Railway from Moree to Inverell, with a view to reporting on the subject to the Legislative Assembly."

The motion was seconded by Mr. Wright, and passed.

The Committee adjourned at ten minutes to 4, until 2 o'clock p.m. on Thursday, the following day.

THURSDAY, 1 *APRIL*, 1897.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. James Hoskins,	John Lionel Fegan, Esq.,
The Hon. Charles James Roberts, C.M.G.,	Thomas Henry Hassall, Esq.,
The Hon. William Joseph Trickett,	George Black, Esq.,
The Hon. Daniel O'Connor,	Francis Augustus Wright, Esq.,
Henry Clarke, Esq.,	Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The Secretary read the following correspondence:—

Letter from C. W. Darley, Engineer-in-Chief for Public Works, with reference to his evidence before the Committee in their inquiry respecting the proposed Deepwater Harbour at Port Kembla.

Letter from Mr. Edward J. Sievers, Government Land Valuer, with reference to certain evidence given in the Committee's inquiry respecting the proposed Deepwater Harbour at Port Kembla.

The following account was passed for payment:— £ s. d.

George Baumann—Expenses connected with Committee's second visit of inspection to Parramatta in connection with the proposed Sewerage Works for Parramatta 6 2 0

The Committee further considered the proposed Railway from Moree to Inverell.

Mr. Roberts moved,—"That, in the opinion of the Committee, it is expedient the proposed Railway from Moree to Inverell, as referred to the Committee by the Legislative Assembly, be carried out."

Mr. O'Connor seconded the motion.

Mr. Wright moved,—"That the motion be amended by the insertion of the word 'not' before the word 'expedient.'"

The debate was adjourned.

The Committee adjourned at 4 o'clock until 2 o'clock p.m., on Friday, the following day.

FRIDAY, 2 *APRIL*, 1897.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. James Hoskins,	John Lionel Fegan, Esq.,
The Hon. Charles James Roberts, C.M.G.,	Thomas Henry Hassall, Esq.,
The Hon. William Joseph Trickett,	George Black, Esq.,
The Hon. Daniel O'Connor,	Francis Augustus Wright, Esq.,
Henry Clarke, Esq.,	Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered the proposed Railway from Moree to Inverell.

The adjourned debate upon Mr. Roberts' motion,—"That, in the opinion of the Committee, it is expedient the proposed Railway from Moree to Inverell, as referred to the Committee by the Legislative Assembly, be carried out"—

Upon which Mr. Wright had moved,—"That the motion be amended by the insertion of the word 'not' before the word 'expedient,'"—was resumed.

Mr. Lee seconded the amendment.

The debate was further adjourned.

The Committee adjourned at 4 o'clock until 2 o'clock p.m., on Tuesday, 6th April.

TUESDAY,

TUESDAY, 6 *APRIL*, 1897.

The Committee met at 2 p.m.

MEMBERS PRESENT.—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. James Hoskins,	John Lionel Fegan, Esq.,
The Hon. Charles James Roberts, C.M.G.,	Thomas Henry Hassall, Esq.,
The Hon. William Joseph Trickett,	George Black, Esq.,
The Hon. Daniel O'Connor,	Francis Augustus Wright, Esq.,
Henry Clarke, Esq.,	Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The following accounts were passed for payment:—

	£	s.	d.
C. O. Lamb—Hire of vehicles in connection with the Committee's visits of inspection with reference to the proposed Sewerage Works for Parramatta	4	0	0
F. J. Ironside—Extra Clerical assistance	4	15	0
A. Chapman—Extra Clerical assistance	1	0	0
Total...	£9	15	0

The Committee further considered the proposed Railway from Moree to Inverell.

The adjourned debate upon Mr. Roberts' motion,—"That, in the opinion of the Committee, it is expedient the proposed Railway from Moree to Inverell, as referred to the Committee by the Legislative Assembly, be carried out"—

Upon which Mr. Wright had moved,—"That the motion be amended by the insertion of the word 'not' before the word 'expedient,'"—was resumed.

The debate was further adjourned.

The Committee adjourned at 4 o'clock until 2 o'clock p.m. on Wednesday, the following day.

WEDNESDAY, 7 *APRIL*, 1897.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. James Hoskins,	John Lionel Fegan, Esq.,
The Hon. Charles James Roberts, C.M.G.,	Thomas Henry Hassall, Esq.,
The Hon. William Joseph Trickett,	George Black, Esq.,
The Hon. Daniel O'Connor,	Francis Augustus Wright, Esq.,
Henry Clarke, Esq.,	Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered the proposed Railway from Moree to Inverell.

The adjourned debate upon Mr. Roberts' motion,—"That, in the opinion of the Committee, it is expedient the proposed Railway from Moree to Inverell, as referred to the Committee by the Legislative Assembly, be carried out"—

Upon which Mr. Wright had moved,—"That the motion be amended by the insertion of the word 'not' before the word 'expedient,'"—was resumed.

The debate was further adjourned.

The Committee adjourned at 4 o'clock until 2 o'clock p.m. on Thursday, the following day.

THURSDAY, 8 *APRIL*, 1897.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. James Hoskins,	John Lionel Fegan, Esq.,
The Hon. Charles James Roberts, C.M.G.,	Thomas Henry Hassall, Esq.,
The Hon. William Joseph Trickett,	George Black, Esq.,
The Hon. Daniel O'Connor,	Francis Augustus Wright, Esq.,
Henry Clarke, Esq.,	Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered the proposed Railway from Moree to Inverell.

The adjourned debate upon Mr. Roberts' motion,—That, in the opinion of the Committee, it is expedient the proposed railway from Moree to Inverell, as referred to the Committee by the Legislative Assembly, be carried out"—

Upon which Mr. Wright had moved,—"That the motion be amended by the insertion of the word 'not' before the word 'expedient,'"—was resumed.

On the question, "That the word 'not' be inserted before the word 'expedient,'" the Committee divided as follows:—

Ayes, 6.	Noes, 7.
Mr. Ewing,	Mr. Humphery,
Mr. Trickett,	Mr. Hoskins,
Mr. Clarke,	Mr. Roberts,
Mr. Lee,	Mr. O'Connor,
Mr. Black,	Mr. Fegan,
Mr. Wright.	Mr. Hassall,
	Mr. Farnell.

The amendment was therefore negatived.

The

The motion was passed on the following division:—

Ayes, 7.	Noes, 6.
Mr. Humphery,	Mr. Ewing,
Mr. Hoskins,	Mr. Trickett,
Mr. Roberts,	Mr. Clarke,
Mr. O'Connor,	Mr. Lee,
Mr. Fegan,	Mr. Black,
Mr. Hassall,	Mr. Wright.
Mr. Farnell.	

The Committee adjourned at twenty minutes to 4, until 2 o'clock p.m. on Friday, the following day.

FRIDAY, 9 *APRIL*, 1897.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. James Hoskins,	John Lionel Fegan, Esq.,
The Hon. Charles James Roberts, C.M.G.,	George Black, Esq.,
The Hon. William Joseph Trickett,	Francis Augustus Wright, Esq.,
Henry Clarke, Esq.,	Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee proceeded to consider their Report to the Legislative Assembly on the proposed Sewerage Works for Parramatta.

Clauses 1 to 9 were passed.

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Tuesday, 13 April.

TUESDAY, 13 *APRIL*, 1897.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. James Hoskins,	John Lionel Fegan, Esq.,
The Hon. Charles James Roberts, C.M.G.,	Thomas Henry Hassall, Esq.,
The Hon. William Joseph Trickett,	George Black, Esq.,
The Hon. Daniel O'Connor,	Francis Augustus Wright, Esq.,
Henry Clarke, Esq.,	Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered their Report to the Legislative Assembly on the proposed Sewerage Works for Parramatta.

Clauses 10 and 11 were passed.

Clause 12—A modified plan of dealing with the nuisance was passed on the following division:—

Ayes, 10.	Noes, 1.
Mr. Ewing,	Mr. Fegan.
Mr. Humphery,	
Mr. Hoskins,	
Mr. Roberts,	
Mr. Clarke,	
Mr. Lee,	
Mr. Hassall,	
Mr. Black,	
Mr. Wright,	
Mr. Farnell.	

Clause 13.—Possible important developments in sewage treatment.

The Committee divided upon the question, "That the following words be omitted from the end of the clause—'It would be well if similar experiments could be made here. At little expense and without difficulty they might be carried out at Glebe Island under the direction of the President of the Board of Health, who could be assisted by the Engineer of the Metropolitan Board of Water Supply and Sewerage, and by the Engineer for Sewerage of the Department of Public Works. The outcome might prove to be of very great benefit to every town in the Colony.'"

Ayes, 7	Noes, 4.
Mr. Humphery,	Mr. Ewing,
Mr. Hoskins,	Mr. Fegan,
Mr. Roberts,	Mr. Hassall,
Mr. Clarke,	Mr. Farnell.
Mr. Lee,	
Mr. Black,	
Mr. Wright.	

The words were therefore omitted, and the clause, as amended, was passed.

The remaining clauses of the Report and the Preamble were passed. The Report was adopted, and the Chairman was authorised to sign it for presentation to the Legislative Assembly.

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Wednesday, the following day.

WEDNESDAY,

WEDNESDAY, 14 *APRIL*, 1897.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. James Hoskins,	John Lionel Fegan, Esq.,
The Hon. Charles James Roberts, C.M.G.,	Thomas Henry Hassall, Esq.,
The Hon. William Joseph Trickett,	George Black, Esq.,
The Hon. Daniel O'Connor,	Francis Augustus Wright, Esq.,
Henry Clarke, Esq.,	Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee proceeded to consider the expediency of erecting new Houses of Parliament for the Colony.

Robert R. P. Hickson, Under Secretary for Public Works, and Walter Liberty Vernon, Government Architect, were sworn, and examined.

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Thursday, the following day.

THURSDAY, 15 *APRIL*, 1897.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. James Hoskins,	John Lionel Fegan, Esq.,
The Hon. Charles James Roberts, C.M.G.,	Thomas Henry Hassall, Esq.,
The Hon. William Joseph Trickett,	George Black, Esq.,
The Hon. Daniel O'Connor,	Francis Augustus Wright, Esq.,
Henry Clarke, Esq.,	Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered the expediency of erecting New Houses of Parliament for the Colony.

Walter Liberty Vernon, Government Architect, was sworn, and further examined.

The Committee adjourned at five minutes to 3, until 2 o'clock p.m. on Tuesday, 20th April.

TUESDAY, 20 *APRIL*, 1897.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. James Hoskins,	John Lionel Fegan, Esq.,
The Hon. Charles James Roberts, C.M.G.,	Thomas Henry Hassall, Esq.,
The Hon. William Joseph Trickett,	George Black, Esq.,
The Hon. Daniel O'Connor,	Francis Augustus Wright, Esq.,
Henry Clarke, Esq.,	Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee proceeded to consider their Report to the Legislative Assembly on the proposed Railway from Moree to Inverell.

The Report was read by the Secretary, and its further consideration was postponed.

The Committee further considered the expediency of erecting New Houses of Parliament for the Colony.

Walter Liberty Vernon, Government Architect, was sworn, and further examined.

The Committee adjourned at 5 minutes past 4, until 2 o'clock p.m. on Wednesday, the following day.

WEDNESDAY, 21 *APRIL*, 1897.

The Committee met at 2 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Charles Alfred Lee, Esq.,
The Hon. James Hoskins,	John Lionel Fegan, Esq.,
The Hon. Charles James Roberts, C.M.G.,	Thomas Henry Hassall, Esq.,
The Hon. William Joseph Trickett,	George Black, Esq.,
Henry Clarke, Esq.,	Frank Farnell, Esq.,

The minutes of the previous meeting were read, and confirmed.

The Committee further considered their Report to the Legislative Assembly on the proposed Railway from Moree to Inverell.

Clauses 1 to 9 were passed.

Clause 10—Objections to the proposed Railway.

Mr. Hoskins moved,—"That the clause be amended by the omission of the following subsection: 'The question whether the Railway Commissioners, by adopting a system of differential rates, are justified in endeavouring to draw traffic from its natural outlet, which, in the case of Inverell, is eastward.'"

The amendment was passed on the following division :—

Ayes, 5.	Noes, 4.
Mr. Humphery,	Mr. Ewing,
Mr. Hoskins,	Mr. Clarke,
Mr Roberts,	Mr. Lee,
Mr. Fegan,	Mr. Black.
Mr. Farnell.	

The clause, as amended, was then passed.

Clauses 11 and 12 were passed.

Clause 13—Decision of the Committee.

Mr. Hassall moved,—" That the clause be amended by the addition of the following words : ' But the Committee are of opinion that the line might be carried nearer to Warialda, as even though the cost of construction may be to some extent increased, the corresponding advantages to that town and the country to the north will more than counterbalance the extra expense incurred.' "

The amendment was negatived on the following division :—

Ayes, 3.	Noes, 6.
Mr. Ewing,	Mr. Humphery,
Mr. Clarke,	Mr. Hoskins,
Mr. Lee.	Mr. Roberts,
	Mr. Fegan,
	Mr. Black,
	Mr. Farnell.

The clause was then passed.

Clause 14 and the Preamble of the Report were passed.

The Report was adopted on the following division :—

Ayes, 5.	Noes, 4.
Mr. Humphery,	Mr. Ewing,
Mr. Hoskins,	Mr. Clarke,
Mr. Roberts,	Mr. Lee,
Mr. Fegan,	Mr. Black.
Mr. Farnell.	

The Chairman was authorised to sign the Report for presentation to the Legislative Assembly.

The Committee adjourned at 4 o'clock, until 2 o'clock p.m. on Thursday, the following day.

THURSDAY, 22 *APRIL*, 1897.

The Committee met at 2 p.m.

MEMBERS PRESENT :—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Henry Clarke, Esq.,
The Hon. James Hoskins,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	George Black, Esq.,
The Hon. Daniel O'Connor,	Francis Augustus Wright, Esq.,

Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The following account was passed for payment :—

John Brereton,—Extra clerical assistance in reading and correcting proofs of evidence £3 10 0

The Committee further considered the expediency of erecting New Houses of Parliament for the Colony.

Joseph Henry Maiden, Director of the Botanic Gardens, was sworn, and examined.

The Committee proceeded to consider their Twelfth General Report to His Excellency the Governor.

Clauses 1 to 6 were passed, and its further consideration was postponed.

The Committee adjourned at 10 minutes to 4, until 2 o'clock p.m. on Friday, the following day.

FRIDAY, 23 *APRIL*, 1897.

The Committee met at 2 p.m.

MEMBERS PRESENT :—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. Frederick Thomas Humphery,	Henry Clarke, Esq.,
The Hon. James Hoskins,	Charles Alfred Lee, Esq.,
The Hon. Charles James Roberts, C.M.G.,	John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett,	George Black, Esq.,
The Hon. Daniel O'Connor,	Francis Augustus Wright, Esq.,

Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The Committee further considered their Twelfth General Report to His Excellency the Governor.

Clause 7 was passed, the Report was adopted, and the Chairman was authorised to sign it for presentation to His Excellency the Governor.

The Committee further considered the expediency of erecting New Houses of Parliament for the Colony.

John J. Calvert, Clerk of Parliaments, and Francis Walsh, Parliamentary Librarian, were sworn, and examined.

The Committee adjourned at 4 o'clock until 2 o'clock p.m. on Tuesday, 27th April.

PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS.

SECTIONAL COMMITTEE.

Railway from Nevertire to Warren.

MINUTES OF PROCEEDINGS.

MINUTES of the Proceedings of the Sectional Committee of the Parliamentary Standing Committee on Public Works, appointed on Wednesday, 6th May, 1896, to inspect, take evidence, and report with reference to the proposed Railway from Nevertire to Warren.

SATURDAY, 9 *MAY*, 1896.

The Sectional Committee met at the Railway Station, Nevertire, at 11·30 a.m.

MEMBERS PRESENT:—

The Hon. William Joseph Trickett, | Thomas Henry Hassall, Esq.,
Francis Augustus Wright, Esq.

The Hon. William Joseph Trickett was elected Chairman.

The Sectional Committee drove along and inspected the route of the proposed Railway, arriving at Warren at 1·15 p.m.

The Sectional Committee met at the Court-house, Warren, at 3·30 p.m.

The Sectional Committee proceeded to consider the proposed Railway from Nevertire to Warren.

Mr. James Struthers, Mayor of Warren, was sworn, and examined.

The Sectional Committee adjourned at 5 p.m.

MONDAY, 11 *MAY*, 1896.

The Sectional Committee met at the Court-house, Warren, at 10 a.m.

MEMBERS PRESENT:—

The Hon. William Joseph Trickett, Chairman.
Thomas Henry Hassall, Esq., | Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Sectional Committee further considered the proposed Railway from Nevertire to Warren.

The following witnesses were sworn and examined:—Messrs. Herbert W. D. Nardin, William Robert Rowles, Michael H. J. Seale, Daniel McAlary, William Wallace, John Colley, Edwin Utley, Charles Hunter, Claude B. Halliday, Henry A. D. O'Connor, Harold W. Stanford, George Self, James Kenny, and Arthur B. Chadwick.

The Sectional Committee adjourned at 5 p.m.

TUESDAY, 12 *MAY*, 1896.

The Sectional Committee met at the "Club Hotel," Warren, at 7·45 a.m.

MEMBERS PRESENT:—

The Hon. William Joseph Trickett, Chairman.
Thomas Henry Hassall, Esq., | Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Sectional Committee drove by special vehicle to Nevertire, and examined the following witnesses at the Court-house:—Messrs. E. K. Rutledge, George Reynolds, Walter Butler, Robert MacRae, P. Lyons, and J. M. Oriel.

The Sectional Committee left Nevertire by train at 3 p.m., and arrived in Sydney at 6 o'clock next morning.

THURSDAY, 14 *MAY*, 1896.

The Sectional Committee met at the Department of Public Works at 1·30 p.m.

MEMBERS PRESENT:—

The Hon. William Joseph Trickett, Chairman.
Thomas Henry Hassall, Esq., | Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Sectional Committee further considered the proposed Railway from Nevertire to Warren.

The Chairman submitted a draft report which was read.

It was resolved upon the motion of Mr. Wright, seconded by Mr. Hassall,—"That the report be adopted."

The Sectional Committee adjourned at 2 p.m.

PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS.

SECTIONAL COMMITTEE.

Construction of Locks and Weirs on the River Darling.

MINUTES OF PROCEEDINGS.

MINUTES of the Proceedings of the Sectional Committee of the Parliamentary Standing Committee on Public Works, appointed on Tuesday, 15th June, 1896, to inspect, take evidence, and report with reference to the proposed Construction of Locks and Weirs on the River Darling.

The Sectional Committee left Sydney by the 8 p.m. train on Friday, 19th June, and arrived at Bourke at 6·30 p.m. the following day.

MONDAY, 22 *JUNE*, 1896.

The Sectional Committee met at the "Royal Hotel," Bourke, at 10 a.m.

MEMBERS PRESENT:—

The Hon. Frederick Thomas Humphery,	Thomas Henry Hassall, Esq.,
The Hon. William Joseph Trickett,	George Black, Esq.,
Charles Alfred Lee, Esq.,	Francis Augustus Wright, Esq.

On the motion of Mr. Wright, seconded by Mr. Trickett, it was resolved,—"That the Honorable F. T. Humphery be the Chairman of the Sectional Committee."

At 10·15 a.m. the Sectional Committee proceeded to the Pera Bore Settlement, 13 miles from Bourke, and inspected the Government Experimental Farm and adjacent buildings.

The Sectional Committee proceeded to consider the proposed Construction of Locks and Weirs on the River Darling.

Mr. Frederick Hersey, farmer, Pera Bore Settlement, was sworn, and examined.

The Sectional Committee returned to Bourke at 5·15 p.m.

TUESDAY, 23 *JUNE*, 1896.

The Sectional Committee met at the "Royal Hotel," Bourke, at 9·15 a.m.

MEMBERS PRESENT:—

The Hon. Frederick Thomas Humphery, Chairman.

The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
Charles Alfred Lee, Esq.,	George Black, Esq.,

Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Sectional Committee proceeded to inspect the works in progress at the site of the Lock and Weir now in course of construction in the River Darling, 2 miles below Bourke.

At 11·45 a.m. the Sectional Committee met at the Council Chambers, Bourke.

The Sectional Committee further considered the proposed Construction of Locks and Weirs on the River Darling.

The following witnesses were sworn, and examined:—Messrs. Philip James Biddulph, Solicitor, Bourke, and William James Holding, Government Appraiser, Bourke.

The Sectional Committee at 1 p.m. adjourned until 2·15 p.m.

The Sectional Committee further considered the proposed Construction of Locks and Weirs on the River Darling.

Mr. William James Holding, Government Appraiser, Bourke, was sworn, and further examined.

Messrs. Daniel William Field Hattan, Government Inspector of Stock, Bourke, and Jocelyn Henry Thomas, Manager of Winbar Station, near Louth, were sworn, and examined.

The Sectional Committee at 4·15 p.m. adjourned until 8·15 p.m.

The Sectional Committee met at the "Royal Hotel," Bourke, at 8·15 p.m.

The Sectional Committee further considered the proposed Construction of Locks and Weirs on the River Darling.

Mr. Edward M'Farlane, District Surveyor and Acting Chairman of the Land Board, Bourke, was sworn, and examined.

The Sectional Committee adjourned at 10·35 p.m.

WEDNESDAY, 24 *JUNE*, 1896.

The Sectional Committee met at the Council Chambers, Bourke, at 10 a.m.

MEMBERS PRESENT:—

The Hon. Frederick Thomas Humphery, Chairman.

The Hon. William Joseph Trickett,	Thomas Henry Hassall, Esq.,
Charles Alfred Lee, Esq.,	George Black, Esq.,

Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Sectional Committee further considered the proposed Construction of Locks and Weirs on the River Darling.

The

The following witnesses were sworn, and examined:—Messrs. Ernest Charles Millen, Council Clerk, Bourke; Andreas Harders, Acting Sub-Collector of Customs, Bourke; Arthur Senior, wool-scourer, near Bourke; and Edward Davis Millen, M.P., Journalist, and Member for the Electoral District of Bourke.

The Sectional Committee at 12·15 p.m. adjourned until 2·15 p.m., when Mr. Edward Davis Millen, M.P., was sworn, and further examined.

The Sectional Committee adjourned at 4 p.m.

THURSDAY, 25 *JUNE*, 1896.

The Sectional Committee met at the "Royal Hotel," Bourke, at 10·15 a.m.

MEMBERS PRESENT:—

The Hon. Frederick Thomas Humphery, Chairman.

The Hon. William Joseph Trickett, | Thomas Henry Hassall, Esq.,
Charles Alfred Lee, Esq., | George Black, Esq.,

Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Sectional Committee left Bourke for Beemery, *en route* to Brewarrina, at 10·30 a.m., arriving at Beemery at 4·15 p.m.; subsequently the Sectional Committee inspected the site of the proposed Lock and Weir at Beemery (No. 4), and of the Lock and Weir which in the alternative scheme it is proposed to substitute for those known as No. 4 and No. 5 in the original scheme.

FRIDAY, 26 *JUNE*, 1896.

The Sectional Committee met at "Plowman's Hotel," Beemery, at 9·15 a.m.

MEMBERS PRESENT:—

The Hon. Frederick Thomas Humphery, Chairman.

The Hon. William Joseph Trickett, | Thomas Henry Hassall, Esq.,
Charles Alfred Lee, Esq., | George Black, Esq.,

Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Sectional Committee then left for Brewarrina, staying at Yambacuna, 48 miles from Bourke, to inspect the irrigation works of Mr. George Woods, homestead lessee, at that place.

Subsequently Mr. Woods was sworn, and examined.

The Sectional Committee arrived at Brewarrina at 5·15 p.m.

SATURDAY, 27 *JUNE*, 1896.

The Sectional Committee met at the Court-house, Brewarrina, at 10 a.m.

MEMBERS PRESENT:—

The Hon. Frederick Thomas Humphery, Chairman.

The Hon. William Joseph Trickett, | Thomas Henry Hassall, Esq.,
Charles Alfred Lee, Esq., | George Black, Esq.,

Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Sectional Committee further considered the proposed Construction of Locks and Weirs on the River Darling.

The following witnesses were sworn, and examined:—Messrs. Henry Loraine Cathie, stock and station agent, Brewarrina; Walter John Jameson, stock and station agent, Brewarrina; William Armstrong M'Vean, manager, Quantambone Station; and James Mannix, homestead lessee, Cato Creek.

The Sectional Committee at 12·45 p.m. adjourned until 2·30 p.m., when Messrs. James Howe Saunders, storekeeper, Brewarrina; Andrew David Kerrigan, agent for Messrs. E. Rich & Co., Brewarrina; Patrick Dolan M'Elligott, Brewarrina; Walter Charles Colless, hotelkeeper and homestead lessee, Brewarrina; and Andrew Loder, stock and station agent, Brewarrina, were sworn, and examined.

The Sectional Committee adjourned at 4·30 p.m.

MONDAY, 29 *JUNE*, 1896.

The Sectional Committee met at the Court-house, Brewarrina, at 10 a.m.

MEMBERS PRESENT:—

The Hon. Frederick Thomas Humphery, Chairman.

The Hon. William Joseph Trickett, | Thomas Henry Hassall, Esq.,
Charles Alfred Lee, Esq., | George Black, Esq.,

Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Sectional Committee, accompanied by Mr. W. Poole, Assistant Engineer, Water Conservation Branch, Department of Mines, then inspected the site of the proposed Lock and Weir at Brewarrina.

The Sectional Committee further considered the proposed Construction of Locks and Weirs on the River Darling.

The following witnesses were sworn, and examined:—Messrs. Richard James Kelly, chemist and druggist, Brewarrina; William Coleman, caretaker of the bridge, Brewarrina; Thomas M'Mahon, storekeeper, Brewarrina; Richard Randolph Machattie, pastoralist, Brewarrina; and Charles Crane, storeman, Messrs. E. Rich & Co., Brewarrina.

The Sectional Committee adjourned at 11·45 a.m.

The Sectional Committee left Brewarrina for Beemery at 1 p.m., and arrived at Beemery at 4·30 p.m.

TUESDAY,

TUESDAY, 30 *JUNE*, 1896.

The Sectional Committee met at "Plowman's Hotel," Beemery, at 9·30 a.m.

MEMBERS PRESENT:—

The Hon. Frederick Thomas Humphery, Chairman.

The Hon. William Joseph Trickett, | Thomas Henry Hassall, Esq.,
Charles Alfred Lee, Esq., | George Black, Esq.,
Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Sectional Committee, accompanied by Mr. W. Poole, Assistant Engineer, Water Conservation Branch, Department of Mines, made a further inspection of the site of the proposed Lock and Weir at Beemery, and of the site of the proposed alternative lock in the Beemery Cowal.

The Sectional Committee at 11 a.m. left Beemery for Bourke, arriving at Bourke at 5·15 p.m.

WEDNESDAY, 1 *JULY*, 1896.

The Sectional Committee met at the "Royal Hotel," Bourke, at 10 a.m.

MEMBERS PRESENT:—

The Hon. Frederick Thomas Humphery, Chairman.

The Hon. William Joseph Trickett, | Thomas Henry Hassall, Esq.,
Charles Alfred Lee, Esq., | George Black, Esq.,
Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

Subsequently the Sectional Committee, accompanied by Mr. W. Poole, Assistant Engineer, Water Conservation Branch, Department of Mines, proceeded to Stony Point, 25 miles above the Bourke weir, and inspected the site of the proposed Lock and Weir at that place.

The Sectional Committee returned to Bourke at 5 p.m.

THURSDAY, 2 *JULY*, 1896.

The Sectional Committee met at the Council Chambers, Bourke, at 10 a.m.

MEMBERS PRESENT:—

The Hon. Frederick Thomas Humphery, Chairman.

The Hon. William Joseph Trickett, | Thomas Henry Hassall, Esq.,
Charles Alfred Lee, Esq., | George Black, Esq.,
Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Sectional Committee further considered the proposed Construction of Locks and Weirs on the River Darling.

Mr. John Smith Jefferson, Manager, Government Farm, Pera Bore, was sworn, and examined.

The Sectional Committee at 1 p.m. adjourned until 3·50 p.m., when Mr. Thomas Whitchurch Seaver, B.E., Assistant Engineer, Water Conservation Branch, Department of Mines, was sworn, and examined.

The Sectional Committee at 5 p.m. adjourned until the following day.

FRIDAY, 3 *JULY*, 1896.

The Sectional Committee met at the "Royal Hotel," Bourke, at 9·30 a.m.

MEMBERS PRESENT:—

The Hon. Frederick Thomas Humphery, Chairman.

The Hon. William Joseph Trickett, | Thomas Henry Hassall, Esq.,
Charles Alfred Lee, Esq., | George Black, Esq.,
Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Sectional Committee further considered the proposed Construction of Locks and Weirs on the River Darling.

The following witnesses were sworn, and examined:—Messrs. Osmond Campbell Macdougall, Inspector of Public Watering-places, and William Poole, Assistant Engineer, Water Conservation Branch, Department of Mines.

The Chairman submitted a Draft Report, which was read.

At 1 p.m. the Sectional Committee adjourned until 8 p.m., when the Draft Report was further considered.

The Sectional Committee adjourned at 10 p.m.

TUESDAY,

TUESDAY, 7 JULY, 1896.

The Sectional Committee met in the Members' Room, Legislative Council Buildings, at 12·30 p.m.

MEMBERS PRESENT:—

The Hon. Frederick Thomas Humphery, Chairman.

The Hon. William Joseph Trickett, | Thomas Henry Hassall, Esq.,
Charles Alfred Lee, Esq., | George Black, Esq.,
Francis Augustus Wright, Esq.

The minutes of the previous meeting were read, and confirmed.

The Sectional Committee further considered the proposed Construction of Locks and Weirs on the River Darling.

The Draft Report was further considered.

At 1·45 p.m. the Sectional Committee adjourned, and met again at the Committee's Board Room, Public Works Buildings, at 2·30 p.m.

The Draft Report was further considered and adopted, and the Chairman was authorised to sign it and present it to the General Committee.

The Committee adjourned *sine die*.

PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS.

SECTIONAL COMMITTEE.

Railway from Berrigan to Finley.

MINUTES OF PROCEEDINGS.

MINUTES of the Proceedings of the Sectional Committee of the Parliamentary Standing Committee on Public Works, appointed on Tuesday, 14th July, 1896, to inspect, take evidence, and report with reference to the proposed Railway from Berrigan to Finley.

MONDAY, 20 *JULY*, 1896.

The Sectional Committee met at the "Federal Hotel," Berrigan, at 2·15 p.m.

MEMBERS PRESENT:—

The Hon. Daniel O'Connor, | George Black, Esq.,
Frank Farnell, Esq.

Mr. O'Connor moved,—"That Frank Farnell, Esq., take the Chair."

Mr. Black seconded the motion, and it was agreed to.

The Sectional Committee proceeded to consider the proposed Railway from Berrigan to Finley.

Messrs. William James Greggery, farmer and grazier, Berrigan, and Emanuel James Gorman, auctioneer and farmer, Berrigan, were sworn, and examined.

The Sectional Committee at 5·10 p.m. adjourned until 11 o'clock a.m. on Tuesday, the following day.

TUESDAY, 21 *JULY*, 1896.

The Sectional Committee met at the "Federal Hotel," Berrigan, at 11 a.m.

MEMBERS PRESENT:—

Frank Farnell, Esq., Chairman.

The Hon. Daniel O'Connor, | George Black, Esq.

The minutes of the previous meeting were read, and confirmed.

The Sectional Committee further considered the proposed Railway from Berrigan to Finley.

Messrs. John Batten, farmer, Berrigan; John M'Lellan, farmer, Berrigan; John Phipps, farmer, near Berrigan; William Douglas Drummond, auctioneer and commission agent, Berrigan; Herbert Royse Lysaght, Manager of the Commercial Banking Company of Sydney (Limited), Berrigan; Lazarus Harris, manager for J. and H. Harris, storekeepers, Berrigan; Ernest Gedye, storekeeper, Berrigan; and John Jones, farmer, near Berrigan, were sworn, and examined.

The Sectional Committee at 4·30 p.m. adjourned until 3 o'clock p.m. on Wednesday, the following day.

WEDNESDAY, 22 *JULY*, 1896.

The Sectional Committee met at "Burbury's Hotel," Finley, at 3 p.m.

MEMBERS PRESENT:—

Frank Farnell, Esq., Chairman.

The Hon. Daniel O'Connor, | George Black, Esq.

The minutes of the previous meeting were read, and confirmed.

The Sectional Committee further considered the proposed Railway from Berrigan to Finley.

Messrs. John Crowe, farmer, near Finley; William Doel, farmer, near Finley; John Westerdale, farmer, Tuppal, near Finley; and William Kirkland, farmer, near Finley, were sworn, and examined.

The Sectional Committee at 5 p.m. adjourned until 10 a.m. on Thursday, the following day.

THURSDAY,

THURSDAY, 23 *JULY*, 1896.

The Sectional Committee met at "Burbury's Hotel," Finley, at 10 a.m.

MEMBERS PRESENT:—

Frank Farnell, Esq., Chairman.

The Hon. Daniel O'Connor, | George Black, Esq.

The minutes of the previous meeting were read, and confirmed.

The Sectional Committee further considered the proposed Railway from Berrigan to Finley.

Mr. William Kirkland, farmer, near Finley, was sworn, and further examined.

Messrs. John Blair, farmer, near Finley; Charles M'Allister, farmer, near Finley; Casimir Rowe, station manager, Springfield, near Finley; William Burns, selector, near Finley; Alexander Macintosh, farmer and grazier, near Finley; Alexander Lang, farmer and grazier, near Finley; Charles Uphill, farmer, Pine Hills, near Finley; George Robinson Jeffries, store manager, Tocumwal; John Howe, farmer, near Finley; Reginald Ernest Glennie, bank manager, Tocumwal; Matthew George Hamilton, farmer and grazier, near Finley; Arthur Westlake Sleeman, farmer, near Finley; William Tindale, publican, Finley; William Blair, farmer, near Finley; George Dent, farmer, near Finley; and George Reynoldson, auctioneer and farmer, near Finley, were sworn, and examined.

The Sectional Committee at 5·30 p.m. adjourned until 9 o'clock a.m. on Friday, the following day.

FRIDAY, 24 *JULY*, 1896.

The Sectional Committee met at "Burbury's Hotel," Finley, at 9 a.m.

MEMBERS PRESENT:—

Frank Farnell, Esq., Chairman.

The Hon. Daniel O'Connor, | George Black, Esq.

The minutes of the previous meeting were read, and confirmed.

The Sectional Committee further considered the proposed Railway from Berrigan to Finley, and decided to go to Tocumwal by a route some distance from the ordinary coach road, which would enable them to inspect more thoroughly the settlement in the district and also a valuable granite reserve in the neighbourhood of Tocumwal, of large area, which might be used for ballast purposes. The Sectional Committee arrived at Tocumwal at 12 o'clock noon, and after making some informal inquiries left in the afternoon for Yarroweyah, where, at 3·30 p.m., train was taken for Seymour, where the Sectional Committee arrived at about 8·45 p.m.

SATURDAY, 25 *JULY*, 1896.

The Sectional Committee met at the "Terminus Hotel," Seymour, at 8 a.m.

MEMBERS PRESENT:—

Frank Farnell, Esq., Chairman.

The Hon. Daniel O'Connor, | George Black, Esq.

The minutes of the previous meeting were read, and confirmed.

The Sectional Committee proceeded to consider their Report on the proposed Railway from Berrigan to Finley, and at 9 a.m. adjourned for the purpose of taking train for Sydney, the further consideration of the Report being resumed on the journey, the Sectional Committee arriving at the Redfern Railway Station at 6·15 a.m. on Sunday, 26th July, and the final consideration and adoption of the Report being postponed until Tuesday, 28th July.

TUESDAY, 28 *JULY*, 1896.

The Sectional Committee met at the Office of the Parliamentary Standing Committee on Public Works, Sydney, at 11 a.m.

MEMBERS PRESENT:—

Frank Farnell, Esq., Chairman.

The Hon. Daniel O'Connor, | George Black, Esq.

The minutes of the previous meeting were read, and confirmed.

The Sectional Committee considered and adopted their Report on the proposed Railway from Berrigan to Finley.

PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS.

SECTIONAL COMMITTEE.

Railway from Condobolin to Broken Hill.

MINUTES OF PROCEEDINGS.

MINUTES of the Proceedings of the Sectional Committee of the Parliamentary Standing Committee on Public Works, appointed on Wednesday, 19th August, 1896, to inspect, take evidence, and report with reference to the proposed Railway from Condobolin to Broken Hill.

SATURDAY, 5 *SEPTEMBER*, 1896.

The Sectional Committee met at the Council Chambers, Lithgow, at 7·30 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., | John Lionel Fegan, Esq.,
The Hon. William Joseph Trickett, | Thomas Henry Hassall, Esq.

It was resolved, on the motion of Mr. Hassall, seconded by Mr. Trickett, that Mr. Ewing be Chairman of the Sectional Committee.

The Sectional Committee proceeded to consider the proposed Railway from Condobolin to Broken Hill.

The following witnesses were sworn and examined:—Mr. Horace Edward Seymour Bracey, Mayor of Lithgow; Mr. James Ryan, editor, *Lithgow Mercury;* Mr. William Sandford, proprietor, Eskbank Colliery and Ironworks; Mr. Louis Buckland Blackwell, A.M.I.C.E., manager, Vale Colliery; Mr. Thomas Wilton, colliery proprietor, Lithgow; and Mr. William Bragg, part proprietor of the Oakey Park Colliery.

The Sectional Committee adjourned at 9·50 p.m.

MONDAY, 7 *SEPTEMBER*, 1896.

The Sectional Committee left Lithgow at 12·50 a.m., and proceeded by train to Parkes.

The Sectional Committee left Parkes at 11 a.m., and continued their journey by coach, arriving at Bogan Gate at 3·45 p.m.

The Sectional Committee met at West's "Bogan Gate Hotel."

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.
The Hon. William Joseph Trickett, | John Lionel Fegan Esq.,
Thomas Henry Hassall, Esq.

The minutes of the previous meeting were read, and confirmed.

The Sectional Committee adjourned at 7·35 p.m.

TUESDAY, 8 *SEPTEMBER*, 1896.

The Sectional Committee left Bogan Gate at 9 a.m. and proceeded to Condobolin, where they arrived at 4 p.m.

The Sectional Committee met at the "Royal Hotel," Condobolin, at 8 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.
The Hon. William Joseph Trickett, | John Lionel Fegan, Esq.,
Thomas Henry Hassall, Esq.

The minutes of the previous meeting were read, and confirmed.

The Sectional Committee adjourned at 8·5 p.m.

WEDNESDAY, 9 *SEPTEMBER*, 1896.

The Sectional Committee met at the "Royal Hall," Condobolin, at 10 a.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.
The Hon. William Joseph Trickett, | John Lionel Fegan, Esq.,
Thomas Henry Hassall, Esq.

The minutes of the previous meeting were read, and confirmed.

The Sectional Committee further considered the proposed Railway from Condobolin to Broken Hill.

The following witnesses were sworn, and examined:—Mr. George Burnet, Mayor of Condobolin; Mr. Humphery William Grey Innes, Council Clerk, Condobolin; and Mr. James Rabinowitch, storekeeper, Condobolin.

The Sectional Committee, at 12 o'clock noon, adjourned until 3 p.m., when Mr. George Cochrane, bookkeeper for Messrs. Nicolas and Reymond, flour-mill and saw-mill proprietors, Condobolin; Mr. John Bouffler, farmer, Condobolin; and Mr. John Coppock White, general commission agent, Condobolin, were sworn, and examined.

The Sectional Committee adjourned at 4·20 p.m.

THURSDAY,

THURSDAY, 10 *SEPTEMBER*, 1896.

The Sectional Committee left Condobolin at 9·30 a.m., and arrived at Cugong at 4·30 p.m.

The Sectional Committee met at "Byrnes' Hotel," Cugong, at 7·15 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. William Joseph Trickett, | John Lionel Fegan, Esq.,
Thomas Henry Hassall, Esq.

The minutes of the previous meeting were read, and confirmed.

The Sectional Committee further considered the proposed Railway from Condobolin to Broken Hill.

Mr. Edward Byrnes, hotelkeeper and selector, Cugong, and Mr. Herbert Evans, miner and selector, Cugong, were sworn, and examined.

The Sectional Committee adjourned at 8·25 p.m.

FRIDAY, 11 *SEPTEMBER*, 1896.

The Sectional Committee left Cugong at 9·30 a.m., and arrived at Euabalong, at 12 o'clock noon.

The Sectional Committee met at "Cabot's Hotel," Euabalong, at 4 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. William Joseph Trickett, | John Lionel Fegan, Esq.,
Thomas Henry Hassall, Esq.

The minutes of the previous meeting were read, and confirmed.

The Sectional Committee further considered the proposed Railway from Condobolin to Broken Hill.

The following witnesses were sworn, and examined:—Mr. John Edgar, grazier, Errebenderry, near Euabalong; Mr. Frederick Small, post and telegraph master, Euabalong; Mr. Michael Wyer, senior constable of police, Euabalong; and Mr. William M'Lean, storeman, Euabalong.

The Sectional Committee adjourned at 5·30 p.m.

SATURDAY, 12 *SEPTEMBER*, 1896.

The Sectional Committee left Euabalong at 9·30 a.m., and arrived at Lake Cudgellico at 12·15 p.m.

During the afternoon the Sectional Committee paid a visit of inspection to the Government weir and flood-gates in Lake Creek, 4 miles from Cudgellico, their object being to ascertain what steps had been taken to conserve the water in the lake.

The Sectional Committee met at the School of Arts, Lake Cudgellico, at 7 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. William Joseph Trickett, | John Lionel Fegan, Esq.,
Thomas Henry Hassall, Esq.

The minutes of the previous meeting were read, and confirmed.

The Sectional Committee further considered the proposed Railway from Condobolin to Broken Hill.

The following witnesses were sworn, and examined:—Mr. Thomas Brooks, farmer; Mr. Alexander Gordon Huie, Secretary, Progress Committee; Mr. Allen M'Innes, selector; Mr. H. D. Edwards, post-master; Mr. John Knight, store manager; Mr. James Knight, prospector; and Mr. Robert M'Ewen, store-keeper.

The Sectional Committee adjourned at 9·30 p.m.

MONDAY, 14 *SEPTEMBER*, 1896.

The Sectional Committee met at the School of Arts, Lake Cudgellico, at 9·30 a.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. William Joseph Trickett, | John Lionel Fegan, Esq.,
Thomas Henry Hassall, Esq.

The minutes of the previous meeting were read, and confirmed.

The Sectional Committee further considered the proposed Railway from Condobolin to Broken Hill.

The following witnesses were sworn, and examined:—Mr. Duncan Erskine Mackellar, manager, Wooyeo Station; Mr. Robert Orr, pastoral tenant, near Lake Cudgellico; Mr. Joseph Campbell, lessee, Euabalong Station; and Mr. Albert Henry Conner Volkman, farmer, near Lake Cudgellico.

The Sectional Committee adjourned at 11·45 a.m, and at 2 p.m., left Lake Cudgellico for Merri-Merrigal, where they arrived at 5·30 p.m.

TUESDAY,

TUESDAY, 15 *SEPTEMBER*, 1896.

The Sectional Committee met at Merri Merrigal at 8·30 a.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.
The Hon. William Joseph Trickett, | John Lionel Fegan, Esq.,
Thomas Henry Hassall, Esq.

The minutes of the previous meeting were read, and confirmed.

The Sectional Committee further considered the proposed Railway from Condobolin to Broken Hill.

Mr. John Broatch, manager, Merri Merrigal Station, was sworn, and examined.

At 9·30 a.m. the Sectional Committee left Merri Merrigal for Hunthawong.

En route they inspected the weir in the Lachlan below the entrance to the Willandra Billabong, and the weir in course of construction at the Middle Billabong, arriving at Hunthawong at 5·30 p.m.

At 8 p.m. the Sectional Committee met at Hunthawong, and Mr. Alexander Cummings, homestead lessee, was sworn, and examined.

The Sectional Committee adjourned at 9·35 p.m.

WEDNESDAY, 16 *SEPTEMBER*, 1896.

The Sectional Committee met at Hunthawong at 8·30 a.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.
The Hon. William Joseph Trickett, | John Lionel Fegan, Esq.,
Thomas Henry Hassall, Esq.

The minutes of the previous meeting were read, and confirmed.

The Sectional Committee further considered the proposed Railway from Condobolin to Broken Hill.

Mr. Alfred William Macpherson, manager of Hunthawong and Willandra Stations, was sworn, and examined.

The Sectional Committee at 9·30 a.m. left Hunthawong for Hillston, and arrived there at 12 o'clock noon.

The Sectional Committee met at the Court-house, Hillston, at 2·30 p.m.

The Sectional Committee further considered the proposed Railway from Condobolin to Broken Hill.

The following witnesses were sworn, and examined:—Mr. Benjamin Varcoe, miller, Hillston; Mr. Samuel Nixon, farmer, Gunbar; Mr. William Thomas, farmer, near Gunbar; Mr. Joseph Rowe Varcoe, farmer, near Hillston; Mr. Thomas Cadell, Inspector of Stock, Hillston; and Mr. James Macbeth Fullerton, storekeeper, Hillston.

The Sectional Committee adjourned at 5 p.m.

THURSDAY, 17 *SEPTEMBER*, 1896.

The Sectional Committee met at the Court-house, Hillston, at 10 a.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.
The Hon. William Joseph Trickett, | John Lionel Fegan, Esq,
Thomas Henry Hassall, Esq.

The minutes of the previous meeting were read, and confirmed.

The Sectional Committee further considered the proposed Railway from Condobolin to Broken Hill.

Mr. William Smith Arnott, post and telegraph master, Hillston; Mr. Robert Walter Stewart, Mayor of Hillston; Mr. William Cowley, land tax assessor; and Mr. Arthur Caldwell Sawtell, sergeant of police in charge of Hillston district, were sworn, and examined.

Mr. Samuel Nixon, farmer, Gunbar, and Mr. Thomas Cadell, Inspector of Stock, Hillston, were sworn, and further examined.

The Sectional Committee adjourned at 11·55 a.m.

During the afternoon the Members of the Sectional Committee were driven around the district, and inspected the wheat-fields in the locality.

FRIDAY, 18 *SEPTEMBER*, 1896.

The Sectional Committee met at the Court-house, Hillston, at 10 a.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.
The Hon. William Joseph Trickett, | John Lionel Fegan, Esq.,
Thomas Henry Hassall, Esq.

The minutes of the previous meeting were read, and confirmed.

The Sectional Committee further considered the proposed Railway from Condobolin to Broken Hill.

Mr. Robert Walter Stewart, Mayor of Hillston; Mr. James Macbeth Fullerton, storekeeper, Hillston; and Mr. Thomas Cadell, Inspector of Stock, Hillston, were sworn, and further examined.

Mr. Frederic Milthorp, farmer, Lake Cudgellico; Mr. George Milbourne Marsh, Acting Crown Lands Agent; and Mr. William Shakespeare Hook, farmer, Hillston, were sworn, and examined.

The Sectional Committee adjourned at 11·10 a.m., and later in the day inspected Mr. Varcoe's flour-mill at Hillston.

SATURDAY,

SATURDAY, 19 *SEPTEMBER*, 1896.

The Sectional Committee left Hillston at 9·30 a.m., and arrived at Roto at 5 p.m.

The Sectional Committee met at Roto Homestead at 7·30 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.
The Hon. William Joseph Trickett, | John Lionel Fegan, Esq.,
Thomas Henry Hassall, Esq.

The minutes of the previous meeting were read, and confirmed.
The Sectional Committee further considered the proposed Railway from Condobolin to Broken Hill.
Mr. Thomas W. Hyndman, bookkeeper, Roto, was sworn, and examined.
The Sectional Committee adjourned at 8·45 p.m.

SUNDAY, 20 *SEPTEMBER*, 1896.

The Sectional Committee left Roto at 10 a.m., and arrived at Big Willandra at 6 p.m.

MONDAY, 21 *SEPTEMBER*, 1896.

The Sectional Committee met at Big Willandra Homestead at 8·15 a.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.
The Hon. William Joseph Trickett, | John Lionel Fegan, Esq.,
Thomas Henry Hassall, Esq.

The minutes of the previous meeting were read, and confirmed.
Mr. Arthur Laird, manager, Big Willandra, and Mr. John Cummings, Surveyor, Railway Construction Branch, Department of Public Works, were sworn, and examined.
The Sectional Committee left Big Willandra at 10 a.m., and arrived at Mossgiel at 6·45 p.m.

TUESDAY, 22 *SEPTEMBER*, 1896.

The Sectional Committee met at the Court-house, Mossgiel, at 10 a.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.
The Hon. William Joseph Trickett, | John Lionel Fegan, Esq.,
Thomas Henry Hassall, Esq.

The minutes of the previous meeting were read, and confirmed.
The Sectional Committee further considered the proposed Railway from Condobolin to Broken Hill.
Mr. Alexander Cameron, grazier, near Mossgiel; Mr. Robert William Broughton, Acting Stock Inspector; Mr. Richard Haydon Cheriton, farmer, near Mossgiel; and Mr. Alexander Wilson, farmer and grazier, near Mossgiel, were sworn, and examined.
The Sectional Committee at 1 p.m. adjourned until 2 p.m., when Mr. J. Abrahams, storekeeper, Mossgiel; Mr. Angus Duncan MacInnes, storekeeper and homestead lessee; Mr. Cecil Joseph Parsons, grazier, Mossgiel Station; Mr. Francis Samuel Brush, grazier, Bundarra Station; and Mr. Henry Capewell, senior-constable of police, Mossgiel, were sworn, and examined.
Mr. Alexander Cameron was sworn, and further examined.
The Sectional Committee adjourned at 3·40 p.m.

WEDNESDAY, 23 *SEPTEMBER*, 1896.

The Sectional Committee left Mossgiel at 8·30 a.m. for Kilfera.

Eight miles from Mossgiel the Sectional Committee were met by Mr. Albert George Little, Engineer and Surveyor, Railway Construction Branch, Department of Public Works, who was sworn, and examined, and who then accompanied the Sectional Committee to Kilfera.

The Sectional Committee arrived at Kilfera at 4·30 p.m., and met at the homestead at 8 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.
The Hon. William Joseph Trickett, | John Lionel Fegan, Esq.,
Thomas Henry Hassall, Esq.

The minutes of the previous meeting were read, and confirmed.
The Sectional Committee further considered the proposed Railway from Condobolin to Broken Hill.
Mr. George Williamson, storekeeper, Ivanhoe; Mr. Francis Villa, storekeeper, Ivanhoe; Mr. John Cameron, manager, Marfield Station; Mr. Herbert Lloyd, manager, Baden Park Station; and Mr. Richard Cappur Webb, part owner and manager of Kilfera Station, were sworn, and examined.
The Chairman, on behalf of the Sectional Committee, thanked Mr. Mullen (District Engineer, Hay Road District), who had accompanied the Committee from Hillston, for the assistance and information which he had rendered in connection with the inquiry.
The Sectional Committee adjourned at 10·45 p.m.

THURSDAY,

THURSDAY, 24 *SEPTEMBER*, 1896.

The Sectional Committee met at Kilfera Homestead at 12 30 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.
The Hon. William Joseph Trickett, | John Lionel Fegan, Esq.,
Thomas Henry Hassall, Esq.

The minutes of the previous meeting were read, and confirmed.

The Sectional Committee left Kilfera at 12·45 p.m., and inspected the country along the route of the proposed line, from Kilfera to Beelpaja, arriving at the latter place at 5·30 p.m.

FRIDAY, 25 *SEPTEMBER*, 1896.

The Sectional Committee met at Beelpaja at 12·30 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.
The Hon. William Joseph Trickett, | John Lionel Fegan, Esq.,
Thomas Henry Hassall, Esq.

The minutes of the previous meeting were read, and confirmed.

The Sectional Committee at 12·35 p.m. left Beelpaja for German Tank. *En route* they inspected the country along the line of the proposed Railway, and arrived at German Tank at 5 p.m.

SATURDAY, 26 *SEPTEMBER*, 1896.

The Sectional Committee left German Tank at 7·30 a.m., and arrived at Bulla Bulka at 4·30 p.m.

The Sectional Committee met at the homestead, Bulla Bulka, at 7·30 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.
The Hon. William Joseph Trickett, | John Lionel Fegan, Esq.,
Thomas Henry Hassall, Esq.

The minutes of the previous meeting were read, and confirmed.

The Sectional Committee further considered the proposed Railway from Condobolin to Broken Hill.

Mr. Angus M'Callum, overseer, Tolarno Station, and Mr. George Jamieson, station employee, were sworn, and examined.

The Sectional Committee adjourned at 8·30 p m.

SUNDAY, 27 *SEPTEMBER*, 1896.

The Sectional Committee left Bulla Bulka at 8·30 a.m.

At 2 p.m. the Sectional Committee arrived at Toorincaca Bore, and obtained from Mr. William Gardiner, who is in charge of the bore, an account of the strata passed through, and of the work done up to date.

Continuing their journey, the Sectional Committee reached Amphitheatre at 5·30 p.m.

MONDAY, 28 *SEPTEMBER*, 1896.

The Sectional Committee left Amphitheatre at 1 a.m., and arrived at Menindie at 8 a.m.

The Sectional Committee met at the "West End Hotel," Menindie, at 3 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.
The Hon. William Joseph Trickett, | John Lionel Fegan, Esq.,
Thomas Henry Hassall, Esq.

The minutes of the previous meeting were read, and confirmed.

The Sectional Committee proceeded upon a visit of inspection to the Menindie Meat-preserving Company's Works, 4 miles from Menindie, and afterwards to Lake Pammamaroo. The lake was found to be dry, and an attempt was being made to permanently shut out the Darling water, and to irrigate the bed of the lake with water from Pammamaroo Creek. Weirs were in course of construction, which it was said would have the effect of raising the water in the creek to levels suitable for the work of irrigation.

TUESDAY, 29 *SEPTEMBER*, 1896.

The Sectional Committee met at the Court-house, Menindie, at 10 a.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.
The Hon. William Joseph Trickett, | John Lionel Fegan, Esq.,
Thomas Henry Hassall, Esq.

The minutes of the previous meeting were read, and confirmed.

The Sectional Committee further considered the proposed Railway from Condobolin to Broken Hill.

The

The following witnesses were sworn, and examined:—Mr. William Davies, accountant and secretary to the Menindie Boiling-down and Meat-preserving Company (Limited); Mr. Ryan Charles Besely, manager of the company; Mr. Wellington Coates, meat expert, employed by the company; Mr. Samuel Klemm, storekeeper, Menindie; Mr. Edward Haines, manager, "Crown Hotel," Menindie; and Mr. William Maiden, grazier, Menindie.

Mr. William James Faust made an affirmation, and was examined.

The Sectional Committee, at 1 p.m., adjourned until 2·30 p.m., when Mr. Robert Scobie was sworn, and examined.

The Sectional Committee adjourned at 3·45 p.m., and afterwards inspected the Government weir at Lake Menindie.

WEDNESDAY, 30 *SEPTEMBER*, 1896.

The Sectional Committee met at the "West End Hotel," Menindie, at 3 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.
The Hon. William Joseph Trickett, | John Lionel Fegan, Esq.,
Thomas Henry Hassall, Esq.

The minutes of the previous meeting were read, and confirmed.

The Sectional Committee, at 3·15 p.m., left Menindie and proceeded to Kars, where they arrived at 8·15 p.m.

THURSDAY, 1 *OCTOBER*, 1896.

The Sectional Committee left Kars Station at 6·30 a.m., and arrived at Broken Hill at 12 o'clock noon.

The Sectional Committee met at the "Freemason's Hotel," Broken Hill, at 8 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.
The Hon. William Joseph Trickett, | John Lionel Fegan, Esq.,
Thomas Henry Hassall, Esq.

The minutes of the previous meeting were read, and confirmed.

The Sectional Committee adjourned at 8·30 p.m.

FRIDAY, 2 *OCTOBER*, 1896.

The Sectional Committee met at the Town Hall, Broken Hill, at 10 a.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.
The Hon. William Joseph Trickett, | John Lionel Fegan, Esq.,
Thomas Henry Hassall, Esq.

The minutes of the previous meeting were read, and confirmed.

The Sectional Committee further considered the proposed Railway from Condobolin to Broken Hill.

The following witnesses were sworn, and examined:—Mr. John Souter, Mayor of Broken Hill; Mr. Charles Eley, Traffic Manager, Silverton Tramway Company (Limited); Mr. Lewis Oswald, mercantile agent and sharebroker; Mr. Charles Isaac, auctioneer.

The Sectional Committee adjourned at 12·30 p.m., and met again at 2 p.m., when the following witnesses were sworn, and examined:—Mr. Alexander Stewart, manager, Broken Hill Proprietary Silver-mining Company (Limited); Mr. Ernest Boam, soft goods importer; Mr. Oswald Septimus Maddocks, Sub-Collector of Customs; Mr. Harold Butler Sweetapple, mining contractor; Mr. Patrick Quinn, hotel-keeper; Mr. William Maiden, grazier; Mr. Charles Thomas Hyde, wood merchant; Mr. Alderman Jabez Wright; and Mr. Charles Counsell, accountant.

The Sectional Committee adjourned at 5 p.m., and at 8 p.m. inspected the Proprietary Company's mine, both surface and underground operations, returning to the hotel at 12 o'clock midnight.

SATURDAY, 3 *OCTOBER*, 1896.

The Sectional Committee met at the Town Hall, Broken Hill, at 10 a.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.
The Hon. William Joseph Trickett, | John Lionel Fegan, Esq.,
Thomas Henry Hassall, Esq.

The minutes of the previous meeting were read, and confirmed.

The Sectional Committee further considered the proposed Railway from Condobolin to Broken Hill.

The following witnesses were sworn, and examined:—Mr. Charles Eley, Traffic Manager, Silverton Tramway Company (Limited); Mr. Oswald Septimus Maddocks, Sub-Collector of Customs; Mr. Albert Alfred Brice, auctioneer; Mr. Francis Whysall, post and telegraph master; Mr. James Lewis Gluyass, general manager, Broken Hill South Silver-mining Company; Mr. John Warren, manager, Block 10 Silver-mining Company; Mr. Randolph Adams, manager, Central Silver-mining Company; Mr. Richard Watson English, surveyor; Mr. John Fielder, builder; Mr. Ernest Fromen, produce merchant; and Mr. Joseph Wilks, inspector of stock.

The Sectional Committee adjourned at 1 p.m. Subsequently

Subsequently the Sectional Committee, accompanied by the Mayor and Aldermen and other residents of Broken Hill, visited the water supply work at Stephen's Creek, about 13 miles from Broken Hill. There is a weir, with stone face and puddle core, erected across Stephen's Creek at a narrow grip. The overshot dam carries ordinary surface-water, but water has never been known to pass over the dam. The evaporation is stated to be about 7 feet per annum. An infinitesimal depth of water over the area impounded is all that is necessary to supply the wants of Broken Hill. The water is forced up to a surface reservoir adjacent to Broken Hill, which was said contained about one week's supply for the field.

MONDAY, 5 *OCTOBER*, 1896.

The Sectional Committee left Broken Hill at 7·15 p.m. on Sunday, 4 October, by the Silverton Tramway and South Australian Railway, *via* Terowie, arriving at Adelaide on Monday, 5 October, at 10·40 a.m.

The Sectional Committee met at 3 p.m., in the Deputation Room, Department of Public Works.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.
The Hon. William Joseph Trickett, | John Lionel Fegan, Esq.,
Thomas Henry Hassall, Esq.

The minutes of the previous meeting were read, and confirmed.

The Sectional Committee further considered the proposed Railway from Condobolin to Broken Hill.

Allan G. Pendleton, Esq., Commissioner of Railways, made a statement with regard to the grades of the railways at present in existence, the means of transit generally to Port Victor, Port Adelaide, Port Augusta, and Port Pirie, the supply of material likely to be carried to and from the Barrier Field, and other matters pertaining thereto.

Alexander Moncrieff, Esq., Engineer-in-Chief, also made a statement with regard to the grades and curves on the railways at present in existence; the operations about to be undertaken by South Australia to improve the same; the present condition of the ports, and the expenditure necessary to make them suitable for first-class ocean-going boats; the traffic on the Murray River; and various other matters that appeared to the Sectional Committee to be of importance to the subject of the inquiry and in connection with railway construction generally.

The Sectional Committee adjourned at 5 p.m.

TUESDAY, 6 *OCTOBER*, 1896.

The Sectional Committee met at Adelaide, at 10 a.m., to consider their Report, and were engaged in its preparation until 9 p.m.

WEDNESDAY, 7 *OCTOBER*, 1896.

The Sectional Committee met at the "South Australian Club Hotel," Adelaide, at 10 a.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.
The Hon. William Joseph Trickett, | John Lionel Fegan, Esq.,
Thomas Henry Hassall, Esq.

The minutes of the previous meeting were read, and confirmed.

The Sectional Committee interviewed Mr. William Rendall Cave, merchant, of Adelaide, who gave information with regard to shipping freights and fares from the various South Australian ports at which the traffic from Broken Hill can be dealt with.

The Sectional Committee left Adelaide at 4·30 p.m. by express train for Melbourne, where they arrived at 12 o'clock noon on Thursday.

THURSDAY, 8 *OCTOBER*, 1896.

The Sectional Committee met at the "Grand Hotel," Melbourne, at 2·30 p.m.

The Sectional Committee interviewed Mr. Macnicol, Secretary of the Silverton Tramway Company, with regard to the operations of his company, and subsequently further considered their Report.

FRIDAY, 9 *OCTOBER*, 1896.

The Sectional Committee met at the "Grand Hotel," Melbourne, at 9·30 a.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.
The Hon. William Joseph Trickett, | John Lionel Fegan, Esq.,
Thomas Henry Hassall, Esq.

The minutes of the previous meeting were read, and confirmed.

The Sectional Committee interviewed Mr. Henry C. Mais, late Engineer-in-Chief for Railways, South Australia, and Engineer for the construction of the Silverton Tramway, who gave evidence with regard to the cost of constructing the railway from Terowie to Cockburn, and the cost of the tramway from Cockburn to Broken Hill, and also with regard to ballast and other matters in connection with railway construction.

The Sectional Committee further considered their Report, and left for Sydney by express train at 5·15 p.m.

THURSDAY,

THURSDAY, 16 *OCTOBER*, 1896.

The Sectional Committee met at Parliament House at 8 p.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq., Chairman.

The Hon. William Joseph Trickett, | John Lionel Fegan, Esq.,
Thomas Henry Hassall, Esq.

The minutes of the previous meeting were read, and confirmed.

The Sectional Committee further considered their Draft Report, which was finally approved and signed by the Chairman.

The Committee adjourned at 11 p m.

PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS.

SECTIONAL COMMITTEE.

Railway from Moree to Inverell.

MINUTES OF PROCEEDINGS.

MINUTES of the Proceedings of the Sectional Committee of the Parliamentary Standing Committee on Public Works, appointed on Tuesday, 29th September, 1896, to inspect, take evidence, and report with reference to the proposed Railway from Moree to Inverell.

The Sectional Committee left Sydney by the 6·15 p.m. mail-train on Friday, 2nd October, 1896, and arrived at Narrabri at 8·30 a.m. on Saturday, 3rd October. At 9·30 a m. the Sectional Committee left Narrabri by the contractors' train and travelled over the newly-constructed line to Moree, which was reached at 1·30 p.m. the same day.

The Sectional Committee subsequently met at the "Royal Hotel," Moree.

MEMBERS PRESENT:—

The Hon. Charles James Roberts, C.M.G., | Henry Clarke, Esq.,
The Hon. Daniel O'Connor, | Charles Alfred Lee, Esq.,
George Black, Esq.

Mr. Black moved,—"That Mr. C. A. Lee be the Chairman of the Sectional Committee."

The motion was seconded by Mr. Clarke, and passed.

MONDAY, 5 *OCTOBER*, 1896.

The Sectional Committee met at the Court-house, Moree, at 10 a.m.

MEMBERS PRESENT:—

Charles Alfred Lee, Esq., Chairman.

The Hon. Charles James Roberts, C.M.G., | Henry Clarke, Esq.,
The Hon. Daniel O'Connor, | George Black, Esq.

The minutes of the previous meeting were read, and confirmed.

The Sectional Committee proceeded to consider the proposed Railway from Moree to Inverell.

The following witnesses were sworn and examined:—Messrs. Percy Ernest Stirton, Mayor of Moree; Colin James M'Masters, Chairman of the Land Board for the Moree District; and John M'Donald, grazier, Moree.

The Sectional Committee adjourned at 12·45 p.m., and again met at 2 p.m., when Messrs. William Henry O'Malley Wood, District Surveyor, Moree; Alexander George Forbes Munro, grazier, Weebollabolla; and William John Stewart, grazier, Yagobe, were sworn, and examined.

The Sectional Committee adjourned at 4·30 p.m., until the following day.

TUESDAY, 6 *OCTOBER*, 1896.

The Sectional Committee met at the Court-house, Moree, at 10 a.m.

MEMBERS PRESENT:—

Charles Alfred Lee, Esq., Chairman.

The Hon. Charles James Roberts, C.M.G., | Henry Clarke, Esq.,
The Hon. Daniel O'Connor, | George Black, Esq.

The minutes of the previous meeting were read, and confirmed.

The Sectional Committee further considered the proposed Railway from Moree to Inverell.

The following witnesses were sworn, and examined:—Messrs. Alexander M'Intosh, storekeeper, Moree; John Thomas Crane, auctioneer and stock and station agent, Moree; Richard Ford Jenkins, road engineer, Moree; John Munro, post and telegraph master, Moree; John Sherman Skeet, librarian, School of Arts, Moree; and William Wood, selector and butcher, Moree.

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The Sectional Committee adjourned at 12·30 p.m., and again met at 2 p.m., when Messrs. Henry Joseph, manager, Gwydir Brewery, Moree; Arthur Thompson, wool-scourer, Moree; and Samuel Lewis Cohen, land agent and auctioneer, Moree, were sworn, and examined.

Mr. Alexander George Forbes Munro was sworn, and further examined.

The Sectional Committee adjourned at 4 p.m., until the following day.

WEDNESDAY, 7 OCTOBER, 1896.

The Sectional Committee, accompanied by Mr. Charles M'Donnell Stuart, Supervising Engineer, Railway Construction Branch, Department of Public Works, left Moree by special coach at 6 a.m., and inspected the route of the proposed Railway, as far as practicable, to Biniguy, and thence to Yagobe and Highland Plain. At this point, 7 miles from Warialda, the Sectional Committee left the main road and visited the site of the proposed Railway Station 4 miles south of the township, and also inspected several portions of agricultural land north and south of Kelly's Gully.

The Sectional Committee arrived at Warialda at 6 p.m., and subsequently met at "Tattersall's Hotel."

MEMBERS PRESENT:—

Charles Alfred Lee, Esq., Chairman.

The Hon. Charles James Roberts, C.M.G.,	Henry Clarke, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.

The minutes of the previous meeting were read, and confirmed.

THURSDAY, 8 OCTOBER, 1896.

The Sectional Committee met at the Court-house, Warialda, at 10 a.m.

MEMBERS PRESENT:—

Charles Alfred Lee, Esq., Chairman.

The Hon. Charles James Roberts, C.M.G.,	Henry Clarke, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.

The minutes of the previous meeting were read, and confirmed.

The Sectional Committee further considered the proposed Railway from Moree to Inverell.

The following witnesses were sworn, and examined:—Messrs. John Lanagan, commission agent, Warialda; Robert Kirkpatrick, Inspector of Stock, Warialda; Frithiof Valdemar Vikner, Engineer for Roads, Warialda; Arthur Ormonde Butler, Clerk of Petty Sessions and Crown Lands Agent, Warialda; Thomas Heydon, baker, Warialda; Joseph Battersby Scholes, grocer, Big River, Ezzy's Crossing; William Butler Geddes, agent, Warialda; and Robert Buist, newspaper proprietor, Warialda.

The Sectional Committee adjourned at 12·30 and again met at 2 p.m., when Messrs. George Hollingworth Gordon, grazier, Gragin; John Dixon, farmer, Warialda; Thomas Lawson, storekeeper, Warialda; John Shelton, grazier, Warialda; and George Freeman, station manager, Gournama, were sworn, and examined.

The Sectional Committee adjourned at 4·30 p.m.

FRIDAY, 9 OCTOBER, 1896.

The Sectional Committee, accompanied by Mr. Charles M'Donell Stuart, Supervising Engineer, Railway Construction Branch, Department of Public Works, left Warialda by special coach for Inverell, at 7·30 am., and followed the originally-surveyed route as far as its junction with the permanent route on the Gunnee Estate, arriving at Inverell at 4·30 p.m.

The Sectional Committee subsequently met at the "Royal Hotel," Inverell.

MEMBERS PRESENT:—

Charles Alfred Lee, Esq., Chairman.

The Hon. Charles James Roberts, C.M.G.,	Henry Clarke, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.

The minutes of the previous meeting were read, and confirmed.

SATURDAY, 10 OCTOBER, 1896.

The Sectional Committee met at the Court-house, Inverell, at 10 a.m.

MEMBERS PRESENT:—

Charles Alfred Lee, Esq., Chairman.

The Hon. Charles James Roberts, C.M.G.,	Henry Clarke, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.

The Sectional Committee further considered the proposed Railway from Moree to Inverell.

The following witnesses were sworn, and examined:—Messrs. Francis George Finley, Chairman of the Land Board, Armidale; Robert Howard, Secretary Moree-Inverell Railway League; Hugh Wyndham, grazier, Bukkulla; William H. Fleming, land agent, Inverell; Conryod Bower, miner and selector, Tingha; Alexander M'Clymont, farmer, Little Plain; Grosvenor Francis Lewin, farmer and fruit-grower; Robert Bevan Jones, farmer, King's Plain; Denis Joseph Lowe, grazier and farmer, Gramin; Joseph Taafe, farmer, Little Plain; James Moore, farmer, Bannockburn; James Bryden, farmer, Nullamanna; James Richard Hatcher, farmer, Byron; Charles M'Donell Stuart, Supervising Engineer, Railway Construction Branch, Department of Public Works; Thomas Jenkins, farmer, Inverell; and Peter Balls-Eddy, farmer and grazier, Eddy Park, Inverell.

The Sectional Committee adjourned at 5 p.m.

MONDAY,

MONDAY, 12 *OCTOBER*, 1896.

The Sectional Committee met at the Court-house, Inverell, at 10 a.m.

MEMBERS PRESENT:—

Charles Alfred Lee, Esq., Chairman.

The Hon. Charles James Roberts, C.M.G.,	Henry Clarke, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.

The minutes of the previous meeting were read, and confirmed.

The Sectional Committee further considered the proposed Railway from Moree to Inverell.

The following witnesses were sworn, and examined:—Messrs. John Sinclair, stock and station agent and grazier, Inverell; Hector M'Lean, storekeeper, Inverell; Arthur Stuart Menzies, station manager, Reedy Creek; John Borthwick, solicitor, Inverell; Caspar Limberg, farmer, near Inverell; Charles Munsie, farmer and grazier, Swanbrook; John Griffin, farmer and grazier, Swanbrook; Alfred Oliver, miller, Inverell; Josiah Rolfe, farmer, Swanbrook; William John Goldman, farmer, Swanbrook; John Archibald Anderson, grazier, Newstead South; Henry Merrymeath, grazier and station manager, Arawatta; James Campbell, grazier, Pinderay; James Jackson Wray Gibson, grazier, Roseneath; Arthur Robinson, farmer, Denton Vale; William Nichols, farmer and storekeeper, Denton Vale; Thomas Mason, farmer and publican, Inverell; Benjamin Champion Martin, miner, Tingha; Andrew Murray, pastoralist, Bannockburn; Peter Colin Campbell, grazier, Inverell Station; John Makin, farmer and grazier, Gum Flats; and Peter M'Carthy O'Sullivan, farmer and grazier, Bannockburn.

Mr. Robert Howard, Secretary Moree-Inverell Railway League, was sworn, and further examined.

The Sectional Committee adjourned at 5·45 p.m.

TUESDAY, 13 *OCTOBER*, 1896.

The Sectional Committee left Inverell by special coach at 9 a.m., and arrived at Glen Innes at 5 p.m.

WEDNESDAY, 14 *OCTOBER*, 1896.

The Sectional Committee met at the Court-house, Glen Innes, at 10 a.m.

MEMBERS PRESENT:—

Charles Alfred Lee, Esq., Chairman.

The Hon. Charles James Roberts, C.M.G.,	Henry Clarke, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.

The minutes of the previous meeting were read, and confirmed.

The Sectional Committee further considered the proposed Railway from Moree to Inverell.

The following witnesses were sworn, and examined:—Messrs. Follet John Thomas, Mayor of Glen Innes; John Frederick Utz, merchant and miller, Glen Innes; Robert Burfield Barton, manager, Haymarket Building Company, Sydney; Hugh M'Donald, farmer, Glen Innes; James Osborne, farmer and grazier, Glen Innes; John Weatherspoon, farmer, Glencoe; William Hodges, grazier, Glen Innes; Frederick Lewis, saw-mill proprietor, Big Hill, Glen Innes; Richard Alcock, coach proprietor, Glen Innes; James Healey, auctioneer, Glen Innes; and John Rule, storekeeper, Glen Innes.

The Sectional Committee adjourned at 4·50 p.m.

THURSDAY, 15 *OCTOBER*, 1896.

The Sectional Committee met at "Tattersall's Hotel," Glen Innes, at 9 a.m.

MEMBERS PRESENT:—

Charles Alfred Lee, Esq., Chairman.

The Hon. Charles James Roberts, C.M.G.,	Henry Clarke, Esq.,
The Hon. Daniel O'Connor,	George Black, Esq.

The minutes of the previous meeting were read, and confirmed.

The Sectional Committee proceeded to consider their Report on the proposed Railway from Moree to Inverell.

Mr. Roberts moved:—"That it is desirable the line of railway from Moree to Inverell, referred to the Sectional Committee, be constructed at a cost not exceeding £2,898 6s. per mile, exclusive of the cost of land resumption and compensation."

The motion was seconded by Mr. O'Connor, and negatived on the following division:—

Ayes, 2.	Noes, 3.
Mr. Roberts,	Mr. Lee,
Mr. O'Connor.	Mr. Clarke,
	Mr. Black.

The Report of the Sectional Committee was adopted on the motion of Mr. Clarke, seconded by Mr. O'Connor, and the Chairman was authorised to sign it and present it to the General Committee.

FRIDAY, 16 *OCTOBER*, 1896.

The Sectional Committee left Glen Innes at 8 a.m., and arrived in Sydney at 11 p.m.

PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS.

SECTIONAL COMMITTEE.

Construction of a Deepwater Harbour at Port Kembla.

MINUTES OF PROCEEDINGS.

MINUTES of the proceedings of the Sectional Committee of the Parliamentary Standing Committee on Public Works, appointed on Wednesday, 13th January, 1897, to inspect, take evidence, and report with reference to the proposed Construction of a Deepwater Harbour at Port Kembla.

The Sectional Committee left Sydney by the 5·30 p.m. train on Friday, the 15th instant, and arrived at Wollongong at 8 o'clock the same evening.

The Sectional Committee met at Bellambi, at 10·30 a.m. on Saturday, the 16th instant.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq. Chairman.

The Hon. Frederick Thomas Humphery.	Charles Alfred Lee, Esq.
The Hon. Charles James Roberts, C.M.G.	John Lionel Fegan, Esq.
The Hon. Daniel O'Connor.	George Black, Esq.
Henry Clarke, Esq.	Frank Farnell, Esq.

The Sectional Committee, accompanied by Mr. Carleton, C.E., of the Department of Public Works, proceeded to inspect the South Bulli Coal Company's works and the site of the proposed Harbour Improvements in Bellambi Bay, discussing with leading residents the question of the construction of breakwaters for the protection of the shipping at the Bellambi jetties. The position of the proposed breakwaters was pointed out by Mr. Morton, C.E., who fully explained the wishes of the local inhabitants with regard to the construction of a harbour.

The Sectional Committee subsequently returned to Wollongong and made a careful inspection of the harbour works at that port.

MONDAY, 18 *JANUARY*, 1897.

The Sectional Committee met in the Council Chambers, Wollongong, at 10·30 a.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq. Chairman..

The Hon. Frederick Thomas Humphery.	John Lionel Fegan, Esq.
The Hon. Charles James Roberts, C.M.G.	Thomas Henry Hassall, Esq.
The Hon. Daniel O'Connor.	George Black, Esq.
Henry Clarke, Esq.	Francis Augustus Wright, Esq.
Charles Alfred Lee, Esq.	Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The Sectional Committee further considered the proposed Construction of a Deepwater Harbour at Port Kembla.

The following witnesses were sworn, and examined:—Messrs. John Archibald Beatson, Mayor of Wollongong; Walter Evans, shipping manager for the Southern Coal Company; Jacob Carlos Jones, mining engineer and colliery manager; Robert Dodd, stevedore; William Weeks, butcher, Wollongong; William Henry Rees, secretary of the South Coast Harbour League; Charles Morton, civil and mining engineer; Michael O'Brien, hotel proprietor, Wollongong; Samuel Kemish, retired teacher; William Osborne, auctioneer; and David John Stewart, journalist.

The Sectional Committee adjourned at 4·30 p.m.

TUESDAY, 19 *JANUARY*, 1897.

The Sectional Committee met at the Brighton Hotel at 10 a.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq. Chairman.

The Hon. Frederick Thomas Humphery.	John Lionel Fegan, Esq.
The Hon. Charles James Roberts, C.M.G.	Thomas Henry Hassall, Esq.
The. Hon. Daniel O'Connor.	George Black, Esq.
Henry Clarke, Esq.	Francis Augustus Wright, Esq.
Charles Alfred Lee, Esq.	Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The Sectional Committee, accompanied by Mr. Carleton, C.E., of the Public Works Department, proceeded by special train to Port Kembla, where they inspected the jetties of the Southern Coal Company and the Mount Kembla Coal Company. Subsequently they inspected the bluestone quarries adjacent to the bay, from which it is proposed to obtain suitable material for the construction of the breakwaters.

The Sectional Committee returned to Wollongong at 7 p.m.

WEDNESDAY,

WEDNESDAY, 20 *JANUARY*, 1897.

The Sectional Committee met at the Brighton Hotel at 7 a.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq. Chairman.

The Hon. Frederick Thomas Humphery.	John Lionel Fegan, Esq.
The Hon. Charles James Roberts, C.M.G.	Thomas Henry Hassall, Esq.
The Hon. Daniel O'Connor.	George Black, Esq.
Henry Clarke, Esq.	Francis Augustus Wright, Esq.
Charles Alfred Lee, Esq.	Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The Sectional Committee, accompanied by Mr. Carleton, C.E., of the Public Works Department, proceeded to Lake Illawarra to inspect the entrance to the proposed harbour at that place, and also the works carried out by the Illawarra Harbour and Land Corporation.

The Sectional Committee also visited and inspected the extensive smelting works of the Smelting Company of Australia.

The following witnesses were sworn, and examined:—Messrs. Austin Joseph O'Grady, commission agent and auctioneer; W. R. Atkinson, resident of Dapto; George Henry Blakemore, manager of the Smelting Company of Australia.

The Sectional Committee returned to Wollongong at 7 o'clock p.m.

THURSDAY, 21 *JANUARY*, 1897.

The Sectional Committee left Wollongong by the 11 a.m. train, and arrived at Nowra at 1 o'clock p.m.

Subsequently a meeting was held in the Nowra Council Chambers.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq. Chairman.

The Hon. Charles James Roberts, C.M.G.	John Lionel Fegan, Esq.
The Hon. Daniel O'Connor.	Thomas Henry Hassall, Esq.
Henry Clarke, Esq.	George Black, Esq.
Charles Alfred Lee, Esq.	Francis Augustus Wright, Esq.

Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The Sectional Committee further considered the proposed Construction of a Deepwater Harbour at Port Kembla.

The following witnesses were sworn, and examined:—Messrs. James Wilson, storekeeper and grazier, Bullawangarah; Lewis McIntyre, farmer; John Maclean, newspaper-proprietor, Nowra; O. J. Beckett, fruitgrower, Falls Creek; George Underwood Alley, farmer, Sassafras; Jacob Ellmoss, fisherman, Sussex Inlet; James Thomas Jones, cattle dealer, of Nowra.

The Sectional Committee adjourned at 6.15 p.m.

FRIDAY, 22 *JANUARY*, 1897.

The Sectional Committee met at 8 a.m., at the Prince of Wales Hotel.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq. Chairman.

The Hon. Charles James Roberts, C.M.G.	John Lionel Fegan, Esq.
The Hon. Daniel O'Connor.	Thomas Henry Hassall, Esq.
Henry Clarke, Esq.	George Black, Esq.
Charles Alfred Lee, Esq.	Francis Augustus Wright, Esq.

Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The Sectional Committee afterwards proceeded to Jervis Bay on a tour of inspection, to ascertain the possibilities regarding the future developments of the shipping trade, and the provision of harbour accommodation in that locality.

The Sectional Committee returned to Nowra at 7 p.m.

SATURDAY, 23 *JANUARY*, 1897.

The Sectional Committee met at the Council Chambers, Nowra, at 10 a.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq. Chairman.

The Hon. Charles James Roberts, C.M.G.	John Lionel Fegan, Esq.
The Hon. Daniel O'Connor.	Thomas Henry Hassall, Esq.
Henry Clarke, Esq.	George Black, Esq.
Charles Alfred Lee, Esq.	Frank Farnell, Esq.

The minutes of the previous meeting were read, and confirmed.

The Sectional Committee further considered the proposed Construction of a Deepwater Harbour at Port Kembla.

The following witnesses were sworn, and examined:—Messrs. Christopher Graham, Mayor of Nowra; Philip Henry Morton, M.P.; T. R. Peake, secretary of the Nowra Railway Extension League; John Maclean, newspaper-proprietor; James Thomas Jones, cattle-dealer, Nowra; Thomas Charles Kennedy, newspaper-proprietor.

The Sectional Committee adjourned at 12·30 p.m.

MONDAY,

MONDAY, 25 *JANUARY*, 1897.

The Sectional Committee met at the Prince of Wales Hotel, Nowra, at 7 a.m.

MEMBERS PRESENT:—

Thomas Thomson Ewing, Esq. Chairman.

The Hon. Charles James Roberts, C.M.G.	John Lionel Fegan, Esq.
The Hon. Daniel O'Connor.	Thomas Henry Hassall, Esq.

Frank Farnell, Esq.

The Sectional Committee proceeded with the consideration of their Report upon the proposed Construction of a Deepwater Harbour at Port Kembla. The Report was adopted. The Sectional Committee left Nowra at 7 a.m., and arrived in Sydney at 11·40 a.m.

Sydney: William Applegate Gullick, Government Printer.—1897.

1897.

LEGISLATIVE ASSEMBLY.

NEW SOUTH WALES.

PROGRESS REPORT FROM THE SELECT COMMITTEE

ON

CONSTRUCTION OF THE TELEPHONE TUNNELS;

TOGETHER WITH THE

PROCEEDINGS OF THE COMMITTEE,

MINUTES OF EVIDENCE,

AND

APPENDIX.

Printed under No. 26 *Report from Printing Committee,* 9 *December,* 1897.

SYDNEY: WILLIAM APPLEGATE GULLICK, GOVERNMENT PRINTER.

1898.

[10*s.*] 198—*a*

1897.

EXTRACTS FROM THE VOTES AND PROCEEDINGS OF THE LEGISLATIVE ASSEMBLY.

VOTES No. 28. WEDNESDAY, 30 JUNE, 1897.

13. CONSTRUCTION OF THE TELEPHONE TUNNELS:—Mr. Lyne moved, pursuant to Notice,—
(1.) That a Select Committee be appointed to inquire into and report upon all matters connected with the construction of the Telephone Tunnels in the City of Sydney.
(2.) That such Committee consist of Mr. Cook, Mr. Bavister, Mr. McGowen, Mr. Robert Jones, Mr. Cann, Mr. Harris, Mr. Nelson, Mr. F. Clarke, Mr. Hayes, and the Mover.
Debate ensued.
Question put and passed.

VOTES No. 33. TUESDAY, 13 JULY, 1897.

3. CONSTRUCTION OF THE TELEPHONE TUNNELS:—Mr. Lyne (*by consent*) moved, without Notice, That the Select Committee now sitting on "Construction of the Telephone Tunnels" have leave to make visits of inspection in connection with the inquiry.
Question put and passed.

VOTES No. 37. WEDNESDAY, 21 JULY, 1897.

3. CONSTRUCTION OF THE TELEPHONE TUNNELS:—Mr. Lyne presented a Petition from Arthur Latimer McCredie, of Sydney, Architect and Consulting Engineer, stating that a Select Committee had been appointed by the House to inquire into and report upon the construction of the Telephone Tunnels; and praying to be represented by counsel or attorney, or in person, before the said Committee, with the right to call witnesses, and to examine and cross-examine all witnesses that may give evidence.
Petition received.
Ordered to be referred to the Select Committee.

VOTES No. 41. THURSDAY, 29 JULY, 1897.

3. CONSTRUCTION OF THE TELEPHONE TUNNELS:—Mr. Lyne presented a Petition from George McCredie, of Sydney, Consulting Engineer and Architect, stating that a Select Committee had been appointed by the House to inquire into and report upon the construction of the Telephone Tunnels; and praying that he may be represented by counsel or attorney, or in person, before the said Committee, with the right to call witnesses, and to examine and cross-examine all witnesses that may give evidence.
Petition received.
Ordered to be referred to the Select Committee.

VOTES No. 80. WEDNESDAY, 8 DECEMBER, 1897.

17. CONSTRUCTION OF THE TELEPHONE TUNNELS:—Mr. Lyne, as Chairman, brought up a Progress Report from, and laid upon the Table the Minutes of Proceedings of, and Evidence taken before, the Select Committee for whose consideration and report this subject was referred on 30th June, 1897; together with Appendix.
Referred by Sessional Order to the Printing Committee.

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1897.

CONSTRUCTION OF THE TELEPHONE TUNNELS:

PROGRESS REPORT.

THE SELECT COMMITTEE of the Legislative Assembly, appointed on 30th June, 1897, "*to inquire into and report upon all matters connected with the construction of the Telephone Tunnels in the city of Sydney*," and to whom was granted on 13th July, 1897, "*leave to make visits of inspection in connection with the inquiry*," and to whom was referred on 21st July, and 29th July, 1897, Petitions from Arthur Latimer McCredie, and George McCredie, respectively, "*praying to be heard by counsel or attorney or in person before the said Committee*",— have agreed to the following Progress Report:—

Your Committee, having examined the witnesses named in the List,* have resolved, owing to the advanced period of the Session, to report the evidence to your Honorable House, and to recommend that the inquiry be resumed early next Session.

* See list, p. 10.

WILLIAM JOHN LYNE,
Chairman.

No. 2 Committee Room,
Legislative Assembly,
8th December, 1897.

PROCEEDINGS OF THE COMMITTEE.

TUESDAY, 6 *JULY*, 1897.

MEMBERS PRESENT:—

Mr. Cann,	Mr. F. Clarke,
Mr. Cook,	Mr. Harris,
Mr. Hayes,	Mr. Lyne,

Mr. McGowen.

[Adjourned till To-morrow at *Twelve* o'clock noon.]

WEDNESDAY, 7 *JULY*, 1897.

MEMBERS PRESENT:—

Mr. Cann,	Mr. F. Clarke,
Mr. Cook,	Mr. Harris,
Mr. Hayes,	Mr. Robert Jones,
Mr. Lyne,	Mr. McGowen,
Mr. Bavister,	Mr. Nelson.

Mr. Hayes moved, "That Mr. Lyne be Chairman of this Committee."
Mr. Bavister [illegible] moved—"That Mr. Cann be Chairman of this Committee."
Question proposed by Mr. Hayes—"That Mr. Lyne be Chairman of this Committee."
Committee divided.

Ayes.	Noes.
Mr. Hayes,	Mr. Bavister,
Mr. McGowen,	Mr. Cann,
Mr. F. Clarke,	Mr. Harris,
Mr. Nelson,	Mr. Robert Jones,
Mr. Lyne.	Mr. Cook.

And the numbers being equal,—
Question proposed by Mr. Hayes—"That Mr. Cann be Chairman of this Committee."
Committee divided.

Ayes.	Noes.
Mr. Bavister,	Mr. Hayes,
Mr. Harris,	Mr. McGowen,
Mr. Cook,	Mr. Lyne,
Mr. Robert Jones,	Mr. F. Clarke,
Mr. Cann.	Mr. Nelson.

The numbers again being equal, and no member making any further motion,—the Committee adjourned.

TUESDAY, 13 *JULY*, 1897.

Meeting called at the request of three members of the Committee.

MEMBERS PRESENT:—

Mr. Robert Jones,	Mr. Cann,
Mr. Hayes,	Mr. Lyne,
Mr. McGowen,	Mr. F. Clarke,
Mr. Bavister,	Mr. Harris,
Mr. Nelson,	Mr. Cook.

On motion of Mr. Hayes, Mr. Lyne called to the Chair.
The Clerk, by direction of the Chairman, read the Minutes of the previous meetings.
Resolved (*on motion of Mr. Bavister*),—That the Chairman obtain leave of the House for the Committee to make visits of inspection in connection with the inquiry.
Ordered,—That P. B. Walker, Esq., M.Inst.C.E., Chief Electrician and Engineer-in-Chief for Telegraphs, and W. M. Gordon, Esq., Acting City Surveyor, be summoned to give evidence next meeting.

[Adjourned till Thursday next at *Eleven* o'clock.]

THURSDAY, 15 *JULY*, 1897.

MEMBERS PRESENT:—

Mr. Lyne in the Chair.

Mr. Harris,	Mr. Cook,
Mr. Robert Jones,	Mr. F. Clarke,

Mr. Nelson.

Entry from Votes and Proceedings, granting leave to the Committee to make visits of inspection, *read* by the Clerk.
Philip Billingsley Walker (*Chief Electrician and Engineer-in-Chief for Telegraphs*) called in sworn, and examined.

Witness,

Witness *handed in* Minutes, &c., respecting the approval to carry out the third section of the Telephone Tunnel by Day-labour [*Appendix* A 1]; Correspondence, Minutes, &c., respecting the appointment of Mr. George Donald as Clerk of Works [*Appendix* A 2]; Recommendation by the late Mr. E. C. Cracknell to the Postmaster-General to carry out No. 1 Tunnel up Moore-street [*Appendix* A 3.]

Room cleared.

Committee deliberated.

Committee to make a visit of inspection next meeting.

[Adjourned till Tuesday next at *Ten* o'clock.

TUESDAY, 20 *JULY*, 1897.

MEMBERS PRESENT:—

Mr. Lyne in the Chair.

Mr. Hayes,	Mr. Cook,
Mr. F. Clarke,	Mr. Bavister,
Mr. McGowen,	Mr. Harris,
Mr. Nelson,	Mr. Cann,

Mr. Robert Jones.

Mr. Cann informed the Committee that Mr. A. L. McCredie, of Messrs. McCredie Brothers, had asked to be admitted to the sittings of the Committee.

Resolved (*on motion of Mr. Bavister*),—That Mr. A. L. McCredie be admitted to the sittings, after he has been sworn as a witness.

William Matheson Gordon (*Acting City Surveyor*) called in, sworn, and examined.

Witness *produced* photographs numbered 1 to 10, and plans Nos. 1, 2, and 3, in reference to subsidences in connection with the telephone tunnels.

Witness withdrew.

Committee then proceeded to inspect the excavations at corner of Pitt and Park streets, and in Pitt-street opposite Royal Arcade, and afterwards the interior of the telephone tunnels, Barrack-street, and Pitt to Hunter street sections.

Committee having returned,—

[Adjourned till To-morrow at *Eleven* o'clock.]

WEDNESDAY, 21 *JULY*, 1897.

MEMBERS PRESENT:—

Mr. Lyne in the Chair.

Mr. Hayes,	Mr. Robert Jones,
Mr. Cook,	Mr. McGowen,
Mr. Cann,	Mr. Harris,
Mr. F. Clarke,	Mr. Bavister,

Mr. Nelson.

The Chairman read a letter from Henry J. Daniels, Town Clerk, intimating that the Right Worshipful the Mayor desired that Mr. William Greenwood, of "Seacombe," Croydon, might be examined before the Committee.

Committee deliberated.

Mr. Bavister moved,—"That the Chairman write to the Minister for Works, asking him to arrange for the examination of the telephone tunnel works by an expert from the Public Service, and also for his attendance before the Committee."

Question put.

Committee divided.

Ayes.	No.
Mr. F. Clarke,	Mr. McGowen.
Mr. Bavister,	
Mr. Cook,	
Mr. Harris,	
Mr. Cann,	
Mr. Robert Jones.	

And so it was resolved in the affirmative.

Arthur Latimer McCredie (*Architect and Consulting Engineer*) called in, sworn, and examined.

Witness *handed in* plans showing the longitudinal section of the method of constructing the tunnel [*Appendix* B 1], cross section of the tunnel [*Appendix* B 2].

Witness withdrew.

[Adjourned till To-morrow at *Two* o'clock.]

THURSDAY, 22 *JULY*, 1897.

MEMBERS PRESENT:—

Mr. Lyne in the Chair.

Mr. Hayes,	Mr. Cann,
Mr. McGowen,	Mr. Bavister,
Mr. Nelson,	Mr. Cook,
Mr. Harris,	Mr. Robert Jones.

Entry from Votes and Proceedings, in reference to the Petition of Arthur Latimer McCredie, praying to be heard by counsel, or attorney, or in person before the Committee, *read* by the Clerk.

Resolved (*on motion of Mr. Harris*),—That Mr. A. L. McCredie be heard.

Mr. A. L. McCredie appeared in person on his own behalf. The

The Chairman informed the Committee that Mr. W. Briggs, a representative of the *Sydney Morning Herald*, had applied to be admitted to the sittings of the Committee, and to be allowed to publish the evidence.

It was agreed that the Chairman consult with Mr. Speaker, and report to the Committee next meeting.

The Clerk was directed to inform Mr. Briggs that the matter would be decided at the meeting on Wednesday next.

Arthur Latimer McCredie recalled and further examined.

The Chairman again submitted the letter from Henry J. Daniels, Town Clerk, intimating that the Right Worshipful the Mayor desired that Mr. William Greenwood be summoned to give evidence.

Ordered,—That a reply be sent to the effect that an opportunity will be afforded Mr. Greenwood to give evidence.

Ordered further,—That the Right Worshipful the Mayor be summoned to give evidence next meeting.

The Chairman then retired, and Mr. Cann was called to the Chair *pro tem.*

Examination of witness continued.

[Adjourned till Wednesday next at *Eleven* o'clock.]

WEDNESDAY, 28 *JULY*, 1897.

MEMBERS PRESENT:—

Mr. Lyne in the Chair.

Mr. Cann,	Mr. Harris,
Mr. F. Clarke,	Mr. McGowen,
Mr. Cook,	Mr. Robert Jones,

Mr. Bavister.

The Chairman informed the Committee that since last meeting he had consulted Mr. Speaker in reference to the admission of the Press to the sittings of the Committee. That Mr. Speaker had referred to a paragraph in May, 10th Edition, page 386, and intimated that he had come to the conclusion that the rule which prohibited the publication of evidence, &c., prior to the presentation of the Committee's Report to the House, was not strictly enforced.

The matter was ordered to stand over till a later hour of the sitting.

The Chairman read a letter from Henry J. Daniels, Town Clerk, intimating that the Right Worshipful the Mayor desired that Mr. George Chamier, M.I.C.E., might be examined before the Committee.

Present:—A. L. McCredie, Esq.

Joseph Davis (*Engineer for Sewerage Construction*) called in, and sworn, and examined.

Witness withdrew.

The Chairman having again referred to the matter of the admission of the Press,—

Mr. F. Clarke moved,—"That the Press be admitted to the proceedings of this Committee."

Mr. Bavister moved to leave out all the words after the word "That" with a view to the insertion of the words "the interests of the public will be best served, and the freedom of the Committee to make "this inquiry most complete and useful by not admitting the Press to its meetings, therefore the Press be "not admitted to its meetings."

Question put,—That the words proposed to be left out stand part of the question.

Committee divided.

Aye.	Noes.
Mr. F. Clarke.	Mr. McGowen, Mr. Bavister, Mr. Harris, Mr. Robert Jones.

And so it passed in the negative.

Question,—That the words proposed to be inserted in place of the words left out be so inserted,—put and passed.

The Clerk was directed to inform the members of the Press that the Committee had decided not to admit them to its sittings.

Isaac Ellis Ives (*Mayor of Sydney*) called in, sworn, and examined.

Witness withdrew.

[Adjourned till Wednesday next at *Eleven* o'clock.]

WEDNESDAY, 4 *AUGUST*, 1897.

MEMBERS PRESENT:—

Mr. Lyne in the Chair.

Mr. Cann,	Mr. Bavister,
Mr. Robert Jones,	Mr. Harris,
Mr. Cook,	Mr. Nelson,

Mr. McGowen.

Present:—Arthur Latimer McCredie, Esq.

Isaac Ellis Ives recalled and further examined.

Witness withdrew.

George Chamier, M.I.C.E., called in, sworn, and examined.

The Chairman having taken exception to the method of examining Mr. Chamier, the witness, an altercation ensued, in consequence of which the Chairman adjourned the meeting without resolution.

WEDNESDAY,

WEDNESDAY, 11 *AUGUST*, 1897.

MEMBERS PRESENT:—

Mr. Lyne in the Chair.

Mr. Hayes,	Mr. F. Clarke,
Mr. Bavister,	Mr. Cook,
Mr. Harris,	Mr. Robert Jones,
Mr. Cann,	Mr. Nelson.

Entry from Votes and Proceedings, in reference to the Petition of George McCredie, praying to be heard by counsel, or attorney, or in person before the Committee, *read* by the Clerk.

Resolved (*on motion of Mr. Harris*),—That Mr. George McCredie be heard.

Mr. Bavister having referred to the manner in which the previous sitting terminated,—the Clerk, by direction of the Chairman, read that portion of the Minutes as follows:—"Adjourned till Wednesday next at *Eleven* o'clock," and was directed to amend the Minutes by substituting the words "The Chairman having taken exception to the method of examining Mr. Chamier, the witness, an altercation ensued, in consequence of which the Chairman adjourned the meeting without resolution."

The Chairman read the following letter:—

Mr. Lyne, Chairman, Telephone Tunnels Select Committee,—

Sir, 10 August, 1897.

Feeling that some doubt existed as to authority to terminate the sitting of a Select Committee, notwithstanding your statement that you had looked up the authorities on the subject and your assurance to the Committee that you possessed that power, I thought it necessary to ask Mr. Speaker for his opinion on the point, and herewith submit copy of my letter to Mr. Speaker and his reply to it, so that the Committee may have that information.

I am, yours truly,
THOMAS BAVISTER.

The Chairman stated that it was a mistake to say that "he had looked up the authorities on the subject, &c."; what he said was that "he was satisfied he had the authority."

Mr. Bavister read a copy of a letter which he had addressed to Mr. Speaker, together with the reply thereto, as follows:—

To the Hon. Sir J. P. Abbott, Speaker, Legislative Assembly,—

Sir, 5 August, 1897.

I should esteem it a favour if you would kindly inform me whether a Chairman of a Select Committee is guided or governed in his procedure by the rules applying to the Speaker in the House or the Chairman in Committee of the Whole, or whether he has more extended powers than either of these officers of the House. In order to enable you to give a definite answer, and to meet the necessity for asking this question, will you kindly state whether the Chairman of a Select Committee has power or authority to adjourn a meeting of such Committee under other than the following circumstances:—

1. By resolution of the Committee.
2. Absence of quorum.
3. Expiration of the time during which, under the rules of the House, such Committee is permitted to sit.

An answer (in writing preferred) to the foregoing will greatly oblige, Yours truly,
THOS. BAVISTER.

Dear Sir, The Speaker's Room, Legislative Assembly, Sydney, 5 August, 1897.

In reply to your letter of this date, requesting information as to the powers which should properly be exercised by the Chairman of a Select Committee of this House, I willingly state my opinion, answering your questions in the order given by you.

1. The sitting of a Committee should not be terminated without motion for adjournment being put and agreed to, or generally assented to without that formality.
2. After the lapse of a quarter of an hour, in the absence of a quorum, the meeting called should lapse. Absence of a quorum during a sitting should, of course, suspend proceedings, or close the meeting promptly. Next meeting to be convened as provided for in Standing Order No. 355.
3. Even in the case of the expiration of the time of sitting, through the meeting of the House, an adjournment should be decided upon by the Committee itself.

Under no other circumstances should a Committee then sitting be adjourned, and the power of adjourning it certainly does not rest with the Chairman thereof.

Yours truly,
J. P. ABBOTT,
Speaker.

Thomas Bavister, Esq., M.P., &c., &c., &c.

Parties called in.

Present:—Messrs. A. L. and G. McCredie.

George Chamier recalled and further examined.

Witness withdrew.

Henry Browne (*Superintendent of Footways, Street Cleansing, and Foreman of Masons, City Council*) called in, sworn, and examined.

Witness withdrew.

John Moore Smail, M.I.C.E. (*Chief Engineer to the Board of Water Supply and Sewerage*), called in, sworn, and examined.

Witness withdrew.

William Greenwood (*Civil Engineer*) called in, sworn, and examined.

Witness withdrew.

[Adjourned till Wednesday next at *Eleven* o'clock.]

WEDNESDAY, 18 *AUGUST*, 1897.

MEMBERS PRESENT:—

Mr. Lyne in the Chair.

Mr. McGowen,	Mr. Robert Jones,
Mr. Cook,	Mr. Bavister,
Mr. Harris,	Mr. Cann.

Present:—Messrs. A. L. and G. McCredie.

Mr. George McCredie applied for a copy of the evidence.

The Clerk was directed to supply the evidence as requested.

William

William Greenwood, recalled and further examined.
Witness withdrew.
Henry Browne recalled and further examined.
Witness *handed in* plan showing approximately the sections and areas of footways disturbed in connection with the removal of timber and the filling over the tunnel extending from Bathurst-street to Market-street. [*Appendix* C.]
Witness withdrew.
[Adjourned till Wednesday next at *Eleven* o'clock.]

WEDNESDAY, 25 *AUGUST*, 1897.

MEMBERS PRESENT:—

Mr. Lyne in the Chair.

Mr. Robert Jones,	Mr. Harris,
Mr. Cook,	Mr. F. Clarke,
Mr. McGowen,	Mr. Nelson,

Mr. Bavister.

Present:—Messrs. A. L. and G. McCredie.
Henry Browne recalled and further examined.
Witness withdrew.
Joseph Alexander Kethel (*Architect*) called in, sworn, and examined.
Witness withdrew.
Reassembling of the Committee to be arranged by the Chairman.
[Adjourned.]

WEDNESDAY, 13 *OCTOBER*, 1897.

MEMBERS PRESENT:—

Mr. Lyne in the Chair.

Mr. Bavister,	Mr. Cook,
Mr. Hayes,	Mr. Robert Jones,
Mr. F. Clarke,	Mr. Nelson,

Mr. McGowen.

Present:—Messrs. A. L. and G. McCredie.
Joseph Alexander Kethel recalled and further examined.
Witness withdrew.
John Haydon Cardew (*Civil Engineer*) called in, sworn, and examined.
Witness *handed in* plan showing the mode of excavation [*Appendix* D1], plan of an improved form of tunnel [*Appendix* D2].
Witness withdrew.
The Chairman intimated that Mr. Cardew had asked for expenses for attending as a witness.
Resolved (on motion of Mr. Bavister), That the question of witnesses' expenses stand over until the Committee has completed the taking of evidence.
[Adjourned till Wednesday next at *Eleven* o'clock.]

WEDNESDAY, 20 *OCTOBER*, 1897.

MEMBERS PRESENT:—

Mr. Lyne in the Chair.

Mr. Bavister,	Mr. Cook,
Mr. Harris,	Mr. Cann.

Present:—Messrs. A. L. and G. McCredie.
William Greenwood recalled and further examined.
Witness withdrew.
[Adjourned till 2·30 o'clock p m. This Day.]
The Chairman not being present on the reassembling of the Committee,—Mr. Cann called to the chair *pro tem.*
George McCredie (*Architect and Consulting Engineer*) sworn and examined.
[Adjourned till Wednesday next at *Eleven* o'clock.]

WEDNESDAY, 27 *OCTOBER*, 1897.

MEMBERS PRESENT:—

Mr. Lyne in the Chair.

Mr. Bavister,	Mr. Cook,
Mr. Robert Jones,	Mr. Cann,

Mr. McGowen.

Present:—Messrs. A. L. and G. McCredie.
George McCredie recalled and further examined.
George Donald made affirmation, and examined.
Witness withdrew.
[Adjourned till Wednesday next at *Eleven* o'clock.]

WEDNESDAY,

WEDNESDAY, 3 *NOVEMBER*, 1897.

MEMBERS PRESENT:—

Mr. Lyne in the Chair.

Mr. Cook,	Mr. Robert Jones,
Mr. Cann,	Mr. Harris.

Present:—Messrs. A. L. and G. McCredie.
George Donald recalled and further examined.
Witness withdrew.
Cornelius Toohey called in, sworn, and examined.
Witness withdrew.

[Adjourned till Wednesday next at *Eleven* o'clock.]

WEDNESDAY, 10 *NOVEMBER*, 1897.

MEMBERS PRESENT:—

Mr. Lyne in the Chair.

Mr. Cook,	Mr. Robert Jones,
Mr. Cann,	Mr. Harris.

Present:—Messrs. A. L. and G. McCredie.
William Mainer (*Architect*) called in, sworn, and examined.
Witness withdrew.
Turner Wadsworth called in, sworn, and examined.
Witness withdrew.
The Chairman read a memorandum which had been addressed to P. B. Walker, Esq., Engineer-in-Chief for Telegraphs, by Mr. G. Donald, in reference to a subsidence which had taken place in Castlereagh-street, opposite No. 4.

[Adjourned till Wednesday next at *Eleven* o'clock.]

WEDNESDAY, 17 *NOVEMBER*, 1897.

MEMBERS PRESENT:—

Mr. Lyne in the Chair.

Mr. Bavister,	Mr. Harris,
Mr. Cook,	Mr. Robert Jones.

Present:—Messrs. A. L. and G. McCredie.
John Charles Waine (*An Alderman of the City of Sydney*) called in, sworn, and examined.
Witness withdrew.
David Davis (*A member of the Metropolitan Water Supply and Sewerage Board*) called in, sworn, and examined.
Witness withdrew.

[Adjourned till Wednesday next at *Eleven* o'clock.]

WEDNESDAY, 24 *NOVEMBER*, 1897.

MEMBERS PRESENT:—

Mr. Lyne in the Chair.

Mr. Cann,	Mr. Bavister,
Mr. Cook,	Mr. McGowen.

Present:—Messrs. A. L. and G. McCredie.
Charles Rhodes (*Chief Inspector, Metropolitan Water Supply and Sewerage Board*) called in, sworn, and examined.
Witness withdrew.
William Matheson Gordon recalled and further examined.
Witness withdrew.
William Mainer recalled and further examined.
Witness withdrew.
John Francis Hennessy (*Architect*) called in, sworn, and examined.
Witness withdrew.

[Adjourned till To-morrow at *Eleven* o'clock.]

THURSDAY, 25 *NOVEMBER*, 1897.

MEMBERS PRESENT:—

Mr. Lyne in the Chair.

Mr. McGowen,	Mr. Bavister,
Mr. Cook,	Mr. Harris,
	Mr. Cann.

Present:—A. L. McCredie, Esq.
John Francis Hennessy recalled and further examined.
Witness withdrew.
Edward Reid called in, sworn, and examined.
Witness withdrew.
George Bancroft called in, sworn, and examined.
Witness withdrew.

[Adjourned till Wednesday next at *Eleven* o'clock.]

WEDNESDAY,

WEDNESDAY 1 *DECEMBER*, 1897.

MEMBERS PRESENT:—

Mr. Cook,	Mr. Harris,
Mr. Hayes.	Mr. Bavister.

In the absence of the Chairman, Mr. Harris called to the Chair *pro tem.*

Present:—Messrs. A. L. and G. McCredie.

Edmund Lonsdale (*A Member of the Legislative Assembly*) called in, sworn, and examined.

Witness withdrew.

George McCredie recalled and further examined.

David Davis recalled and further examined.

Witness withdrew.

[Adjourned till Wednesday next at *Eleven* o'clock.]

WEDNESDAY 8 *DECEMBER*, 1897.

MEMBERS PRESENT:—

Mr. Lyne in the Chair.

Mr. McGowen,	Mr. Bavister,
Mr. Cook,	Mr. Harris,
Mr. Cann,	Mr. Robert Jones.

The Clerk submitted claim from J. H. Cardew for £5 5s. witness expenses.

Resolved (*on motion of Mr. Bavister*),—"That this Committee grant £1 1s. to Mr. Cardew for the giving of evidence on information he had been employed to obtain."

The following were ordered to be appended:—

Photographs Nos. 1 to 10, and Plans Nos. 1, 2, and 3, produced by W. M. Gordon, Acting City Surveyor, on 20th July, 1897. [*Appendix* E.]

Plan showing the position of pipes, &c., above the telephone tunnel at Park-street crossing. [*Appendix* F.]

The Chairman submitted Draft Progress Report.

Mr. McGowen moved—"That the Progress Report as submitted by the Chairman be the Progress Report of this Committee."

Question put.

Committee divided.

Ayes.	No.
Mr. Cann,	Mr. Cook.
Mr. Harris,	
Mr. Robert Jones,	
Mr. McGowen,	
Mr. Bavister.	

And so it was resolved in the affirmative.

Chairman to report to the House.

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1897.

LEGISLATIVE ASSEMBLY.

NEW SOUTH WALES.

MINUTES OF EVIDENCE

TAKEN BEFORE

THE SELECT COMMITTEE

ON THE

CONSTRUCTION OF TELEPHONE TUNNELS.

THURSDAY, 15 *JULY*, 1897.

Present:—

MR. F. CLARKE, MR. COOK, MR. HARRIS, MR. ROBERT JONES, MR. NELSON.

W. J. LYNE ESQ., IN THE CHAIR.

Philip Billingsley Walker, sworn, and examined:—

1. *Chairman.*] What is your position? Chief Electrician and Engineer-in-chief for Telegraphs; I am also a Member of the Institute of Civil Engineers, England. P. B. Walke 15 July, 1897.

2. You know everything connected with the construction of what are known as the telephone tunnels? Yes. Perhaps I had better give you the history of it. In the early part of 1887 a small section was constructed across from the basement of the General Post Office to the corner near David Jones & Co.'s establishment. This was done on the recommendation of the late Superintendent of Telegraphs, Mr. E. C. Cracknell. The architects for the work were Messrs. Humphreys & Cracknell, and the contractor's name was Thomas Hanly. This section was 66 feet long, and cost £190. What may be called the first tunnel went from the basement of the General Post Office to the corner of Moore-street, and from the corner of Moore-street, in Pitt-street, to the corner of Castlereagh-street.

3. What year was that in? In the year 1892. It was recommended by the late Mr. Cracknell, and was approved of by Mr. Kidd, who was then Postmaster-General, on the 29th February, 1892. This was brought about in consequence of the late Mr. Cracknell stating that the wires were likely to be interfered with by the Fire Brigade, and it was necessary to remove the wires from the streets, as the number of wires being put up were increasing so rapidly that it was advisable to do that. This work was commenced in March, 1892, and was finished in December 1892. It cost £3,330. The late Mr. Cracknell made a very strong recommendation that the work should be placed under Messrs. McCredie Bros. Mr. Ashdown was appointed Clerk of Works at £4 per week, and the contract was carried out by Messrs. Grocock and Chambers.

4. What length was that? 757 feet 6 inches. No. 2 tunnel was from the corner of Moore-street, at the intersection of Pitt-street, down to the Exchange, in Bridge-street—1,478 feet 3 inches long. It originated in a letter from Messrs. McCredie Bros., dated 21st October, 1892, to the late Superintendent of Telegraphs, Mr. Cracknell. In this letter Messrs. McCredie Bros. pointed out the comparative inutility of the Moore-street tunnel without further extensions, and suggested that further tunnels be constructed in Pitt-street to the Exchange, Bridge-street. On the 16th November, 1892, the late Mr. Cracknell submitted a recommendation to the Postmaster-General, Mr. Kidd, that this extension be carried out under the supervision of Messrs. McCredie Bros, and on the same terms as the previous tunnel. The late Mr. Cracknell estimated it to cost £6,000. The Postmaster-General, Mr. Kidd, inquired if it would not be better for the work to be carried out under the supervision of the Government Architect; but after some discussion he waived that, and approved of the work being continued under Messrs. McCredie Bros., as formerly.

5. *Mr. Cook.*] Do you know the date of that approval? 29th November, 1892.

6. *Chairman.*] Was the work carried out under Messrs. McCredie Bros. at that time? No; it was held over in consequence of Mr. Cracknell's illness and his subsequent death. 7.

P. B. Walker. 15 July, 1897.

7. When did Mr. Cracknell die? About the 14th January, 1893. The matter was held over till the 28th January, 1895.

8. Do you know why it was held over for that length of time? Tenders were called for the work by order of Mr. Kidd, but before he acted on the tenders Mr. Cook came into office. Subsequent to that a discussion took place as to whether conduits or tunnels should be used, and eventually it was decided in favour of tunnels.

9. Was not the matter before the Public Works Committee? No. It was ultimately approved of on 28th January, 1895, by Mr. Cook, who decided, after mature consideration, that the balance of testimony was on the side of the proposal to construct a subway to the Exchange, and he, therefore, authorised the calling for tenders for the same. Fresh tenders were invited, and Mr. Charles Grocock agreed to carry out the work for £4,444.

10. That is, of course, as you have described, from Moore-street down to the Exchange in Bridge-street? Yes. The third tunnel was from the intersection of Moore street—as shown by the red line on the rough tracing—to York-street and up to Clarence-street. Tenders were invited for this portion of the work, but the advertisement was subsequently withdrawn, and directions were given by the Postmaster-General, Mr. Cook, for this work to be done by day labour.

11. Have you any record as to why the advertisement was withdrawn? Yes. The following is Mr. Cook's minute:—

> After an interview with the Secretary for Telegraphs and Mr. McCredie, I have decided that the proposed section of tunnel across Martin-place shall be carried out directly by the Department by day-labour, and I shall be glad if the matter can be put in hand without delay.
>
> Let tenders for this work be at once withdrawn.
>
> J. COOK, 5/9/95.

The work was carried out under the day-labour system, and Messrs. McCredie Brothers were appointed to take charge of the work, with Mr. Donald as managing clerk of works, and it has been continued under this system ever since. That is a short history of the whole matter.

12. A good deal has been said about Mr. Donald;—how was Mr. Donald appointed? He was appointed on the recommendation of Messrs. McCredie Brothers in the first instance, approved of by Mr. Cook.

13. Have you the papers on that? Yes. There was a recommendation from Messrs. McCredie Brothers forwarded to me. I sent it on to the Minister with a recommendation that Mr. Donald should be appointed at £4 per week. I produce the papers as an appendix to my evidence. The first [*vide Appendix* A 1] is an approval of the carrying out of the work by day-labour, the record number being B. 2–2,067; 5th September, 1895. The second [*vide Appendix* A 2] is Mr. Donald's appointment as clerk of works, the record number being B. 2–2,187, 18th September, 1895. The length of the tunnel from Moore-street to York-street and Clarence-street is 1,530 feet, and the cost, £3,413 5s. 8d. That was constructed by day-labour. The next tunnel was No. 4 tunnel, going from the General Post Office to Park-street, and from Park-street to Goulburn-street, and from Goulburn-street to the Redfern railway station; its length is 6,977 feet, and its cost, £17,974 3s. The next tunnel was from the corner of Castlereagh-street up King-street to near St. James' Church; length, 1,128 feet; cost, £2,804. The last tunnel was in Clarence-street, Kent-street, and Liverpool-street; length, 3,926 feet 9 inches; cost, £9,456 15s.

14. Were all these last-mentioned tunnels carried out by day-labour? All those last named were carried out by day-labour—from No. 3 to No. 6. The blue line on the tracing indicates the contract work, and the red line indicates the day-labour work.

15. Were they carried out continuously? Yes.

16. So that the appointments for inspection and superintendence went on continuously from one to the other? Yes.

17. Did Messrs. McCredie Bros. prepare designs for them all? Yes.

18. What were they paid? Five per cent. on the cost of construction.

19. Do you know the total amount of that percentage? £1,350.

20. When were those works completed? They are still going on. They have never been handed over yet.

21. If the work is not completed, have Messrs. McCredie Bros. been paid in full? No; they have not been paid in full.

22. You mentioned the sum they have already been paid? Yes; what they have been paid on account.

23. Have you any idea what balance there is? No; I could not say without referring to the Accountant; but I think the amount is approximately £300 or £400.

24. Do you know anything further than you have stated in reference to the appointment of Mr. Donald? No.

25. You have put in a paper showing that this appointment was made on the recommendation of Messrs. McCredie Bros.? Yes.

26. That is all you know about it? Yes.

27. Do you know what Mr. Donald's qualifications are? I believe he is a very good builder.

28. But do you know of your own knowledge? I know him to be a builder, and a very good builder, and I have always found him a very good officer—a most industrious, hard-working man.

29. In reference to sections 1 and 2, those were done by contract labour, were they not? Yes.

30. Are the figures you have given the actual cost? That is the actual cost of the tunnel.

31. The payment to the contractor? Yes.

32. Do you know of your own knowledge whether the specification for the tunnel is the same in the contract work as in the day-labour work? The specification is the same in both cases. They are built under the same class of specification. There may be a slight variation, but the same style of brickwork and everything else is carried out.

33. But I am speaking of the actual specification;—Messrs. Cracknell and Humphreys prepared the specification from the first (the short) section? Yes.

34. And then the specification for No. 1 tunnel was prepared by Messrs. McCredie Bros.? Yes.

35. Do you know what comparison there is between the short section for which the specification was prepared by Messrs. Cracknell and Humphreys, and those tunnels carried out under the supervision of Messrs. McCredie Bros.? I have not examined the short section referred to. I do not think it would be a fair comparison, because it is only a small piece.

36. Still, the design ought to be good, at all events? It is only a hole—a small conduit.

37.

37. You think there is no comparison? No comparison whatever. It was not a tunnel, but only a brick conduit across the street. P. B. Walker. 15 July, 1897.

38. Have you the papers to which you referred in reference to Messrs. McCredie's first appointment? I produce Mr. Cracknell's minute, recommending the appointment of Messrs. McCredie.

39. *Mr. Cook.*] As a matter of fact, the whole work was commenced at the instance of the City Council? Yes; the Town Clerk originated the work.

40. They requested that the wires should be placed underground? Yes.

41. *Chairman.*] Will you put this paper in? Yes; it is numbered B. 3,015. It is Mr. Cracknell's recommendation to the Postmaster-General to carry out No. 1 tunnel, up Moore-street. [*Vide Appendix* A 3.]

42. Was there to your knowledge any correspondence or any suggestion in any way that the work should be done under the Public Works Department? Yes; Mr. Kidd wrote a minute. I alluded to that in my short *précis*.

43. Do you know anything further than appears on the papers in connection with the whole matter? No; nothing. I have simply dealt with it in an official manner.

44. Have you a copy of Mr. Kidd's minute? Yes; it is as follows:—

Write to the Under Secretary for Works and ask him to be good enough to obtain for me a report from the Roads Department as to the size of the tunnel for the sewerage works within the city, and whether it is being or to be arched with bricks; also as to what space there will be available after providing for the sewage requirements, in the event of this Department desiring to place wires in the tunnel. State that I have the question under consideration of carrying telegraph and other wires underground, and would like the report as early as it can be conveniently furnished, with a view of determining how far it would be practicable to make use of the tunnel for our wires.

I would also like to be supplied with full information as to the streets through which the sewage tunnel will traverse, and the length of same, so far as the works are already in hand, as well as the same information in regard to works to be carried out in future.—J.K., 26/2/92.

45. What is the reply to that? Mr. Lambton wrote a letter on that minute, and a minute was sent on from the Public Works Department approved of by Mr. Lyne, the then Minister for Works, on 12th March, 1892.

46. What is the substance of that? I will read it:—

A plan showing the positions and sizes of the sewers is forwarded herewith. There is no record of the position of manholes in the corporation sewers. In reply to the questions asked in the letter, I have to state as follows:—First, the size of the sewers is shown on the plan. Sewers constructed by this branch are in red; corporation sewers in blue. Second, all the sewers have brick arches. Third, no provision whatever has been made for placing gas or water pipes, or wires, in the sewers. Sewers constructed for those purposes must have a much larger cross-section, and must be built of a different shape to those constructed here. At ordinary maximum flow, the new sewers are calculated to run three-quarters full; but in storm floods they will run full. If wires were placed in them the flow would be seriously interfered with in times of heavy rain, when it is most important that the channel should be kept clear. The almost certain result of even a partial block would be serious damage both to the wires and sewer. The ventilating arrangements would also be interfered with by the wires, as the gas checks would have to be removed, and these are absolutely necessary to prevent the distribution of foul gases in the adjoining districts. The sewers in the city being at the head of the system are generally so small that if a portion of the roof is taken up with wires, proper inspection would be nearly impossible. Corporation sewers in all cases carry storm-water, and run full bore at every flood. They are generally old, and any interference with the flow might lead to serious results.—W. Ohlfsen Bagge.

Mr. Hickson puts on that,—

Forwarded for the information of the Postmaster-General. It is very clear our sewers would not answer for carrying telegraph wires; they are too small, and our system of ventilation would be destroyed.—R.H., 8/3/92. May perhaps be forwarded to the Postmaster-General.—J.B., 9/3/92. Approved; to forward.—W.J.L., 12/3/92. Submitted.—Jas. D., 15/3/92. Seen. Bring under the notice of the Postmaster-General on his return.—T.M.S., 17/3/92. Seen and read.—J.K., 5/4/92.

47. *Mr. Cook.*] You have a minute by Mr. Cracknell, suggesting the extension to the Exchange? Yes; and Mr. Kidd minuted that recommendation as follows:—

Would it not be better that this work should be continued under the supervision of the Government Architect, and tenders invited by him in the usual way, as the Works Department is recognised as the constructing branch for the Government Service. I think, if I remember rightly, that Mr. Lyne took some exception to work being taken out of his Department so far as we have gone. However, Mr. Cracknell might give me his views on the matter; and to prevent any misunderstanding with the Works Department, I would like to have some reasons to submit to the Cabinet, if, in the public interest, good grounds are shown for retaining the construction of the work under this Department.

Here are further reasons given by Mr. Cracknell against that:—

There are many reasons why the Department should carry out the extension of these tunnels in the same manner as the Moore-street portion has been constructed.

In the first place, the erection of all telegraph lines, which some years ago was under the control of the Department of Works, has for a considerable time been dealt with by the Postmaster-General, and carried out by the Telegraph Department's own officers, and therefore, whether it be poles or subways, the whole work should be under the sole control of the Telegraph Department.

It is also a well-known fact that considerable delays occur when works are constructed under the Department of Public Works, and as the tunnels are urgently required it is quite clear—especially as the Moore-street one has been successfully built under Messrs. A. L. and G. McCredie—that the Government would not gain, on the contrary, would lose, by departing from this arrangement. There is nothing in the papers to show that the Minister for Public Works ever took exception to this Department constructing the tunnels, nor can I see what objection can be raised to any works we require being carried out independent of that Department, seeing, as already stated, the lines, &c., are erected under the supervision of this Department.

In addition to this, the engineers have been to an immense amount of trouble in collecting information from the Water and Sewerage Board and other sources respecting sewers, water and gas pipes, &c., and by taking the supervision out of their hands the whole thing would have to be commenced *de novo*. Therefore, I strongly urge, on the grounds of economy, that my recommendation of the 16th inst. be approved.

So far as the tenders are concerned, they could be called for in the usual way—to be addressed to the Secretary, General Post Office, and opened by the Tender Board, as done in the case of tenders for erection of telegraph lines, &c.

The Secretary, General Post Office.

E. C. CRACKNELL,
28/11/92.

Submitted.—S.H.L., 29/11/92. Approved.—J.K., 29/11/92. The Superintendent of Telegraphs.—S.H.L., 3/12/92. Messrs. A. L. and G. McCredie, 10/12/92.

48. That approval was given in the year 1892, was it not? Yes; 29th November, 1892.

P. B. Walker. 15 July, 1897.

49. I understand the matter was then deferred for want of funds? I really do not know what delayed it, but I know it was postponed for some time—I think in consequence of Mr. Cracknell's illness. Mr. Cracknell died in January, 1893. After his death it was put off again. I had nothing to do with the tunnels before he died.

50. You came on the scene, then, in February, 1893? I alluded to it in February, 1893, but it was held over till 2nd June, 1894, when I wrote a long minute.

51. Then I believe you submitted a more extended scheme? Yes.

52. At that time it was understood that Park-street was to be the terminus of the tunnel on one side and the Exchange on the other? It was intended to send it along Castlereagh-street in the first instance to Park-street, and to take it along Castlereagh-street through Hunter and Bligh streets to the Exchange; but we altered that, because it was better to take it along Pitt-street in consequence of the wires being more numerous in Pitt-street than in Castlereagh-street.

53. And you estimated the cost for making those sections of tunnel to the Exchange, and to Park-street, at about £17,000? Yes; £17,500.

54. And you recommended that it should be taken in hand at once, as to delay it might mean serious accidents? Yes.

55. And impediment to the traffic? Quite so.

56. And you contemplated at that time an extension to the railway station? Yes.

57. With the idea of instituting a system of pneumatic tubes when you were ready for them? Yes.

58. And you recommended that tenders should be called for carrying out this work to the Exchange and to Park-street at once? Yes.

59. Mr. Kidd's approval of that work, on 12th June, 1894, included the two tunnels—the one to Park-street, up Castlereagh-street, and the one to the Exchange, down Castlereagh-street? Yes; but that was altered afterwards.

60. You yourself wrote a minute on 27th June, 1894, in which you recommended that the work should be carried out by Messrs. McCredie Bros.? Yes.

61. At first you thought that the work should be carried out by the Government Architect? Yes.

62. But you subsequently altered your opinion and thought that Messrs. McCredie Bros. should be continued in the work of supervising these tunnels? Yes; under the same arrangement as that proposed by Mr. Cracknell.

63. And you recommended that tenders should be invited at once for that section of the subway between the General Post Office and the Exchange, and that was approved by Mr. Kidd on 27th June, 1894? Yes.

64. And then the matter appears to have been held over for some reason until the next month; and beneath that approval of Mr. Kidd's there is another minute, is there not, saying that tenders might be called for this work without delay? There is a minute of mine:—

> Prepare notice and inform Messrs. McCredie. Tenders might be called for this work without delay.

The notice was prepared on 31st July, 1894, and then you came into office, and the matter was held over.

65. *Chairman.*] I understand that your recommendation was made just before Mr. Kidd went out of office? Yes; and then the matter was postponed, for the reasons I have explained.

66. *Mr. Cook.*] Then, again, did you not submit the papers while I was away in Lithgow fighting for my re-election? I think the papers were put before Mr. Garrard, who was acting for you pending your re-election, but Mr. Garrard took no action on them, and they were simply laid aside pending your return. There is no minute on the papers showing that they were put before Mr. Garrard, but he saw them, I believe.

67. And expressed his approval to you? I forget whether he did express an opinion. There is nothing recorded showing that he expressed an opinion. He did nothing official, but I think he expressed some opinion about the matter.

68. To you? No, not to me; but I think a paragraph appeared in one of the newspapers.

69. *Chairman.*] Is that with the official papers? No. We have looked for it, but could not find it.

70. Do you know what opinion he did express, as published in the newspapers? I think that his opinion was favourable to its being done.

71. Did he refer to the question of whether it should be done by the Government Architect's Department or by you? I do not know. I believe that his opinion was favourable to the construction of the tunnel, but he did not express it to me.

72. But you do not know what he said? No; I do not recollect, but I know something was said.

73. *Mr. Cook.*] As a matter of fact, you and I have before now talked over the question of continuing the arrangement with Messrs. McCredie Bros.? Yes.

74. And you have always been strongly in favour of it? Yes.

75. Why? My reasons were that we carry out all our own works, such as the erection of telegraph-poles and telegraph-lines, under contract and by day-labour, and that putting those under the Works Department would give us a great deal of trouble and cause a great deal of delay, because the two Departments would be constantly clashing. It is necessary that the telegraph work should be carried out as quickly as possible.

76. What I understand you to mean is that the construction of these tunnels is merely incidental to your work of constructing telegraph-lines? Quite so. It is part and parcel of the same system.

77. Merely the substitution of subways for poles? Yes.

78. You have already said that Messrs. McCredie Bros. recommended Mr. Donald? Yes; I put in the letter.

79. Your minute, submitting the name of Mr. Donald, has also been put in? Yes.

80. You made every inquiry about Mr. Donald before his appointment? Yes.

81. And you were quite satisfied as to his capability? Quite satisfied.

82. What is your opinion of the McCredies? I think they are very capable men. I believe that they assisted to build the General Post Office. I think that would be a recommendation for anybody. I have always heard them very highly spoken of.

83. When the question of extending the tunnel was under consideration, you wrote a minute? Yes; a minute dated 12th August, 1895. There is a letter here from the McCredies, in which they say:—

> In reply to your telephone inquiry, we have the honor to say that the length from the end of the present tunnel in Pitt-street, opposite the General Post Office, to Park-street, is as follows:—

84. You had evidently been speaking to them about that? Yes. In a minute I say:— P. B. Walker.

As regards the question of supervision, I think it would be advisable to allow Messrs. A. L. and G. McCredie, who have supervised the construction of the first and second sections of the tunnel in a very satisfactory manner, to continue to supervise the proposed extensions, because I consider it better for us to have the direct control over this work in the same way that we are doing with our buildings, than for it to be carried out under the Government Architect's Department. My experience has been that we can get the work done much more expeditiously and economically by the former system. I might add that Messrs. McCredie have verbally informed me that they have, upon their own responsibility, prepared plans and specifications for the tunnel right through to the Haymarket, along Pitt-street, and whilst the Department is not in any way bound to this firm, still I think a decided advantage would be gained by utilising their knowledge and experience of the requirements of the work when we wish to carry out further extensions. 15 July, 1897.

85. Now turn to a minute of yours dated 17th September, 1895? Yes; it is marked "*Appendix* A 2."
86. Referring to *Appendix* A 2, I find that on 17th September, 1895, you proposed an alteration in Mr. Donald's position and pay? Yes.
87. On the grounds that he would have the responsibility of the gang upon him, as well as looking after all materials, and arranging the men's time; and you thought that he was fully entitled to £6 per week? Yes.
88. The appointment of course to be only temporary, and terminable at will? Quite so.
89. You say that Mr. Donald had given every satisfaction in regard to the work that he had already supervised? Yes.
90. And you had not the slightest doubt that he would make a good job of the work undertaken by day-labour? Yes.
91. *Chairman.*] Has any examination been made by the Department lately of the tunnels that were carried out, as referred to in your evidence? No official examination of them has been made.
92. Has any report of any kind been obtained? No official report of any kind has been obtained except a report from McCredie Brothers.
93. Lately? On the 23rd June, 1897, they sent in a report.
94. Have you got that? Yes; that is the only report we have got.
95. You say you have no report except one from McCredies, of which I suppose they have a copy, and which could be put in? Yes.
96. Have you had any report lately in reference to the tunnels that there has been so much dispute about—the tunnels that were put down in Pitt-street, and perhaps other streets—those that there has been this civil war about? This report of McCredies covers all that ground.
97. Has anyone else made a report? No. It relates to this particular part of the work specially.
98. I want to know if you have a report from anyone else? No.
99. Has anybody else been instructed or asked to make a report? I have given no instructions.
100. Has the Department? No.
101. According to what was said to me last night the Department did ask a certain firm to report on it? No, I have not asked anybody; I have not asked for any report whatever. I do not know what McCredies may be doing.
102. But you do not know anything about it. No; I have given no official instructions for anything of the kind.
103. *Mr. F. Clarke.*] In the prices that you have given us for the different works carried out by day-labour, have you in each case added cost of supervision? No, I have not. I have stated merely the cost of the tunnel proper. The cost of supervision is not included.
104. Was Mr. Donald's salary added? No; that is not added.
105. Then there would be Mr. Donald's salary and 5 per cent. for supervision to be added? Yes.
106. *Mr. Harris.*] Did not the pneumatic tubes prove a failure? We never tried them.
107. Were they not tried all along George-street? No.
108. I refer to the taking of cables along George-street, from the General Post Office to the railway station—it was thought that you could put all the wires together in a cable? Yes; frieze-work. That was Mr. Cracknell's idea.
109. And that proved a failure? Yes; and part of that frieze-work had to be taken down. That is in connection with the little tunnel across George-street.
110. *Mr. Nelson.*] You have had no supervision of this work? No. It has been entirely under the control of the Messrs. McCredie.
111. Do the Messrs. McCredie furnish you with any progress reports during the progress of the work? They send a report in to me occasionally stating how the work is getting on.
112. *Mr. Cook.*] As a matter of fact, you have had departmental supervision of the Messrs. McCredie? Simply the supervision of their certificates. When they send in a voucher weekly for the wages, that voucher is certified by McCredie and Donald, and I only pay on their certificate for the wages.
113. You have had the responsibility of paying? Yes.
114. That is to say, you have had the departmental supervision of the whole of the work, over McCredie and Donald? Yes.
115. *Mr. Nelson.*] But not the actual supervision of the work? No; I have had nothing to do with the management of that.
116. *Mr. Cook.*] You have had the responsibility of supervision? Yes; supervising the paying of Messrs. McCredie and Donald.
117. *Mr. Nelson.*] McCredie is still on the work now? Yes.
118. *Chairman.*] Have you given any instructions at any time to have any portion of the street or foot-path opened to examine the tunnel lately? No.
119. Or have you given any instructions to have it closed up? I gave instructions to McCredie to settle up the corner of Liverpool-street—that is the only place—and that was done after consultation with the Mayor, who agreed to it.
120. No other instructions? No other instructions on this point.
121. *Mr. Nelson.*] Had you the control of the men in any way? No control of the men whatever.
122. Who was in the habit of employing them? Mr. Donald.

TUESDAY,

TUESDAY, 20 *JULY*, 1897.

Present:—

Mr. BAVISTER,	Mr. HARRIS,
Mr. CANN,	Mr. HAYES,
Mr. F. CLARKE,	Mr. ROBERT JONES,
Mr. COOK,	Mr. McGOWEN,

Mr. NELSON.

W. J. LYNE, Esq. (in the Chair.)

William Matheson Gordon, sworn, and examined:—

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123. *Chairman.*] What are you? Acting City Surveyor.
124. Since when? About the 14th of last December.
125. What position did you hold previously? I was Assistant City Surveyor.
126. Are you a surveyor or a civil engineer? I am a licensed surveyor.
127. You know something in connection with the telephone tunnels? Yes.
128. Will you state to the Committee what you know in reference to them? About the beginning of last May, at the Civil Service Co-operative Society's new stores in Pitt-street, near King-street, excavations were being made which exposed the telephone tunnel on the eastern building line of Pitt-street.
129. What excavations? Excavations for the areas and foundations of the new building of the Civil Service Co-operative Society. Their areas were constructed right out under the footway.
130. *Mr. Robert Jones.*] By whom were those excavations being made? The contractors—Baxter and Boyne.
131. *Mr. Bavister.*] Do you mean the new building now being erected near King-street? Yes. Those areas projected out over the building line about 2 ft. 6 in., so they had to make the excavations out over the building line. Being down there very frequently in connection with other matters—principally in connection with the blasting—I saw the excavations being made alongside the telephone tunnel. One or two of the city Aldermen also were pretty frequently there watching the operations.
132. *Mr. Cook.*] Who were those Aldermen? As near as I can recollect, Alderman Waine was one of them.
133. Anyone else? I am not very certain as to whether Alderman Landers was or was not the other. Before I made any report to the Council in connection with the excavation, it not having gone far enough, I believe it was brought before the Council or under the notice of the Mayor by one of the Aldermen. The Mayor spoke to me about it, and after a long conversation the Mayor and I went down at 1 o'clock on the 15th May, I think, as near as I can recollect, to look at the excavation.
134. *Mr. Bavister.*] Any Aldermen? No. The Mayor remarked to me that he had better see the Postmaster-General at once in connection with the matter, and we went to the General Post Office, where a messenger informed us that the Postmaster-General was away, and he could not say when that gentleman would be back. I think that the Mayor made an appointment for 3 o'clock the same day. The Mayor, the Assistant Town Clerk (Mr. Palmer), and myself went down at 3 o'clock and met the Postmaster-General and we proceeded to view the excavations.
135. *Mr. Cann.*] Did the Mayor go at your request to the excavations? No. The matter was reported to the Mayor and he sent for me, and we had a conversation, and I said, "The best way is to have a look at it for yourself."
136. *Mr. McGowen.*] Did the Mayor go and verify the statement of the Alderman before he saw the Postmaster-General? Yes; we were there about ten minutes past 1 o'clock, and then went to see the Postmaster-General.
137. *Chairman.*] Will you proceed with your statement? There were six of us altogether then at the inspection, and one of the contractors for the Civil Service Co-operative Society's new building—I think, Mr. Boyne—was standing by. The six were:—The Postmaster-General, Mr. Donald, Mr. McCredie, the Mayor, the Assistant Town Clerk, and myself—not the Mr. McCredie I see now in connection with the works, I think, but his brother. A long conversation took place there. I think they were about three-quarters of an hour altogether down and alongside the tunnel, and inspecting everything.
138. You produce some photographs? Yes; they are marked 1, 2, 3, and 4. No. 1 is as follows:—Standing in the excavation, with the building looking westerly, between Hagon's and the centre door of the Civil Service Co-operative Society's new building, giving a view of the tunnel and the earth above it, showing struts now carrying timber. No. 2 is a north-westerly view, in which are seen the footings of Hagon's building, and the packing down the side of the tunnel, and supports now carrying timber. No. 3 is a south-westerly aspect of the northern side of the excavation. No. 4 is a westerly view from the southern side of the building.
139. Are those all the photographs you have? Yes; of that particular part.
140. *Mr. Bavister.*] By whom were they taken? A man named Hall, of Hunter-street.
141. *Mr. McGowen.*] At the request, I suppose, of the Mayor? Yes; I was requested by the Mayor to get them.
142. *Chairman.*] What defects, if any, are shown in photograph No. 1? When I went down into the side of this tunnel, the packing on the top of the tunnel was very loose. I could poke the long handle of a shovel or a pickhandle through it anywhere. I did that in the presence of the five gentlemen there. In photograph No. 1 the timber over the tunnel is shown by line marked AA. The earth above it is shown between lines AA and BB. The defective packing is over the crown of the tunnel under line AA.
143. How long had the excavation been in existence when this photograph was taken? A fortnight or three weeks, or perhaps more.
144. What defective work do you mean? Between the boards on the top of the tunnel there would be a space of, I suppose, about 6 inches or more, which was packed in with stone, through which you could put the long handle of a shovel or a pick-axe with the greatest ease, between the centre of the building and Hagon's corner—that is over the crown of the tunnel. I am not now dealing with the sides of the tunnel.
145. *Mr. Cann.*] What was the size of the stone? It was rubble—6, 7, 8, or 9-inch stuff.
146. What was the size of the handle of the shovel you used? The shovel was an ordinary long-handled shovel. I drove a pick-handle in under the timber.

147.

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147. *Mr. Cook.*] Did you do that when I was there? Yes.
148. *Chairman.*] Will you describe No. 2? The packing down the side of the tunnel was not very good—the packing between C and C in photograph No. 2.
149. Which side of the tunnel? The immediate south-west corner of Hagon's building, The packing between the side of the tunnel and the footings of Hagon's building (between C and C), was also very soft.
150. Is that packing outside the tunnel and down the sides of the tunnel? Yes.
151. Is it large stones or rubble? It was very fine muck and clay principally.
152. And you consider that it was not properly packed? Yes.
153. Have you anything further to say about that photograph as to the packing? Nothing further.
154. What does photograph No. 3 show? No. 2 is a straight-on view, but No. 3 is a more south-westerly view of the eastern side of the tunnel; it is looking on the side of the tunnel more in a south-westerly direction than the other.
155. And this photograph, I understand you to say, also shows defective packing? Yes; over the crown of the tunnel, under timber marked DD.
156. Is that timber above the tunnel? Yes; over the tunnel.
157. Does that photograph show the edge of the timber over the tunnel? It shows the side of the timber. The timber goes lengthways along the footpath, and that is all that is holding the timber up now.
158. That photograph is looking at the side of the tunnel? Yes.
159. What are these uprights? That is a bearer across the top of the tunnel, about 9 x 3. The struts that generally support this are all 9 x 3. The packing was taken out and these put there temporarily.
160. You say that the uprights were temporary, and were not the permanent uprights to support the timber? No; that was not the upright put in by the Telegraph Department when they were doing the work, but the uprights supporting the timber of the footway.
161. Why were they put in afterwards? Because, when they were building this area between the building-line and the tunnel, 2 ft. 6 in. out from the building-line, they had to put out the support that carried the 9 x 3 Electric Telegraph Department bearer to the wood for the tunnel.
162. And also had to put in a strut between that bearer and the footway to support it while doing the work? Yes.
163. Who put this in? The contractor, no doubt.
164. But do you know? No; I do not know.
165. There was someone excavating these foundations? Yes; the contractor.
166. And you presume he put that in? Yes.
167. Who were the contractors? Baxter and Boyne.
168. Now as to photograph No. 4? The timbering of the tunnel is shown at point E. The brickwork of the area is shown at point F. The points I have just described show the timber of the area as the building is in course of construction.
169. Have you yourself seen any defective work other than you have described? Yes.
170. Where? In Pitt-street.
171. Whereabout? From Goulburn-street northward.
172. What class of defective work? Want of packing over the tunnel.
173. Do you produce another photograph? Yes; No. 5.
174. Taken at what particular point? 372, Pitt-street.
175. Does that photograph disclose the top woodwork of the tunnel? Yes; the woodwork over the tunnel.
176. Showing the bearer of the cross-pieces? Yes; the bearer of the timber.
177. Can you mark any point where there is defective packing? At point G there is defective work.
178. Is that defective in the same way as you have already described? No; there was no packing at all there.
179. There was a space? Yes; a vacant space, running from 6½ inches to 1 foot 3 inches.
180. You produce photograph No. 6? Yes.
181. Does that disclose the woodwork above the tunnel? Yes.
182. Does it also disclose a vacant space underneath the woodwork? Yes; at 372, Pitt-street, on No. 2 sketch, plan No. 1, at the point marked H, under the timber there is a vacant space—no packing.
183. You now produce the plan? Yes.
184. What plan is it? A plan made by myself.
185. It is a plan of what point in the tunnel? One photograph looks northerly, and one southerly; and one plan looks northerly, and one southerly. Photograph No. 6 looks northerly.
186. And what is plan No. 1? The third sketch on plan No. 1 also looks northerly.
187. In what direction is No. 1 sketch looking? No. 5 photograph is looking southerly, and sketch No. 1 on plan 1 is the measurements of that looking southerly.
188. What is the middle sketch on plan No. 1? That is a bird's-eye view of the timbering in photo. No. 5.
189. In sketch No. 1 on plan 1 the red colour denotes a space over the brickwork? Yes.
190. And in sketch No. 2 on plan 1 the red colour also denotes a space over brickwork? Yes.
191. That is, where there is no packing? Yes; the red colour.
192. Have you any other photographs? Yes; I produce photograph No. 7.
193. Will you describe what that photograph shows? That is the corner of Pitt and Park streets.
194. Is that the place that is open now? Yes.
195. What does the photograph show? It shows the woodblocks, and the concrete, and the subsidence of the original foundation.
196. And does it show a vacant space? The black represents the vacant space—without any filling.
197. Is that as it was opened? Exactly.
198. *Mr. Bavister.*] How soon was the photograph taken after the commencement of the opening? It was opened at about 3 o'clock on Monday, the 13th July, and the photograph was taken about 9 or 10 o'clock next morning.
199. What does sketch No. 2 show? The position of the opening opposite 372, Pitt-street.

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200. What does sketch No. 3 show? The whole of the work that was done at the corner of Pitt and Park streets.
201. What is the next photograph? No. 8.
202. Is that a photograph of the corner of Pitt and Park streets? Yes; another view of the same hole shown in the last photograph, and showing the deeper portions of it.
203. That discloses a vacant space under the concrete and above the tunnel? Yes.
204. What does photograph No. 9 disclose? That is, looking from above, over the tunnel, at the corner of Pitt and Park streets, showing the woodwork and the holes down the sides of the uprights.
205. What spaces do these photographs disclose between the top of the tunnel and the concrete? They run from 7½ inches, 9 inches, 1 foot, and 1 foot 3 inches, up to 2 feet 1 inch.
206. What about photograph No. 10? You are standing in the hole and looking under the full extent of the concrete, and the photograph shows a vacant space of from 4 or 5 inches up to 15 inches.
207. Is this a photograph of the same place, at the corner of Pitt and Park streets? Yes.
208. Do you know of any spots which you wish to describe as being faulty? The corner of Liverpool-street and Pitt-street was faulty, but it has been filled up now.
209. Was it faulty in the same manner? No; this was a branch running off the main tunnel across Liverpool-street.
210. How was that faulty? At the end of that branch there was a space of about 10 feet long and 18 inches wide, and I suppose it would be about 9 feet to the timbering; and all that kept the roadway up was 1½-inch timbering.
211. Is there any other place you wish to describe? In front of the Criterion it was very hollow under the concrete—under the granolithic pavement.
212. Any other place? Macintosh's gateway, in Pitt-street, was a very bad place.
213. Any other place? I do not know that I could specify any other place. You get them here and there, and it is not difficult to pick them out when the openings are being made.
214. As far as your examination has gone, is the defective packing of the work which you have described in connection with these photographs only in isolated places, or is it continuous? Between Bathurst-street and Park-street it has not been very good at all—in some places very bad, and in other places fairly good. Just now, where we are opening from Park-street down, you will find some fairly good spots, but in one or two places bad spots.
215. Have you had any experience in constructing tunnels? Not a very great deal; in fact, I do not think I have had any experience at all, so far as the construction of tunnelling is concerned.
216. Not in connection with the City Council? No.
217. *Mr. Cann.*] What do you mean by saying that some of them were good, and some of them not so good;—do you mean that these vacancies, where there is no packing, are only in certain places—that there are spots where there is no packing? If you take up ten lengths of timber, you will in a couple of lengths, perhaps find a few stones—large stones—but most of it ordinary clay and muck, and no good filling.
218. Are we to understand that there are places where it was well filled up? Yes.
219. *Mr. McGowen.*] In reply to the Chairman you stated that you had had no experience in tunnelling;—what qualifications, then, have you to speak in regard to this work being defective? I am not here to give expert evidence at all, but am simply stating facts.
220. *Mr. Cook.*] You have expressed opinions, though, on the packing of the tunnel? Yes.
221. And on the class of packing? No. All I am pointing out is simply that in some places there is no packing at all.
222. Have you made a report to the City Council, pointing out what ought to be done in regard to the packing? Yes, I have.
223. Then you have given expert evidence to the City Council in regard to the tunnels? Yes; but I am not here to give expert evidence.
224. *Mr. Robert Jones.*] But you say there is defective packing? Well, the want of packing is defective packing.
225. *Mr. McGowen.*] What are your qualifications to pass an opinion? I have had sufficient experience to know when a hole is or is not properly rammed. I have had experience in road, bridge, and culvert work; but I am not here as an expert, but am acting simply on instructions to point out what I have already found. There are men better able to give expert evidence than I am.
226. *Chairman.*] The evidence you have given to-day in connection with these tunnels has been from your observations? Yes.
227. You are deputed by the Mayor to act during Mr. Richards' absence? Yes.
228. Have you any idea what it will cost to repair these tunnels—to make them good? No; I would not like to bind myself as to cost.
229. Do you know whether it is customary to use wood over tunnels in the way it has been used here? I have already stated that I am not here to give any expert evidence.
230. But I ask you, do you know whether it is customary? I know it is customary.
231. I mean, to put in timber to support the roadway, the same as in these tunnels? Yes.
232. Is that customary with the City Council? They have not carrried out any such works since I have been Acting City Surveyor. We have had no tunnel or sewer work during that time.
233. Is it customary for the City Council to do that? I could not say. I was not there when work of this kind was carried out.
234. But you have said it is customary? Yes—to put timber in that class of work; but I do not know if the City Council have done it.
235. Do you know if the Council have or have not done it? I do not.
236. Do you know anything as to the class of material that has been used? No; I have never gone into that matter.
237. *Mr. Hayes.*] Do you know if it is customary, after the brickwork of the tunnel is finished, and before packing takes place, to remove the timber supporting the earth-work above while the tunnel was being constructed? Yes; it is in most cases.
238. Has that always been the practice, so far as you know? I could not tell you that. In some places it is left in, and in other places it is taken out.

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239. Is it good work to leave the timber in in those cases? It all depends on the heading you have.
240. If the heading is not very high, and the timber decays, will not a subsidence take place? Certainly; subsidences will take place. With such a small heading as you have there subsidences must take place.
241. What kind of timber was used there? Hardwood.
242. All hardwood? Yes.
243. Will you describe the timber that supported the tunnel? The uprights and bearers are, I think, 9 x 3, and the longitudinal timber, running along the footpath over these bearers, would be about 9 x 1¼.
244. How long would that last? I could not tell you.
245. *Mr. Robert Jones.*] Did you notice what size the caps across the bearers and uprights was? 9 x 3.
246. *Mr. McGowen.*] You stated at the commencement of your evidence that you had occasion to go down to the Co-operative Society's new stores;—I should like to ask you whether you had been requested to go there? No.
247. What reason had you for going then? We had a considerable amount of trouble in connection with a building alongside of the Civil Service Co-operative Society's new store in regard to the blasting, and I had to keep a man there to prevent it, and, consequently, also had to run down there frequently myself. That was long before anything in connection with the tunnels came up.
248. It was simply in the ordinary performance of your duty that you were there? That is all.
249. In reference to the photographs taken opposite the Civil Service Co-operative Society's new store, I think you said that between the time when the excavations were made, and the time the photographs were taken, a fortnight or three weeks elapsed? I expect it would be that time.
250. How long had those excavations been made before you were there when you saw the work? I could not tell you now, but I could find out, if necessary, by reference to certain dates.
251. How often did your duty as Acting City Surveyor impose on you the necessity of going down to see the work? Sometimes I would drop in at lunch time, and perhaps not go there again for a couple of days or so.
252. In the case of any excavations of a similar kind made adjoining the City Council's footpath or roadway, would you, as Acting City Surveyor, go and examine them once a week? When they were blasting in connection with the building alongside of the Civil Service Co-operative Society's new store—where Park, the chemist, now is—I was there pretty well every day. That was before anything was known about these tunnels. We received complaints every day from Washington Soul and Buttel in connection with the blasting, and I had to go to the contractor, and I had to have a man there.
253. You could not say what time had elapsed from the starting of this work until you went to see it? No.
254. Do you think it was a week? More than that. I could tell you exactly on referring to my book in the office.
255. You have said that in regard to similar works you went down every day;—what was your reason for allowing a week to go by before going to see this place? I used to go there very frequently, before this excavation was made in the front. When they were blasting in the back I used to be there very often.
256. You stated that you had not been requested to go and see this work? That is quite right.
257. But when excavations were being made adjoining the Council's footpaths or streets, it was your duty to go down daily? Well, not always, in the case of ordinary excavations; but in this particular instance it was, because of the blasting.
258. As regards the making of the excavation in such a way that you could see this work from the top right down to where you stood level with the tunnel, and saw over the crown of the tunnel, you cannot say how long it had taken them to make that excavation? No.
259. How long was this defective work open for your inspection prior to your seeing it? I saw it practically every day, as I told you before. It was not opened any length of time. Most of the excavation took place in the back, where they were blasting. They were gradually coming forward, and it did not take them more than a day to expose what we saw on the building line.
260. You say that on the very day it was exposed you saw it? Yes.
261. It was not until a fortnight after you saw it that you had the photograph taken? No; I say I fancy that they began excavating in connection with that building three weeks prior to the time when we got the photograph—it might be four or five weeks. They were excavating, first of all, at the back. They may have come forward, and in a few days made the excavation in the front, but they did not carry the whole thing in a body to the front.
262. Was your attention called to the work by anyone? No.
263. You said in your evidence in chief, that Alderman Waine and another alderman were present when you saw the work? I did not say that they were present when I saw the work.
264. You saw the work without those gentlemen being present? I did. My attention was not drawn to it by anybody.
265. And as soon as you saw what you have termed defective work, what did you do? I did not report the matter at that time.
266. Why not? I wanted to see the excavation made to the bottom before I made any report.
267. The defective work to which you have referred is between the surface of the street and the top of the tunnel? Yes.
268. There is a space there? Yes.
269. When you saw that defective work between the timber and the crown of the tunnel, you say you did not report it immediately? No; not at once.
270. Why did you not? I wanted to see the whole thing down to the bottom. I brought under the notice of the City Council several other little things that had happened—subsidences that had occurred in Pitt-street—and I did not think it of sufficient importance at the time to rush away and report it.
271. Subsidences in what work—in connection with this Government tunnelling work? In our footways over this particular tunnel, but I do not know whether they were due to it entirely or not.
272. You called the attention of the City Council to subsidences in connection with other work? I drew the attention of the Inspector of Pavements to little subsidences that we repaired ourselves. In a few cases the Electric Telegraph Department people were there before us.

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273. Have the City Council ever done any driving or tunnelling since you have been Acting City Surveyor? No.
274. Can you tell me whether they have done it themselves or had it done under contract, if they have had such work done in the past? I cannot tell you.
275. In the work you have spoken of to-day, have you found any subsidences between the filling and the surface of the street—I mean in the work over the tunnel generally? Undoubtedly; we have found subsidences in Park-street and Pitt-street.
276. Have not the Hydraulic Power Company done work of a similar kind under your footpaths? They have.
277. Have you found any similar defects in their work? They have not come under my notice.
278. They have not been reported to you as Acting City Surveyor? No.
279. Has any report been made to you of the work done by the Water and Sewerage Board? No.
280. Nor the work done by the Gas Company? No.
281. In any of the examinations that you have made of work over the tunnel, have you come across work done by any of the people to whom I have referred where there has been a subsidence? In the Park-street opening, you can see the packing over the Hydraulic Power Co.'s own main, and it shows a slight subsidence under the concrete—at least, I believe there is a slight subsidence there, but I could not tell you for certain.
282. *Mr. Cook.*] But did you not look at it? I did not take particular notice of it.
283. You did not examine it? There may be something else to account for that.
284. *Mr. McGowen.*] You said that in a case of that kind you would refer it to the Inspector of Pavements? Yes.
285. Can you tell us whether any of the parties I have mentioned have ever had any of their subsidences referred to the Inspector of Pavements? I have never had a case come under my notice since I have been acting as City Surveyor.
286. And every one of those small subsidences you were aware of before you made a report to the City Council were in connection with the telephone tunnels? As far as I know. We know pretty well where the Hydraulic Power Co.'s pipes or the Water and Sewerage pipes are laid, and if we found a hollow over those places we should of course know pretty well what had caused it.
287. And in cases like that you would expect them to make the work good? They make it good, or we make it good and charge them.
288. When you found this subsidence over the tunnel, and previous to making any report about it, did the Government officers refuse to make it good? Not that I know of, up to the present time. I am only speaking, of course, during my term of office, since last December.
289. *Mr. Cann.*] As a matter of fact, have you not referred scores of slight cases to them, and they have made the work good? There are one or two cases where we have had a little bit of trouble with them.
290. *Mr. Cook.*] What has been the rule in connection with the excavations of the City Council generally? It is a hard matter to say, because there is so much divided authority in connection with the laying of the mains. When the Water and Sewerage Board excavate, they put back all the ordinary flagging; but if they come to tar-paving they ask us to do what is required to be done. The Hydraulic Power Co. do the filling and put back the flagging. The Australian Gaslight Co. do the same, except on the wood-blocking, when they send a requisition and we do the work.
291. *Mr. McGowen.*] In regard to any previous subsidences, before you reported this affair, Mr. Donald or the officer in charge made them good, the same as the Hydraulic Power Co.? Yes.
292. Did you have any friction with Mr. Donald or any of the officers under him? I could not say there was any friction. There were several places where he was not carrying out the work to my satisfaction as regards the re-instatement of the footpath, and I wrote to the Department about it, and Mr. Donald met me, and I pointed out certain things I wanted done.
293. *Mr. Cook.*] Were they done? There is one particular case where I do not think what I desired was done.
294. Which is that? They opened from the kerb to a point about 18 inches from the building line, and they left a strip of tar-paving undone along the building line.
295. Where was this? In Kent-street. If we have a first-class tar-paved footway before they excavate, we expect that to be put back the same as it was when they found it. They perhaps excavate and leave 18 inches or 2 feet along the building-line, and cut down our tar-paving, and only re-instate back to that; consequently that makes an uneven joint, and when the filling subsides it will always show a crack along there. You cannot join the tar-paving. I had a considerable amount of bother over that, and do not now know if they did the whole of the footpath.
296. Has there ever been a case in which inferior tar-paving has been taken up and good tar-paving put down in its place? I do not think our work is inferior.
297. Well, it wears out? Yes.
298. *Mr. McGowen.*] Did you ever have any difficulty with the other parties who have been mentioned of a similar nature, where they afterwards did the work to your satisfaction? They have done the work to my satisfaction.
299. Would you say that the Government officers in this case prevented you from seeing or examining anything? No; I was always treated most courteously.
300. They rendered you every assistance to enable you to see it? Yes.
301. The defective work to which you have called our attention is all tunnelling work, is it not? Yes.
302. The only complaint that has been made was in regard to tunnelling work? Yes; the other matters were only minor things, about which we managed to come to an agreement—except the tar-paving question.
303. In your opinion the only element of danger arises from the looseness of the filling between the crown of the tunnel and the pavement? Yes; and down sides, consequent on the subsidences that would occur.
304. *Mr. Cann.*] The ground of your complaint in regard to the construction of the telephone tunnels applies to the portion where there is tunnelling instead of open cut? Yes.
305. The City Council have made no complaint about the work done in the form of open cut? Only minor complaints. I do not think there is really any objection to the way in which the packing was done in the open cut.

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306. *Mr. Harris.*] I think all Pitt-street is tunnelled? Up to beyond Bathurst-street, I think.
307. Have you had any complaint of the footways in connection with the open-cut packing? Complaints were dealt with departmentally.
308. As a matter of fact, you have had some? Yes.
309. *Mr. Cook.*] You say now that you dealt with those minor matters departmentally—that is to say, you represented them to the Post Office Department, and it was put right? Yes.
310. Have you represented any of these matters to our Department with the exception of the first one;—have you reported Park-street to our Department? You were always informed about these matters. Before we did any work we informed you that we were going to do something.
311. Have your representations been in the ordinary way? The difficulty was that when we made an opening, of course I made a report to the City Council, and had to prove the truth of my report, and when an opening was made we had hardly a chance of keeping it open. It was filled up so quickly by the Postal Department.
312. When was this? That occurred at the corner of Goulburn-street and Pitt-street, I think. I forget the particular Saturday afternoon, but the Mayor, the Town Clerk, Mr. Donald, Mr. Brown, and myself were there; and at the opening at 372, Pitt-street, the Mayor requested it should be kept open, but it was filled up.
313. *Mr. McGowen.*] Have you seen the inside of the tunnel? No; I have never been inside it.
314. You have never reported anything in regard to the weakness of the inside of the tunnel? No.
315. *Mr. Cook.*] Not with regard to the iron strips that carry the brickwork? No; I know nothing whatever of it. It did not concern me, and I did not interfere with regard to it.
316. *Mr. Nelson.*] In photograph No. 1 the line AA indicates the top of the tunnel? Practically so.
317. And the line BB represents the line of the footpath? Yes.
318. I take it that from the line AA to the crown of the tunnel is a portion which ought to be packed, but which is shown here as not being packed;—is that so? It is shown there as not being packed, but of course the packing has fallen away. I do not want you to think that that was the way in which it was left.
319. There are evidences that when the wall was taken down the packing fell away? When they took that away there was a slight subsidence against the building-line; but the packing that is there is loose inside. However, that would not affect the packing on the top of it; but it would as far as the centre of the crown.
320. Is that where you put the pick-handle in? Yes.
321. You are a surveyor, not a civil engineer? I am not a civil engineer.
322. It is not part of a surveyor's duty to build tunnels? No.
323. That is more the duty of a civil engineer? Yes.
324. *Mr. Bavister.*] Can you tell the Committee what is the distance from the building-line to the nearest side wall of the tunnel opposite the Civil Service Co-operative Society's new stores? From the building alignment to the side of the tunnel would be about 2 feet 6 inches.
325. Yet there are buildings areas projecting 2 feet 6 inches from the building-line;—where do they get their wall-space of sufficient thickness for the area wall? They are right up against the side of the tunnel now.
326. And as a consequence it follows they must have removed the packing to get that distance, no matter how well it had been done? Undoubtedly. I have said all along that they have excavated right up to the side of the tunnel, to get that area in.
327. In No. 1 photograph the timber shown on the line AA is supposed to be the top of the arch; when the excavation was made right up to the side of the tunnel it would not be possible for the packing on the span of the arch to remain there? It would not remain there, certainly.
328. You have referred to previous visits of inspection to the next building, which were made in consequence of complaints about the blasting? Yes.
329. Did those complaints arise in consequence of poople thinking that their buildings were in danger from the excessive force of the blasts? I think so.
330. I ask you, not as an engineer, but as a man of ordinary common-sense, whether your experience would not tell you that heavy charges so close to the tunnel would have a tendency to affect the stability of the packing around it—that is to say, if they would shake a permanent building, would they not cause vibration of less substantial work to take place? It is so far back that I do not know that it would affect it much. You would not compare the tunnel with the building they were complaining about, for the wall of Washington Soul's building was not a very good one near where they were blasting.
331. Do you know how much deeper the excavation for that building was than the bottom of the tunnel? No. I do not know that it went down as far as the bottom of the tunnel, but I am not quite sure.
332. You have referred to possible leakage from water-pipes;—do you know whether, if such a thing took place in the neighbourhood of tunnelling excavation, it would have a bad effect on the packing? There is no question about it, if the water gets in. I saw a case of that kind yesterday in an opening where a water-pipe had been burst for some little time, and there was a large cavity where the water had been trickling away from the pipe.
333. Was that near the tunnel works? Fairly over the tunnel work.
334. So some of the defective work complained of in regard to the tunnel may have been owing to the escape of water, from different causes? No doubt the escape of water would cause a lot of these cavities.
335. You spoke of thrusting a shovel-handle into the packing at the place opposite to the Civil Service Co-operative Society's new stores;—are there any drain-pipes across the path there? I am not certain whether there was a sewer-pipe close by.
336. I refer to something smaller—to a drain-pipe or water-pipe? It was not close by where I put the shovel-handle in.
337. *Mr. Cook.*] Are there no earthenware pipes exposed there? There is an earthenware pipe there.
338. Was that where you put the shovel-handle in? I put it in beyond the pipe.
339. *Mr. Bavister.*] If there were pipes across the path, would not large packing be more suitable than small stuff;—in making good tunnel-work, in such a case, would it not be better to put in large spawls than small packing? You would require a certain amount of small packing as well. If the pipe was in

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before the tunnel was constructed it ought to be well packed underneath, and you could not put large spawls under it.
340. I am not speaking of underneath it, but by the side of it, to relieve the pipe from pressure of the weight above it;—would it not be better to use large spawls than small ones? Undoubtedly.
341. Would it not be much easier to push a shovel-handle between large spawls than between small ones? Yes.
342. *Mr. Cook.*] Do you say to the Committee that you were not near the earthenware pipe the day I was with you? We were near it, but I do not think I went within 18 inches or 2 feet of it.
343. Do you not remember my pointing out a pipe to you? I recollect a pipe.
344. Were you not poking over it with a shovel or pick handle? I was not poking over it, but beyond it.
345. Do you remember my saying to you, "You are absolutely unfair in the matter"? No; I do not remember that.
346. *Mr. Bavister.*] In regard to the excavation at that side, there seems to be some confusion;—you admit that the excavation must have been started at the back at least three weeks previously? I am not certain about the dates.
347. I am not going to a day or even a week; but as you visited the place frequently I ask you is it not a fact that they left a centre roadway at the front, and as soon as the excavation had been started at the back they also started on both sides of the centre roadway at the front, and took the front down even before some of the work was finished? That is right.
348. So that the tunnel excavation must have been exposed some considerable time before the photograph was taken? I do not know about a considerable time. I do not know that it would be more than a few days at the very most, as near as I can recollect.
349. You have sufficient knowledge of the locality to know what kind of sinking they had;—was it soft earth? It was earth on top and soft rock, and all kinds of stuff near Hagon's.
350. I am speaking of the ground that had not been moved? It was soft rock.
351. Did that require blasting? There was no blasting done, to my knowledge, in the front part of it.
352. How near to the surface did the rock commence? I could not tell you now.
353. Was it more than 3 feet? I could not say. I did not take much notice of that particular thing.
354. Could it be ascertained there now? I think you could get down below and see the section of the whole thing there at the side of the building.
355. It is excavated right up to the tunnel? To about 12 inches from the tunnel.
356. But you are of opinion that from the time of starting it to the front to the time when the photograph was taken, only a few days elapsed? I believe that within two or three days after it was started that photograph was taken. That is as near as I can recollect, but I do not bind myself to it.
357. Now I will leave that part and go to Park-street;—had anything been brought under your notice as to the danger existing there before the roadway was broken open—had you seen any evidences of liability to subsidence? We had several subsidences there.
358. Do not misunderstand me; I refer to the crossing at the junction of Pitt and Park streets; had any evidences been brought under your notice that there was a liability to collapse there;—had you seen anything indicating such a state of affairs? Several people drew my attention to things.
359. Who were they? Almost everybody I used to cross over there with noticed it.
360. What facts did they point out? The great vibration of the roadway when a 'bus passed over it.
361. Is that not also perceptible in the great square at the railway station? I have not noticed it.
362. You will not say it is not so? I will not.
363. There had been no evidence of cracks on the surface at the corner of Pitt and Park streets? No.
364. Had any of the traffic been diverted from that particular crossing in consequence of apprehension of danger? No.
365. Have you any knowledge as to whether, in connection with the new market buildings, any heavy loads had been drawn across there recently? I cannot tell you. I do not know the route taken by Phippard Bros., the carriers, but I think they must have come that way, as it is the handiest for them.
366. Would it have come under your notice if the town authorities had considered that crossing dangerous, and had ordered heavy traffic to be diverted from it? That is a matter that would come under the Transit Commission, and I might not hear anything about it.
367. But if it were done in consequence of something coming to the knowledge of the city authorities, it could not be done without your knowledge? I know nothing about it.
368. You said that you had had no experience in tunnel work? Yes.
369. As a matter of fact, a surveyor's duties are on the surface? Yes.
370. Had you had any experience at all other than that of a surveyor prior to the going away of the City Surveyor? As a civil engineer, unfortunately, I did not complete my final year at the Melbourne University; but I have learnt the theory of civil engineering, and have had a considerable amount of practice during the last fifteen years.
371. In connection with what works has your practice been obtained? Road-making.
372. Can you specify any works that have been under your charge as a civil engineer, or of which you had inspection? No; but I have done a considerable amount of road-making under Colonel Wells and Mr. David Houison in the Public Works Department.
373. What position were you occupying then? I was in the position of a staff surveyor at the Lands Department then.
374. Not as an engineer? No.
375. Have there been any other works in which you have obtained practice as a civil engineer? A lot of work in roadmaking, culvert and bridge-making, in the north-east of Victoria, before I came here.
376. Under a municipal council? Under a civil engineer.
377. But for what authority were they being constructed? For the shire council.
378. Were they done by contract? Yes.
379. Were you the officer in charge, or were you simply inspecting the work? I was the officer in charge for the shire.
380. You were virtually the inspector of certain portions of work? Yes.
381. *Mr. Cook.*] The newspapers have been full of accounts of collapses of the street;—have there been any actual collapses of the street or of the footpath? Only subsidences.
382. What do you call subsidences? Well, in many cases the pavement would fall in.

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383. How far? From 6 to 9 inches in some places; the flags or paving stones would go down a depth of 6 or 9 inches.
384. I suppose that would be liable to occur in the case of any excavation? Yes.
385. You would not regard those subsidences as serious ones? Yes; in the sense that if a man were injured in consequence of one of them the Council would probably be liable.
386. But they are usual things to happen? Undoubtedly.
387. And whenever these subsidences have occurred you have always applied to the Postal Department to have them remedied, have you not? Yes; as far as I know.
388. Have the Department ever refused to do anything you asked them to do? Well, Mr. Donald refused to do several things for us in connection with Kent-street.
389. What else? He distinctly refused to leave the holes open in Pitt-street.
390. What holes? At the corner of Goulburn and Pitt streets, and at 372, Pitt-street, although he was requested to do so by the Mayor.
391. Who opened those holes? I believe that one of them was opened by the Postal Department and extended by the Council. We opened the other at 372, Pitt-street.
392. Did he fill one up, knowing that you had ordered it to be left open? Yes.
393. You have already told us that you have had no experience in tunnel work? Yes.
394. But you have made several reports to the City Council lately? Yes.
395. As to defective tunnel work? I do not know whether it was put that way.
396. I put it that way? I have said nothing about the tunnel.
397. You complained of the packing outside right down to the foundation? Yes; you are quite right. I said so in my last report.
398. But you admit that those reports are not expert reports? It does not require an expert to see whether a hole is or is not properly rammed.
399. Then nothing you have said here to-day requires the opinion of an expert? No.
400. You were asked several questions, and you said you were not an expert? Not in tunnel work.
401. Have you expressed opinions as to whether timbering should come out? I have not done so here.
402. But you have done so to the City Council? Not in my report. At least, I am not quite certain whether I have done so in my report.
403. In making that report, did you tell the City Council that you had had no experience in tunnel work, and were not an expert;—you did not give them to understand that, did you? I told them the plain truth. I made a straightforward report, and whatever report I make I am prepared to stick to. I do not come here to say one thing and mean another. I am not an expert in tunnel work, but I am here simply to point out facts.
404. When you made a report to the City Council concerning the timbering of the tunnel, you made a report concerning a matter about which you admit here you do not know much? No, it is not so. I thoroughly understand what I am talking about. I understand sufficiently to make a report to my Council.
405. But you have told us that you are not an expert; and, therefore, in reporting to the City Council in regard to timbering or packing for a tunnel, yours would be a non-expert's report? That is a matter of opinion entirely.
406. *Chairman.*] Are you an expert in timbering? No.
407. *Mr. Cook.*] You never had any experience in tunnelling? Not any actual experience in constructing tunnels.
408. Therefore, when you were reporting to the City Council in regard to the tunnel itself, the packing outside it, or the timbering, you were reporting as to a matter you had had no experience in—that is to say, you only used your common sense the same as other people who had not been specially trained might do? I had sufficient experience to point out exactly what I have pointed out. You require no expert evidence to make the report I sent to the City Council.
409. You would not regard this as a matter appertaining to experts? Quite so.
410. But you have said in your reports to the City Council that you regarded the system of timbering tunnels as defective? Yes, leaving the timber in.
411. Do you know of your own knowledge whether in this instance the timber was left in or taken out? It has been left in in some places and withdrawn in others.
412. Now, about the Civil Service Co-operative Society's new store; I have already asked you whether you remembered an incident that occurred when you and I were there; I mean when you were using that pick-handle you have talked about to get between the spawls;—you do not remember my saying to you, "You are absolutely unfair in your treatment of the whole matter"? I do not quite remember your remarks to me.
413. You can only see a section of the packing intact at the intersection of the building;—you must go flush up to the building, before you can get a fair section of the packing? There is another place just under the roadway where you can get a fair section of it, too.
414. It has been interfered with, has it not? It has now; but it had not at the time.
415. It had been interfered with at the time I saw it? I do not think so.
416. The excavation was down pretty well below it, was it not;—the men were working in a pretty big hole? They had not touched that part near the tunnel.
417. Have you at any time given permission to the contractor to blast? We never do give permission to blast in the city.
418. Never have done? No.
419. But you know if any blasting has taken place there? Blasting did take place there.
420. After our visit of inspection that day? Yes; they used to do it in the middle of the night, so as to elude us.
421. Have you ever complained to the Postal Department that any of these places have been opened since that blasting? In what respect?
422. Take the places where the packing is left out;—have you made any complaint to my Department as to that? No; except to ask some officers of your Department to go down and have a look at it, just before we made that opening.
423. Have you ever asked them to put it right? No; I rather wanted to keep it open, according to instructions.
424. Why? I have no idea. I had instructions to keep it open.

425.

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425. You did not want it filled up? No.
426. There must have been some other object in view than the mere putting of the street into its proper condition? When I reported the matter to the Mayor, I suppose that he wanted to keep the place open for the aldermen to see it.
427. But at any time, to your knowledge, has a complaint ever been sent to the Post Office Department in writing, which has not been attended to? As far as I can recollect, the only one was that communication between Mr. Donald and myself in connection with Kent-street.
428. And even then there was nothing in writing, was there? Yes; I think a letter or two passed.
429. Is there any record of the complaint? I think so.
430. From your knowledge of the streets, would you say whether we have improved the footpaths at all in any place—that is to say, have we taken up broken flags and put good ones down, or have we taken up worn-out tar-paving and put good in its place—would you say that the pavement, as a pavement throughout Pitt-street, is better now than it was before the tunnel was constructed? No.
431. Are you quite clear about that? I am.
432. You have an Inspector of Pavements; has he not looked after the street throughout the whole time the excavations have been going on—from the time this tunnel work was started? I do not know anything about that. I do not know what his duties were.
433. The City Council have been aware that this work has been going on? Yes.
434. As a matter of fact, it was at their suggestion that it was started? I do not know anything about that.
435. When was the first time you heard any complaints about the defective packing under the footways? I think about the 15th of May was the first time I had any idea there was any defective packing.
436. Then it must have been two years before then that the tunnelling was started? About eighteen months, I expect.
437. What are the functions of this Inspector of Pavements? He is foreman of masons, and has the superintendence of all the footways throughout the city.
438. To see that they are secure? Yes.
439. Therefore, if there were any interference with the ground underneath the pavement, he would naturally be interested, would he not? No doubt.
440. As a matter of fact, it would be part of his duty, as well as part of the City Surveyors's duty, to see that the pathway was secure? Yes; undoubtedly.
441. What steps were taken during the progress of this work to see that that was done? You are now getting beyond my time. I cannot answer that question.
442. Well, what steps did you take between December and May to see that the pavements were secure—you say you have never been down the tunnel? No.
443. And have never actually seen a section of the work? Only on the plan.
444. You have never been down to see if the packing was put in properly? I was never down below, under the ground, at all.
445. And yet you have the responsibility of seeing that the pavements are looked after? Yes.
446. Has the Inspector of Pavements been down at all? I could not say.
447. You have never asked him? He can come here and answer for himself. He had no instructions from me to go inside the tunnel. You must recollect that this tunnel was done eighteen months ago, and I have been acting City Surveyor only for the last six or eight months, and am not cognizant of the inner working of the Department except in my own branch.
448. You can tell us nothing as to the relation of the City Council to this tunnel until May last? That is about as much as I know. It never concerned me much in my own Department at the time, and it is of no use my giving you what you can get better from others.
449. What was the date on which Alderman Waine moved the resolution in the City Council? I do not know. It was following on a report of mine.
450. Following on a report of yours, was it? I think so. My report was made on 9th June, and the resolution was subsequent to that.
451. That resolution asked us to open the footway throughout, did it not? Yes.
452. And to remove all the timbering? Yes.
453. Do you remember what reply was sent to that? I never saw your reply; I do not know what it contained; it never came to me.
454. You do not know what was the nature of it? No; I do not.
455. You do not know of your own knowledge that the reply stated that we were going to take this timber out? I did not see the reply; it would not come to me in the ordinary course of things.
456. You do not know that? No.
457. Did you see it in the newspapers? Yes, I saw it in the newspapers; but I never saw your reply to that letter, which, I believe, was sent.
458. But you know of it, all the same? Yes; I have heard of it since.
459. As a matter of fact we were taking this timber out, and are doing it now, are we not? Yes.
460. All the timber down to Park-street? You have begun from Park-street to Bathurst-street, and now you are going from Park-street to Market-street.
461. And on July 12th or 13th we were in process of doing this work which the City Council requested should be done? Yes.
462. Why did you open that place in Park-street? Under instructions.
463. From whom? The Mayor.
464. You know nothing as to the reasons? I am not supposed to know everything that goes on in the Town Hall.
465. As a matter of fact, do you know the reason why it was open? Most of the aldermen were aware that there was a certain amount of vibration there.
466. I ask you why you opened that street, and got right in the middle of our men to do it? We did not get in the middle of your men.
467. You, knowing as you did know, that they were removing all the timber from the street, why did you get between them at that particular point? We did not. Your men had gone back to Bathurst-street when we started there.

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468. But you knew they were not going to take that out? I was told they were going to drive under there.
469. Who told you? I heard it from the man looking after the work at the present time.
470. Who was that? A man named Wadsworth—one of the City Council's employees.
471. He told you that? Yes.
472. Did you take any steps to verify that before making the opening? No.
473. Why not? Simply because I could not get any information.
474. Did you ask for it? No; I never troubled myself to get any information up there at all.
475. Did you notify my Department in the usual way that you were going to open it? Yes.
476. At what time? As soon as they put the hoarding around the street, I immediately went to the Town Hall.
477. What time was that? At 2 o'clock; and I telephoned there and then.
478. To Mr. Dalgarno? I expect it would be.
479. But if Mr. Dalgarno says that it was at half-past 3 o'clock, what would you say? There is only Mr. Dalgarno's word and mine against each other; but I assure you that it was 2 o'clock. I stood by my Chief while he wrote that letter, and my instructions were, "Let that go at once by hand, so that it will reach almost as soon as the telephone message."
480. What time would that be? He must have got it before half-past 2, unless there was something radically wrong somewhere.
481. If our departmental officer, Mr. Dalgarno, said that it arrived at 4 o'clock, and if you saw the time, 4 o'clock, marked on that letter, you would say that he was absolutely wrong? I would be very sorry to say that any man was a prevaricator of the truth.
482. But that is the point to which you bring matters? I can simply tell you that is exactly what I did.
483. And if Mr. Dalgarno said he noted the time you rung him up, and it was exactly half-past 3? I would, undoubtedly, say there was something wrong. I assure you that every time we have done anything I have endeavoured not to fall out with the Department.
484. Was Mr. Donald there when the opening was first made? I am not sure whether Mr. Donald or Mr. McCredie came up first. By the time I got back, after sending the letter away, I think they had removed the wood-blocks.
485. Was Mr. McCredie there when the opening was made? I believe he was there. I believe he was the first one there, and that a few minutes afterwards others came, before anything was done—half-a-dozen or more, I think.
486. You do not know the reason why the place was opened, notwithstanding that we had come to that point in the general opening of the street, and the taking out of the timber? No, except that there was a tremendous vibration there, which had become noticeable to everybody.
487. As a matter of fact, you did not see Mr. Donald that day until late? He was there at 2 o'clock, but immediately left when our hoarding went up, and I did not see him again that day.
488. What occurred that day—you know there was a sensation caused over it;—who was the Mayor speaking to when he first inspected it? A tall man, with a grey beard—a ganger; I do not know his name.
489. Did he tell you that we were going to open that place? No.
490. He did not? No. I never knew all along you were going to open it; I understood you were going to drive it.
491. What is the difference? One is open cut, and the other is driving under the concrete and removing the timber.
492. Who told you we were going to do that? I got the information from my own man.
493. Did you take any steps to verify it? No.
494. Did you ask Mr. Donald about it? No; but the evidence we got at the other end of the street did not require any verifying.
495. Do you not think, if your relations had been of the happiest, as you have told us, that it would have been natural to seek the man in charge? Our working alongside of them did not create any unhappy feeling, as far as I could see.
496. You knew that we were going to open this place, and take the timber out, and thoroughly fill it up? Yes.
497. Then why need you have troubled about it, even supposing there was vibration? Well, I am only a second party in this question. A great deal of my work is forced upon me. I have my instructions to do a certain thing, and I must carry them out.
498. You did not open it for the purpose of making it safe, did you—I want to get at the reason why this was opened? I suppose the reason was to see if a subsidence was there.
499. Not for the purpose of putting it right? No.
500. You know nothing more than that about the opening in Park-street, except that you were simply ordered to do it by the Mayor? That was all.
501. And you did it, so far as we know, on the statement of one of your own employees without taking any steps to verify it—that is, without consulting any of our officers? We never thought of consulting your officers in the matter. This was done by the Mayor himself. Your men started at the corner of the "Criterion Hotel," and it was their intention to drive under the street, as has been admitted in the Press by Mr. Donald. The Mayor gave instructions to have a certain thing done.
502. Has Mr. Donald admitted that he was going to leave the concrete intact? So it appeared from the papers.
503. And you have acted on those Press statements? That occurred after the opening. I only say I saw in the paper that that was what he was going to do.
504. *Mr. Harris.*] You took office on the 14th December, 1896? Yes.
505. You had nothing to do with these tunnels? Nothing whatever.
506. You knew nothing about them? No; the matter did not concern me.
507. You do not know how long they have been finished? Only from looking up the matter since—from sixteen to eighteen months.
508. *Mr. Cook.*] You have looked up the history of the thing? Yes.
509. *Mr. Harris.*] You have been asked a lot of questions about packing;—in building some retaining-walls, would you use any packing at the back of them? Yes.

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510. Do you know anything about packing at all? Yes; about that packing.
511. Would this packing on the top of the tunnel be the same as the packing of a retaining-wall? Something similar in a great deal of the work.
512. If you came across packing like this at the back of a retaining-wall, would you call it good or bad packing? I have never come across any packing like that at the back of a retaining-wall.
513. How do the Water and Sewerage Board and the Hydraulic Power Company work—by open cutting or by tunnelling? Some by tunnelling, and some by open cutting.
514. You were in office when a permit was given for this excavation to be taken out? The Water and Sewerage Board simply notify us that they are going to make certain openings.
515. In regard to the taking out of foundations, a permit has always to be given by the City Council before anybody can start the work? Yes; they generally get them from the City Surveyor's Office.
516. And no blasting is allowed in the city? No. I mean we never give permission. They have to take all risks.
517. But there must have been blasting in this case when you put a man there? Yes.
518. Your attention had often been called to subsidences before this in the footpaths after excavation? Yes; small subsidences.
519. Often in Pitt-street? Several times in Pitt-street.
520. But you never thought it was anything connected with the Hydraulic Power tunnelling or the Water and Sewerage Board? No. In most instances along Pitt-street—in fact, I think in all except one, as far as I can recollect—we have done the work ourselves. There was only one that I know of where the Post and Telegraph Department were in front of us and put the matter right.
521. *Mr. Cook.*] Where was that? In front of the *Herald* office.
522. *Mr. Harris.*] You would not have known anything of the cause of these subsidences if those areas had not been taken out for the Civil Service Co-operative Society's new stores? No; I would not.
523. And when there was a subsidence of the footpath in Pitt-street at the side of the tunnel, you thought it was likely to be something giving away in connection with the tunnel? Yes.
524. Did anyone else open the street and find anything wrong in connection with the tunnel? The Water and Sewerage Board.
525. Did they ever tell you they had to fill in large cavities? They told me they had to put seventeen loads into an opening near the Natatorium.
526. Did you ever see that? No; it was covered up before I knew anything about it.
527. Under whose instructions have you carried out this work? The Mayor's, entirely. I have not stirred in the matter without the Mayor instructing me.
528. The Mayor has taken this on himself? Yes.
529. And the Council knew nothing about it? No; except that there was a report brought before the Council.
530. You have not received instructions from the Council? No.
531. And the work done in Park-street was under the Mayor's instructions? Yes.
532. *Mr. Cann.*] There was an action previously in connection with the Post Office Department for damages to a building in Pitt-street, was there not? Yes.
533. Do you remember the case? Only just by seeing it reported in the paper.
534. Were you a witness in that case? No; I did not know anything about the case until it was practically all over. I did not know it was on.
535. *Mr. Cook.*] Do you know whether Mr. Waldron, the City Solicitor, conducted the case for the plaintiffs? Yes; I believe that Mr. Waldron, the City Solicitor, of the firm of Waldron and Dawson, conducted it.
536. *Mr. Cann.*] Is it possible that the investigations by the City Council originated in that case? I do not think so.
537. It is, I suppose, just possible that the officers who do the legal work for the City Council could bring influence to bear on other officers of the department about their work to have an investigation? They have never brought any to bear on me.
538. They have not told you, I suppose, but still they call for reports? He would have to bring his influence to bear on some of the aldermen.
539. *Mr. Cook.*] It is subsequent to the decision in that case that all these revelations have been made by the City Council, is it not? Yes, as far as I know.
540. As a matter of fact, these revelations began immediately after the conclusion of that case of Thompson *v.* the Crown? I do not know when the case was heard. I was not mixed up in the case at all. I was never consulted or spoken to in connection with the matter.
541. But you told me just now that you knew it was after that case was over that these revelations began? No; I think you put it in that way in the question yourself. I was never spoken to by the City Solicitor or anybody else in connection with it.
542. *Mr. Cann.*] What sort of timber was used? Hardwood.
543. What sort of hardwood—gum or stringybark? I could not tell you what sort it was.
544. Is it anything like the hardwood used in the wood-blocks in the street? I could not tell you; I never examined it closely.
545. *Mr. Cook.*] Did you not take out a piece and examine it? No.
546. Did you not take a piece to the Town Hall? No; I did not.
547. Who did? I could not tell you who took that; it was taken and put in my office, and then taken from there to the Council Chamber.
548. *Mr. Cann.*] Did you look at it at all? I just had a look at it.
549. *Mr. Cook.*] You have examined that piece in your office? Yes.
550. What is the fault in it? It was rotten at one end.
551. Only one end? I believe only rotten at one end.
552. Is the rest of the timber good? I believe it is. There might be a bit of sappy wood.
553. How do you account for this being rotten at that end? A little sappy.
554. Have you any idea as to whether that would be likely to have been a fault in the timber when purchased and put in? It may have been faulty when put in.
555. You do not think it had time to decay at that one end during the time it lay there? It may have been

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been partly gone in dry-rot or sap before it was put in. As far as I could see, I do not say there is very much to complain of in regard to the timber.
556. *Mr. Cann.*] The dimensions of the timber shown on the plan was 9 by 3¼? I expect so, if it is so stated there.
557. Have you any idea what the life of 9 by 3¼ timber is? I could not say.
558. When you came to the crown of the arch and found the packing, have you ever found the packing sunk down from the timber or the timber down on the top of the packing? Some of it is lying on the stuff the same as it was put in without the packing ever having been near it.
559. Do you mean by that that the packing has never been made up to the timber from the arch? Yes; I should say so.
560. You never saw any subsidence where the packing had come down and left the timber behind? I cannot say whether the packing was originally put under the timber, or whether it has subsided or not, but there is a space now.
561. It is of no use asking you whether this was completed work or not? Of course, when the pathway had been reinstated, some sixteen months I think, I concluded the work was completed.
562. It is of no use asking you whether it was or not—it seems, from questions this morning, that it was not;—this timber is still being taken out? That timber is all removed now.
563. I mean the timber all over the tunnel is being taken out? All over that portion, 372, Pitt-street.
564. *Mr. Robert Jones.*] You said, at the commencement of your evidence, that a report was given to the Mayor by an alderman;—do you know who that alderman was? I would not like to name any alderman; I could not give it to you for a certainty.
565. Do you know for a certainty that a report was made to the Mayor by an alderman? I only understand that some alderman brought the matter under his notice. I would not like to say that a certain alderman did make a report.
566. You do not know of your own knowledge that there was any report made by an alderman to the Mayor—is that so? Yes.
567. And your statement at the commencement of your evidence would be mere hearsay? Yes; principally from hearsay.
568. You say it was reported by an alderman, and at 1 p.m. the Mayor and you went down and saw the work—is that so? Yes. The Mayor and I left the Town Hall at 1 o'clock, as near as I can recollect.
569. And then went to see the Postmaster-General? Yes.
570. And then went from the General Post Office to the work, and saw it again? No; we went with the Postmaster-General.
571. You went with the Postmaster-General, and saw the work again—six of you in number? Yes.
572. What time was that? I think 3 o'clock the appointment was made for, and I suppose that it was a few minutes after 3 o'clock when we went over.
573. You say that where photograph No. 1 was taken there was a subsidence of from 6 to 7 inches in the stone packing;—is that so? I did not say there was a subsidence of from 6 to 7 inches, but a space between the woodwork and the top of the tunnel, which is filled in with stone, through which I put the shovel handle.
574. Then there is not an open space? I never said there was an open space.
575. Then, as a matter of fact, there is no cavity there? There is not a cavity there.
576. But you would imply that the spawls put in there were not firmly packed—not well bedded? Yes.
577. At Park-street there are several mains—for what purpose I do not know—over the tunnel? Yes.
578. If the tunnel had not been placed there at all, and if that opening had been made, would any of those drains have shown bad packing? As far as I can judge from the two sections, I do not think there would have been very much to complain of, if the tunnel had not been made, as to the way the packing was done there, if one or two sections had been cut out.
579. How deep is the crown of the tunnel from the surface at Park-street where the opening is now? Perhaps it is from 4 ft. 6 in. to 5 ft.; I have not measured it.
580. There are several drains there shown over the crown of the tunnel? Yes.
581. Is it not a fact that over the timber of the tunnel there the earth has actually ravelled away, it was so loose, when it was touched? I do not think so. I think it was fairly well packed.
582. Do you think there is anything there now standing that will ravel away in the manner I have mentioned? Well, of course, the weather is very dry, and it might give way now if touched.
583. Do you know that a lot of it has fallen down without being touched at all since? That has not come to my knowledge. I have not been into the excavation since last Friday. Some of the timber of the tunnel is resting on the collars of the hydraulic pipe, and the weight of the stuff on top may be pressing on the pipes, and it may be causing subsidence from the fact of the timber resting on the collars.
584. *Mr. Cook.*] Is the hydraulic pipe below the timber of the tunnel? It is above the timber, or practically on a level with it. This particular timber is carrying the weight on the collar of the pipe.
585. You do not mean to suggest that the uprights in the tunnel have given way, do you? I have never said so.
586. But you said just now that a collapse in regard to the hydraulic pipe may have been caused by a subsidence over the tunnel? No. What I say is that the timber is resting on the collar of the pipe, and it is carrying the whole weight of the roadway, and if pressure comes on that part it must press the pipe down or crack it at that particular joint.
587. *Mr. Robert Jones.*] In your opinion, would it matter if the whole of that timber actually rotted away;—would it interfere with the stability of the work? There is only 2 ft. 6 in. of stuff to fall in.
588. *Mr. Cann.*] Is it not a matter of fact that wherever you carry on any excavation and fill it up again, there is a certain amount of subsidence? There always will be for some considerable time.
589. You have had equally as much subsidence in this Post Office tunnel, where the tunnel has been constructed by open cut, as you have had by the tunnelling itself? I cannot say that. There have been more indications over the tunnel than in any other place of subsidence, for under one flag you would be able to put away half a load of stuff. Near the *Herald* Office they put three barrowfuls in one hole. If you have an open cut you will simply get slight subsidences.
590. *Mr. Bavister.*] Was not the portion to which you refer, near the *Herald* Office, done under contract, and not by the Post Office authorities? I only know that by hearsay.

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591. Have you any idea what length of time had elapsed between the completion of the work there, and the subsidence to which you have referred? I do not know how long it is since they finished there. I suppose it would be over eighteen months.
592. *Mr. Cann.*] There must be some subsidence, unless the filling is done with concrete? There will be a certain amount of subsidence.
593. *Chairman.*] You do not know exactly? No.
594. Is it your opinion that the packing generally in connection with this tunnel is of a defective character? Yes; and such as will cause considerable subsidence on our footways.
595. When that place was open in Park-street, did the City Council consider it was unsafe? I have heard several of the aldermen say it would be very dangerous.
596. *Mr. Cook.*] Who were the aldermen? I could not give you the names.
597. You know nothing of your own knowledge about that? No.
598. *Mr. F. Clarke.*] Was there an indication on the surface in Park-street before you made the opening of the subsidence? No.
599. Does your experience qualify you to say whether there would be a danger there by leaving it as it was? I think that the ordinary road there was a little bit thicker than the road is sometimes, and that it would carry the ordinary traffic; but if we had to remove the kerbing and guttering from both sides, or from one side at a time, and any very heavy traffic came across there—even our steam-roller—it might collapse at this particular end. The concrete there was a little softer than in any other part of the street. It might be some considerable time before anything would happen. It would take a very heavy load, I think, to break the concrete.
600. A question has been raised as to why the Mayor took upon himself to open the roadway;—is it not a fact that the Mayor has power to open roadways and footways, as he thinks fit? Yes; anywhere he likes.
601. *Mr. Bavister.*] Do you know whether the Postmaster-General has the same power? I am very doubtful about it.
602. You have not consulted the Act of Parliament to find out whether it is so or not? I have read the Act.
603. *Mr. Cook.*] Mr. Lyne asked you whether, in your opinion, the telephone tunnel packing was defective, and you said, "Yes"; I asked you whether, in judging of the defective packing of the tunnel, you speak as a non-expert, without any experience in such matters, and you have already told the Committee that? I have simply pointed out that it is defective. I have told you I was not an expert in tunnelling work.
604. *Mr. Robert Jones.*] As regards this reference to the work by the Mayor, was it before the Record Reign celebrations, or not? I could not tell you.

WEDNESDAY, 21 JULY, 1897.

Present:—

Mr. BAVISTER,	Mr. HARRIS,
Mr. CANN,	Mr. HAYES,
Mr. F. CLARKE,	Mr. ROBT. JONES,
Mr. COOK,	Mr. McGOWEN,

Mr. NELSON.

W. J. LYNE, Esq., in the Chair.

Arthur Latimer McCredie sworn, and examined:—

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605. *Chairman.*] What are you by profession? Architect and engineer.
606. You have been constructing the telephone tunnels, have you not? Yes.
607. You have done the work of preparing the specifications? Yes.
608. And of supervising the work generally afterwards? Just so.
609. Will you state how you came to have to deal with the telephone tunnels? It was originally an idea of the City Council to have telephone tunnels laid in the street, and a letter from Mr. Manning, who was then Mayor of Sydney, to the Postmaster-General, asked that inasmuch as Moore-street was then opened out, opportunity might be taken to have a telephone tunnel put in the street. I think that was about the origin of it so far as our firm—that is, A. L. and G. McCredie—were concerned. Previous to that, there had been some telephone wires laid through a little tunnel in George-street, but we had nothing to do with that.
610. That small tunnel was made before you came to deal with the matter? Yes.
611. How did you come, then, to be brought into the matter at all? I think it was owing to a minute written by Mr. Kidd, who was then Postmaster-General, to Mr. Cracknell.
612. Did you see Mr. Kidd? No; I did not see Mr. Kidd at first.
613. Did any of your firm see Mr. Kidd? I am not certain whether it was Mr. Cracknell or Mr. Kidd who was seen first.
614. I want to ascertain how you came to be entrusted with this work? Mr. Cracknell sent for one of the firm, and I think it was I who went to see him, and consulted with reference to which was the best way to take these wires off the street where they were on poles; and I told him that I thought the best way would be to have tunnels for telephones made through the street.
615. Had you any previous communication with Mr. Kidd? Not that I know of. I cannot remember.
616. After that conversation with Mr. Cracknell you were appointed? Yes.
617. And you were instructed to make designs? Yes.
618. Was the payment arranged? Yes.
619. What payment were you to get? Five per cent. on the cost of the work done.
620. What tunnel did you first start upon? The one at Martin-place.
621. Was that carried out under your supervision? Yes.
622. By contract? Yes.
623. Who was the contractor? Chambers and Grocock.

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624. Was that specification similar to the specification under which the tunnels that have since been done by day-work have been made? Something similar.
625. But was it the same? Not exactly the same.
626. What was the difference? We modified it. We found it was necessary, for instance, to make some modifications of the way in which the racks were to be fastened to the wall.
627. Was the thickness of the brickwork the same? Yes.
628. Was the thickness of the cement the same? Yes.
629. *Mr. McGowen.*] Were the general principles right through the same? Yes; right through.
630. *Mr. Cann.*] Were the dimensions the same? Yes.
631. I thought the latter tunnels were higher? Yes; they were higher.
632. *Mr. Cook.*] Then what did you mean by saying that the dimensions were the same, when you now say that the tunnels were higher? They were higher.
633. *Mr. Bavister.*] To what extent? The new tunnels were 5 ft. 9 in.
634. What were the others? 5 ft. 6 in.
635. *Mr. Cann.*] That is one course of brick? Yes.
636. *Chairman.*] You have mentioned one tunnel you had done by contract? Yes.
637. Were there any others done by contract? No. 1 and No. 2 sections were done by contract.
638. That is excluding the small one you spoke of as not having anything to do with? Yes.
639. Which is No. 3? No. 3 was the one up to Clarence-street.
640. Was that a contract tunnel? No; day-labour.
641. Can you state the time, or about the time, when you were appointed by Mr. Kidd? It was in the year 1892.
642. And you did these works at once? Yes.
643. Have you an idea when they were completed? No. 1 was completed in the year 1892.
644. When was No. 2 completed? No. 2 was completed in 1895, I think.
645. And on the completion of No. 2 did you cease work for a time? Before No. 2 was completed tenders were called for No. 3, and then withdrawn, and the work went on by day-labour.
646. Do you know what was the cause of the delay between the completion of No. 2 tunnel and proceeding further with the work? There was a long delay after No. 1 was done, and work was not started again until three years afterwards—until 1895.
647. What was the cause of that? Depressed times, Bank smashes, and that kind of thing.
648. Mr. P. B. Walker said Mr. Cracknell's death? Yes, that came in too.
649. I understand there was no delay after No. 2 tunnel was finished? There was no delay then; we went right on.
650. You have seen complaints as to the work in the tunnels that have lately been completed, or nearly so? Yes.
651. Are those tunnels built with the same class of bricks as the other tunnels were built of? Yes, they are.
652. As good? Yes.
653. And is the cement as good? Yes.
654. Where did the cement come from? Goodlet and Smith's.
655. What test was it put under? We simply had a practical test of it; we did not put it under any test by machine.
656. Did you put it under what is known as the hot-water test? No; we did not. We had a table of tests presented to us attached to it.
657. Can you tell me whether the hot-water test was applied to the cement used in the other tunnels? No; it was not.
658. Were these bricks refuse or the remnants of any condemned bricks? No; they were good bricks.
659. You have heard complaints made about the packing of the tunnels? Yes.
660. Is the packing good? Yes.
661. Is it the usual kind of packing in work of this description? Yes.
662. Are there any vacant spaces of which you are aware in the top of the packing under the boards? None at all.
663. You were present yesterday when the Committee were down examining portions of the tunnels? Yes.
664. What is the reason why at certain parts under the boards there are spaces varying from 6 to about 9 inches? The reason of that is that the space at one side of the cap-piece cannot practically be filled—there is a difficulty in filling it. If the cap-piece is across the top of the tunnel the packing is packed well up against the further cap-piece.
665. The plan now produced by you marked B 1 is a plan of what? It is a longitudinal section of the method of construction. [*Vide Appendix* B 1.]
666. You hand this plan is? Yes.
667. How do the men start to pack? They start to fill from No. 1 cap-piece towards No. 2 cap-piece, and they pack under the boards and hard against No. 2 cap-piece, packing as they go, and backing towards No. 2 cap-piece, until they come close under No. 1 cap-piece. That leaves a space on the side of No. 1 cap-piece facing No. 2 cap-piece, the thickness of the cap-piece itself.
668. Starting now from No. 3 cap-piece, how do you work to meet No. 2 cap-piece? No. 2 cap-piece is the centre cap-piece. We back out from No. 2 cap-piece towards No. 3, and repeat the same mode of packing as shown in the plan.
669. *Mr. F. Clarke.*] So that every alternate cap-piece shows a slight space? No. 2 is the starting-point, and the men back towards No. 3 and so on, and the space would therefore be at that side on the side of cap-piece No. 2, and on the other side, starting from No. 2 to No. 1 cap-piece, the space would also be on the side nearest to No. 2 cap-piece.
670. *Mr. Cook.*] But I take it you do your best to get up behind the cap where the space is shown? Yes.
671. *Mr. Robert Jones.*] Is that space large? Not of any great size.
672. What is the thickness of the cap-piece? About 3 inches.
673. *Mr. Cann.*] What is the space between your lath and the cap-piece? It may be about ½ inch.

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674. It would be controlled by whatever slope you gave the lath? Yes. Of course, if it is a short poling-board there is more tilt on it.
675. Whatever extra tilt you gave your lath would add to the space behind the cap? Yes.
676. *Chairman.*] You were with me yesterday when I was examining this special work? Yes.
677. How is it that some of those spaces were as deep as 9 inches—and generally varied from 6 to 9 inches? I could scarcely say.
678. You saw me measure them? Some of them I saw measured
679. *Mr. Cann.*] What is the thickness of your lath? One and a quarter inch.
680. And in the measurements did you not measure from the top of your packing to the top of the laths? I did not measure them at all. I only saw Mr. Lyne measure them.
681. *Chairman.*] Did you see me measure from the top or the bottom of the lath that remained alongside? I saw you take some measurements, but I did not particularly notice. That packing there was good packing, although it was about the worst of the kind that had been opened for some time. The packing was solid, and hard up against the poling-board.
682. That was under the footpath in Pitt-street? Yes. The plan shows the bridge bearing on the top of the cap in such a way as to give space for the laths to be driven for the next set.
683. You now put in section marked B 2? Yes; a cross-section of the tunnel. [*Vide Appendix* B 2.]
684. How is the space filled in between the outer edge of the tunnel and the woodwork at the sides and top? It is filled in with fine quarry cuttings from quarry excavations.
685. Has that been substantially and properly done all through? Yes.
686. You were with the Committee yesterday when they examined that opening in Park-street? Yes.
687. What is the cause of the subsidence under the concrete or cement under the blocks? I believe that was a former subsidence caused by previous tunnelling and excavating.
688. Are you aware of your own knowledge what tunnelling and excavating that refers to? There was a tunnel cut under that concrete by the Hydraulic Power Company to lay a pipe.
689. And you think that that trouble has been the result of that excavation? That, and then there had been another trench for a pipe or water-main laid down the street towards George-street. There had been a number of water-pipes and drains in that portion of the street. There were evident signs of the water having travelled through the ground.
690. Water from the surface? Water that had percolated by some means under the blocks.
691. From the surface? Either from the surface or from leakage from pipes in the street.
692. You saw that subsidence? Yes.
693. Did you form any opinion about the depth of the space that was left under the concrete from the subsidence? It was about from $3\frac{1}{2}$ to 9 inches. There was a pot-hole in one spot about 18 inches.
694. And did the work that you did underneath tunnelling disturb that portion at all? No; a drive was put through in the usual way by good, careful men.
695. Did you inspect that portion at all as it was going through? Yes.
696. Did you notice any fault above where the men were working? None whatever.
697. Then the ground at that time above seemed sound? Yes; it seemed sound and solid.
698. And you drove the laths through to support it? Yes.
699. When the men were doing the work? Yes.
700. Did you use woodwork in the same way in the contract tunnels? Yes.
701. Just the same? Yes.
702. The same size? Yes, I think so.
703. The same class of timber? Yes.
704. What kind of timber generally is it? It is various hardwoods—tallow-wood, mahogany, and spotted gum.
705. There was no decayed wood put in? None whatever.
706. Or inferior woods? No.
707. Can you say what is the life of that timber placed as that is? It would be about from fifteen to twenty years. I know of timber that I have taken out of excavations that has been fifty years down, and good then. This timber might possibly live as long as that.
708. Do you know whether in the sewer tunnels that have been constructed under the Sewerage Branch of the Works Department they used timber in the same way? Yes.
709. And left it there? Yes; we have come across it.
710. *Mr. Cann.*] Can you say whether it is the usual practice to leave the timber in that way? Yes; it is the usual practice.
711. *Mr. F. Clarke.*] In all cases? Well, of course, there are some cases where they can draw it, and then they draw it; but that would be exceptional. It is a common practice at Home. It has been used in large engineering structures at Home under roads, and it is being used by some of the best authorities—Sir Frederick Bramwell, for instance—and I have illustrations here showing works that have been carried out, and the timber left in inferior timber to ours, because it is a softer timber—but it is left in even under canals, where the water percolates and the packing is brickbats.
712. *Mr. Cann.*] I suppose that where there is a running ground, you run less risk by leaving the timber in than you would by drawing it? Yes.
713. Where there is hard ground you can easily draw it? Drawing it would disturb the upper surface.
714. *Chairman.*] Is this ground you worked in to form these tunnels running ground or hard ground? It varies; some is sandy, loamy ground, some is loamy, clay ground, some is gravelly ground, and some is made ground. There are various kinds of ground right through.
715. *Mr. Robert Jones.*] Is it a fact that some of the excavation was made in running ground? Not that I am aware of.
716. Near the railway station? That was sand. That is what we found in the shafts; but the tunnel was on the rock there.
717. *Mr. Cook.*] But you had to go through sand to it? We had to go down through the sand by shafts to the tunnel.

THURSDAY,

THURSDAY, 22 *JULY*, 1897.

Present:—

MR. BAVISTER,	MR. HAYES,
MR. CANN,	MR. ROBT. JONES,
MR. COOK,	MR. McGOWEN,
MR. HARRIS,	MR. NELSON,

W. J. LYNE, ESQ., IN THE CHAIR.

Arthur Latimer McCredie, Esq., appeared in person, on his own behalf.

Arthur Latimer McCredie recalled, and further examined:—

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718. *Chairman.*] I asked you some questions yesterday about the packing above the boards, to which you replied, but I do not think I asked you a direct question in reference to the packing as exposed in that opening in Park-street—the packing by the side of the tunnel and between the top of the tunnel and the boards;—you saw what was exposed at Park-street? Yes; I saw the ends of it over the haunches of the arch.
719. As that packing is seen now, does it appear to be bad packing? No; it seems to be good packing.
720. I mean, does it appear to be insufficient? No; it does not appear to me to be insufficient. Of course, it has been taken out, and you cannot judge correctly about it at the present time.
721. I am only speaking of it as it looks now; I do not know what has been done to it;—are there any holes or faults in it? Not that I know of—not in the packing over the arch.
722. Nor down the sides? None that I know of.
723. You saw it? Yes.
724. You did not see any faults? No.
725. I also asked you a question yesterday about the cement used, and I think you said that it was good cement, but was not subjected to what is known as the hot-water test? Yes; I said that.
726. Was any of that cement cement that had been rejected elsewhere? Not that I know of.
727. Was any of it bought from Carter, Gummow, & Co.? Yes; 400 casks, I understand.
728. Was that cement that had been rejected anywhere else? Not that I know of.
729. Was it not rejected by the Public Works Department? Not that I know of.
730. Do you know whether it was, or was not? I do not. It was represented to us as surplus stock. I know it has been stated in the paper by Mr. David Davis that 5,000 casks of condemned cement had been used on the job. That was entirely false. The fact is that 400 casks of cement had been used on the job other than that obtained from Goodlet and Smith.
731. Was that the cement purchased from Carter, Gummow, & Co.? Yes.
732. *Mr. Cook.*] Was it purchased direct from Carter, Gummow, & Co.? No; not direct from Carter, Gummow, & Co. It came about through an agent going to Mr. Donald and offering this cement. Mr. Donald told me about it. He said that this cement was good cement, and was used on Government jobs, and that it was cheaper than the usual run of cement. For some time I demurred about having it. He said it was surplus stock. However, it was found out that it was Carter, Gummow, & Co.'s cement, and that they were Government contractors. It was surplus stock of some cement they had used on contract works. I gave way then. I said, "It must be good if it is used on that sort of work, but you had better get some of this cement and try it."
733. How did you try it? We tried it on some bricks alongside of others. It was set for some time, and we examined it and tested it in that way, and found that it was as good as any other.
734. Did you subject that cement to any of the ordinary severe tests to which some cement is subjected? No; we did not.
735. Or did you subject any of the other cement to such a test? No; we did not.
736. *Mr. McGowen.*] Did you put this cement to the same test as the other cement you were using? Yes; we put it alongside of it, and it seemed good cement.
737. *Chairman.*] You know Mr. Donald? Yes.
738. Have you known him for any length of time? Since he has been the clerk of works.
739. Did you know him before? I did not. He was appointed clerk of works when I was away in Queensland.
740. What are Mr. Donald's duties? He supervises the work as clerk of works.
741. Does he deal with the employment of the men, or do you deal with it? He deals with that.
742. And not you? No; not I nor my brother.
743. Then you know nothing about the employment of any labour? No; I know nothing about the employment of the men.
744. Nor the qualifications of the men? No; except what I see of them.
745. *Mr. Cann.*] Did you supervise the mining portion of the work—that is, the tunnelling—before you put any brickwork into the tunnel? I was through it from day to day.
746. You did not stay constantly with the men, watching them? No; I could not do that.
747. That is the duty of your gangers? Yes. There were foremen there in whom we placed every reliance, and they attended to that part of the work. My visits were daily visits in the drive and in the tunnel.
748. As regards the process of timbering, I suppose you would only see the timber when it had actually been put into the drive? That is all.
749. And see that it was standing all right in the drive? Yes.
750. You would not see if any slips were made by letting the ground run above the laths, or anything like that? I could not possibly see that. All I could see would be the poling-boards.
751. And the method adopted? Yes; and it seemed to be done thoroughly well, everything seemed satisfactory, tight, and good any time I saw it.
752. I suppose it would be better to examine the ganger as to how they did the work? I expect so. He would be there constantly. The men employed on the work were the very best procurable—men who had been used to the constructive part of the Water and Sewerage Board's work—men who had been working in the city before.

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753. In driving home what you call poling-boards, and what I call laths, did they put them in by driving, or did they put the laths in after they had taken the ground out for a full set? In putting the poling-boards through they drove the boards on to a false cap first, and then, as they cut forward, they drove the boards over that, driving forward until they came to the face, and they then put in a set the length of the poling-board.
754. That is to say, they drove their back laths home first? Yes; they follow the drive up with the back laths or poling-boards.
755. *Mr. McGowen.*] I understood you to say in answer to Mr. Lyne that Mr. Donald was clerk of works;—am I to understand you to mean that he was holding that position when some of these tunnels were done under the contract system? Yes.
756. You had plenty of opportunity from your practical knowledge, and the supervision you gave the work, of seeing whether the men who were employed under the day-labour system were or were not qualified for the work? Yes.
757. What is your opinion;—that they were qualified? Yes; they were qualified good men.
758. They had been at the same kind of work before? Yes; they were all practical men who had been used to that class of work.
759. *Mr. Nelson.*] When the tenders were called for the first contract, was there not a clause in the specification to the effect that the work should be done underground, and not in open cut? Yes.
760. That is what the contractors tendered for? Yes; but at the same time they could get permission to do the work in open cut.
761. Was there a clause to the effect that they could get permission to do that? Yes, practically.
762. You are sure there was a clause to that effect? Yes.
763. Is it possible to get a copy of that specification? Yes.
764. Is it customary for you to give advice as the work proceeds, as to whether the work shall be done by open cut or by tunnelling, or is that left to Mr. Donald? That is left to Mr. Donald.
765. Referring to the opening in Park-street at the present time, I suppose you have looked at it carefully? I have looked at it.
766. What is your opinion as to the cause of the subsidence there? It is a difficult thing to state. There seems to me to be a complication of causes. It is one of those things you cannot clearly account for. At the crossings of all streets there are a great many pipes, and a great many old drains and sewers, and with these pipes, drains, and sewers there is sure to be some settlement against the sides of them, or over the top of them. Take, for instance, old sewers. We have found old sewers with a water-channel down each side of them—positively running water passing down the sides of the old sewers. That must exert a great influence in bringing stuff down from the top.
767. There are no sewers on each side of the place you are speaking of, are there? Yes; there is a sewer or a big drain-pipe, I think, across the top of the tunnel.
768. Would that be where it is opened? It is close to the footpath. Then there is a hydraulic pipe across the street, and there is also a pipe running down the street towards George-street, and you can see that the filling under that has subsided a little. The great difficulty is that water-pipes may be leaking, and valves sometimes leak, and you cannot see it above ground, or somewhere on the top of the street a vent may be made which lets the water in, and it travels underneath the concrete.
769. What is the excavation—about 7 feet? Yes.
770. Presuming you got your timbers—the sets of poling-boards—in and your brickwork completed, and that the space between the brickwork and the poling-boards was not filled in, water coming on to the surface and percolating through would have a tendency, would it not, to make that ease off in the centre and spread to the right and left? If water were to drop on to the top of the arch it would fall down on to the haunches.
771. Presuming you have a quantity of earth on the top of the crosswood, and the space between the top of the arch and the wood is not filled in, water having access to the surface would have a tendency to cause that to subside right in the centre and spread off on each side, would it not? If it came down from the surface filtering the stuff away in the centre, of course it would have that effect.
772. What depth of clay had you in your heading going through Park-street? I think about 4 feet, or a little more.
773. I suppose you did not give instructions as to whether they should have an open cut there? No.
774. But, from your experience as a practical man in work of this kind, do you not think that it would have been better to have had an open cut there instead of a drive, considering the small head and the peculiar nature of the soil? We have always tried to have open cuttings, but, as you will understand, it would have been difficult to have an open cutting in that street. We did not wish to interfere with the convenience of owners of shops, and it is a street where there are a great many passage-ways continually used. Therefore, an effort was made there to do the work in such a way as to cause the least inconvenience to the public. That was the sole object of timbering. Of course, we always kept that in view. It was always understood that if any settlement took place—and you may, of course, always look for some settlement—we were ready and willing to put everything right.
775. According to your experience, is it at all times customary to leave the sets in the cuttings? It is very often done.
776. Has it ever come to your knowledge that in a contract the Government have had to pay for timber left in, or to pay for withdrawing the timber? They pay for all the timber left in.
777. It is customary to specify in Government contracts very often that the timber shall be withdrawn? Yes.
778. But what if the engineer feels so disposed and the timber is left in? Then the timber is paid for at a certain rate.
779. *Mr. Cook.*] There is always a clause in the specifications leaving it optional for the engineer to have the timber either withdrawn or left in? Yes.
780. *Mr. Nelson.*] With regard to the cement, you say that the Department bought 400 casks of cement from Carter, Gummow, & Co.;—you accepted that, I suppose, as what is called tested cement? Yes.
781. But in connection with Government contracts they generally insist on having their own test made, I think? Yes.
782. You have had no test made of this cement? No.

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783. You have taken it as tested cement, and I suppose that one of the Departments made a test and gave a certificate? Yes.
784. You had no test made yourself? No test whatever of that cement, except a practical trial.
785. What would you term a practical trial? A test with the bricks.
786. That is to say, you put a certain number of bricks together with the cement? Yes.
787. That is not the usual system adopted by the Government? No.
788. They make brickettes, and test them with hot water? Yes; but if you have to get a test of brickettes, what becomes of the countless casks of cement you are using.
789. What Department was Carter, Gummow, & Co.'s cement obtained from? The Sewerage Department.
790. You saw some of the timbers lifted on the crown of the tunnel at Pitt-street the other day? Yes.
791. Did you observe the quality of the packing underneath the timbers? Yes.
792. Did you notice any difference between the packing on the top of the tunnel and the packing underneath the poling-boards? Yes.
793. Did you observe the packing on the crown of the tunnel in Park-street? Yes; the filling.
794. Did you notice any difference in the two materials? Yes; the materials vary.
795. Was the packing at Park-street of the same nature as the packing in Pitt-street? Not exactly. The materials used for packing vary according to the position they are placed in.
796. You would not think that a loamy clay of a friable nature is good packing? Well, it is not bad packing, provided it is rammed.
797. But, in Park-street, was there anything to indicate, so far as you saw, that it had been rammed? It seemed to me that it had been rammed, but, of course, I did not see that until it had been disturbed.
798. But, as it appeared when we were there the day before yesterday, did you think from the indications that it had been rammed? Yes. You could test that by trying to put a bar into that packing, and also into the trenches over the pipes, and you will find there is a big difference, and that proves conclusively that it was rammed.
799. What is the difference? One is so much stiffer than the other that you cannot get a bar into it at all.
800. You are speaking of a bar being inserted vertically? No, horizontally.
801. I did not see any effort made to put a bar in? But, of course, an effort could be made at any time. I have seen a bar attempted to be inserted and it was not an easy matter. The Corporation men have attempted to do that themselves. There is a wonderful difference between the packing round the pipes and the packing round the arch. That is to be seen after all this lapse of time.
802. I take it that you drafted the specification for this work? Yes.
803. And you are, practically speaking, the head engineer over the work—what are your duties supposed to consist in? Inspection, consultation with the clerk of works, and general supervision.
804. You do not keep a man constantly supervising the work? No.
805. It is periodical business? Yes.
806. You have one leading man there, practically speaking, as an engineer? Yes.
807. Who provides him? The Government. The Government pay for all the men; I have nothing to do with that.
808. Then it is his duty to see that this work is properly done? Yes.
809. And to report to you? Yes; if there is anything not done well, or anything he may wish to consult me about.
810. *Mr. Cook.*] As a matter of fact, he has always been under your direction? Yes.
811. You visit these works daily? Yes.
812. *Mr. Bavister.*] Referring to the packing, some confusion seems to have arisen;—where the work is done in tunnel and the whole of the timber is left in, can any packing be done on the top of the poling-boards or laths—can a man get there to do that, by any means? No, not from the tunnel.
813. Assuming that the upper portion of the ground has not been interfered with, and that the only means of access the men have is from the inside of the tunnel, can they then pack above the woodwork? No.
814. So that whatever appears above the wood could not have been done after the wood was put in position? No.
815. Now I wish to call your attention to the cement and cement tests;—if the work were being done under contract, would you expect that, for work of the same character as that in this tunnel, the cement or any material should be submitted to such a test, or such a class of tests, as would be required if it were being used for sewerage or waterworks construction purposes? No; I would not. This tunnel is not a sewer, it is simply a passage-way.
816. Would such a test be necessary for this work? No.
817. Would it be customary? No; I do not think so.
818. Was any guarantee given by the vendors of this cement which was purchased—supposed to have been Carter, Gummow, & Co.'s—as to its having passed a test? It was stated that it had passed a test, and they presented a copy of the Government certificate.
819. You treated that as being a *bonâ fide* statement, made in good faith, and only on that condition did your purchase the cement? Yes.
820. Was the whole of these 400 casks of cement used, or was any of it rejected? There were 400 casks used.
821. Out of 500 casks supposed to have been purchased? Yes.
822. But 100 casks you refused to take delivery of? Yes.
823. So that you made some examination of the cement for your work? At first.
824. And that which you found unsuitable you rejected without hesitation? My officers did.
825. We have it stated in the earlier part of the evidence that the first wires that were put underground were put in a small underground-way across from the General Post Office to the corner of Barrack-street? Yes.
826. That was done under contract? Yes.
827. Can you tell us the dimensions of that passage-way, or how it is constructed? It was about 2 ft. 6 in.
828. Was it constructed in brick? Yes.
829. In tunnel? Yes; just a narrow passage-way across the street.
830. *Mr. Cook.*] Had you anything to do with that? No.

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831. *Mr. Bavister.*] Have you any knowledge as to the difference, if any, between the level of the bottom of your tunnel and the foundation for the stores that are being constructed in Pitt-street for the Civil Service Co-operative Society? No; I do not know where the foundation of the building is; but the tunnel is about 12 feet deep.
832. Some reference was made to the fact that Mr. Donald occupied the position of clerk of works in connection with some of these tunnel works which were done by contract;—can you specify which they were? No. 2.
833. Where is that? No. 2 extends from Moore-street to the Exchange.
834. Was the specification as to the work being done either by tunnel or open cut the same in the case of tenders which were called for the work, which was ultimately done by day-labour, as for that which was carried out under contract? Yes.
835. Was any portion of the work done by contract carried out in open cut? Yes.
836. Was special permission obtained to enable that to be done? Yes.
837. Did the City Council, or any authority acting under them, object to the work being done in open cut, and request that it should be done in tunnel? Yes; they did, at the Exchange end.
838. Now, as to the matter referred to by Mr. Nelson in connection with the Park-street–Pitt-street excavation, where it is broken open, did you see any evidence of water having travelled between the concrete and the top of the soil at any time? I could not say that.
839. In all cases where the street levels are lower than any surrounding open ground, does it not follow, as a matter of course, that the water falling on that, and getting into the subsoil, must finds its way to the lower positions? Yes.
840. Would not such water find its way through the subsoil under the wood-blocks, and then find its natural vent wherever excavations have been made? Yes.
841. Do you know anything as to the formation of the strata between Hyde Park and this tunnel—is the natural formation of the ground a dip from Hyde Park towards your line of tunnel? Yes.
842. In the ordinary course of nature, would not the greater portion of the water gathered on Hyde Park percolate through the surface of the ground, and gradually make its way to your line of tunnel, unless intercepted by some deeper excavation? It is quite possible.
843. Could that be shown by an excavation, or by breaking through the wood-blocks and the concrete at any position slightly higher than the excavation at present in Park-street? I think it could.
844. In your opinion, to put the matter beyond doubt, could such a breaking-through take place, for the information of this Committee? I think it would be of advantage to the Committee to have a test hole made.
845. Could the doubt on that head be removed without such a step being taken? I do not think so.
846. Supposing the line of the soil is at some position higher than the crown of the arch, and the water on the surface of that soil be led towards the tunnel, how could it possibly get over the intervening space between the side of the excavation and the crown of the arch, which would be at least 4 feet, unless provision were made to lead it there;—instead of that would it not have a tendency as soon as it reached the edge of the cutting to go straight down to the bottom of the excavation at the point of least resistance? It would go down the side of the undisturbed soil.
847. Is it not a fact that the earth some 3 ft. 6 in. above the poling-boards and beneath the concrete has shown considerable settlement? Yes.
848. That being so, must there not be a line of fracture of the earth from the edge of the tunnel, extending away from the line of the tunnel? Well, if it gets down, there must be some means of conveying it down.
849. We have got it admitted that there is a settlement over the boards and under the concrete? Yes.
850. That settlement having occurred, there must have been a fracture in the earth? Yes.
851. Would not the water go into that fracture and get down to the excavation instead of over the centre of the arch? Yes.
852. *Mr. Hayes.*] Would that not depend on where the fracture was, whether over the centre of the arch or down near the haunches of the arch? It would depend on where the fracture was.
853. *Mr. Bavister.*] Admitting that the line of fracture is in the centre of the depression and over the arch, would not the very breaking down of the earth causing that central depression create a fracture at the sides where it left the main body of earth? Yes.
854. And would not the water get down there before it could reach the central depression over the centre of the arch? Yes.
855. I want to call your attention to the work that was opened in our presence between Market-street and Park-street;—as the work was opened and the boards were removed, did you see any evidence of water having passed between the packing and having carried with it some of the surrounding earth and deposited it on the crown of the arch? I cannot say that I did.
856. If water had passed through the packing, would it not have carried any loose earth with it? If it passed down through the topsoil it would carry some topsoil with it.
857. Do you know anything of the system of city drainage for the purpose of carrying away surface water from Hyde Park and its surroundings? I cannot say how that is done.
858. But in all cases of rainfall a proportion of the water passes through the soil into the subsoil? Yes.
859. And that will follow the general trend of the subsoil till it meets some excavation or tunnel to get away through? Until it gets to a point it can discharge into.
860. The portion of Hyde Park having a fall towards Elizabeth-street is very considerable? Yes.
861. And in the case of heavy rainfall a large quantity of water would drain into the subsoil? It would.
862. If a long-continued fall of rain took place at any time subsequent to the construction of this tunnel, the tendency would be for a considerable amount of water to go in that direction? Yes; it would.
863. In travelling through the streets of the city, especially over wood-blocking and concrete, have you noticed any considerable amount of vibration and sounds indicating cavities underneath? Yes; there are places where there is a drum-like sound.
864. In all cases where wood-blocks are laid is not the under side of the concrete considerably below the surface of the footpaths? Yes.
865. And in most cases considerably below the level of the street crossings? Yes.
866. Therefore, water that got into the position I have indicated would naturally find a channel under the concrete? Yes.

867.

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867. And the more water travelling through the greater will be the channel? Yes.
868. *Mr. Cook.*] Has the timber all been left in the contract work? Yes.
869. Just the same as in the day-labour work? Yes.
870. If you had had your own choice, and had been able to use your own discretion, you would have had it withdrawn? I would prefer to have open cut, but if obliged to tunnel I would leave the timber in.
871. Supposing that you had the choice of open cut or tunnel? I would prefer open cut.
872. You would not have to put any timber in? Some timber would be required at the sides of the open cut.
873. You simply put other timber in because you were compelled to tunnel? Yes.
874. And, as a matter of fact, even in tunnelling, you had the greatest possible difficulty in getting up that street, owing to complaints of one sort and another? Yes, frequent harassing complaints, even in reference to the shafts—people begging of me not to interfere with their premises, and threatening to write to you about the matter. I had many annoyances of that kind.
875. *Chairman.*] Was it you who gave evidence in reference to the tunnels that were done by Carter, Gummow, & Co.? No.
876. Was it your brother? Yes.
877. Had you anything to do with the examination of those tunnels as to the alleged faults? No.
878. Do you hold the highest classification as an engineer? I am a Member of the Institute of Mechanical Engineers.
879. Not a Member of the Institute of Civil Engineers? No.
880. *Mr. Harris.*] Yesterday you said that good hardwood timber was used, and you mentioned spotted gum;—would you say that that would last fifteen or twenty-one years underground? That would depend on the nature of the soil it was in—how closely it was packed.
881. You also said that in all the packing you used spawls? Fine stuff put down the side.
882. Where did you get that from? It was rock from the tunnel excavations.
883. Were you allowed to keep the stuff on the streets in any place? Not for any great length of time. It was stowed below in the tunnel so that the street should not be blocked with it.
884. When some of these places were open, were any spawls found round the tunnel? Yes; when the bar was put down to the bottom you could feel them.
885. Can you tell us what the brand of cement bought from Carter, Gummow, & Co. was? Try's.
886. Is that a German make? No; Colonial.
887. You mentioned the sewer-pipes in Park-street;—do you know what distance they would be from the foothpath? I could not tell you, but the distance does not seem to me to be more than 3 or 4 feet. Of course I cannot see them.
888. Is it usual to leave timber in these cuttings so near the surface? It is the practice at Home to leave it very close to the surface, even under water-channels, where you would think the water would be liable to percolate through the soil. That has been done under the Bridge Water Drainage Works Canal, Manchester.
889. *Mr. Cook.*] Who was the engineer for that work? The district engineer for the borough. Sir Frederick Bramwell has used timber not only over the arch, but supporting the whole structure itself, and the presumption is that that timber is of a far inferior class to ours, because it is mostly softwood.
890. I take it that the leaving in or the taking out of the timber would be a matter in regard to which experts would differ in opinion? Yes; some would say that they would not leave the timber in, and others would say that they would. A gentleman told me yesterday that he had done many hundreds of yards of milling work, and had never taken any timber out.
891. *Mr. Harris.*] Is it a fact that in some of the openings made lately, in filling in, you had four men ramming to twelve men throwing in? I can scarcely answer that question, because I am not there all day. It is open to the public to see for themselves. Whenever I have been there, there has always been one man ramming to each shovel.
892. In Park-street we saw no timber on the top of the tunnel;—where had it all gone to? That was taken out.
893. Who took it out? I do not know.
894. Was there timber on that part as well as on the others? Yes; that is where the public are being led astray in regard to that hole. The timber has been lifted, and the packing removed.
895. *Mr. McGowen.*] You do not know who took either the timber or the packing off? I did not see it done.
896. Was it done by Government servants? No; the presumption is that it was taken off by the Corporation men.
897. *Mr. Cann.*] Was the timber that had been taken off there when your attention was called to the hole? No; I did not see it.
898. Was it taken right away from the place altogether? Yes; I never saw it.
899. *Mr. Cook.*] In taking out a section of polling-boards near the surface in Park-street, where the hole has been made, how would the men loosen them? They would have to spring them up.
900. I thought they were placed under a bearer at each end? Yes; under and over—one end under, and the other over.
901. They would have to spring them up? Yes.
902. And in getting those timbers out they would necessarily maul the place about? Yes; there is evidence of that.
903. You could not possibly rip out timber like that, without making the place look as bad as possible? No; you could not.
904. Therefore in looking at that place now, you are actually looking at a place which has been made to look as bad as it possibly could? Yes; I have been informed that even in taking the filling off the crown of the arch undue force was used—that shovels were used and were knocked on it.
905. *Mr. Harris.*] Is there a tunnel under Market-street and under King-street? Yes.
906. We could get a portion of one of those tunnels opened in order to see the timber used for the arch of the tunnel there? You could not in King-street, because it is right through the rock there.
907. *Mr. Robert Jones.*] Have you heard where any portion of the timber taken away from Park-street is at the present time? I do not know where it was taken to, but I have heard that one piece was taken to the Town Hall.

908.

A. L. McCredie. 22 July, 1897.

908. *Mr. Cook.*] Not from Park-street? No.
909. *Mr. Robert Jones.*] Some of the timber has been taken to the Town Hall? Yes.
910. As to spotted gum, do you, of your own knowledge, know that timber varies very materially because of the difference in the soil where it is grown? Yes.
911. Coast timber is very different from up-country timber of the same class? Yes.
912. Is it your experience that sometimes the life of one will be double that of the other? Yes; you will find a difference between the northern and the southern timber.
913. It depends on the nature of the soil and the district where it is taken from? Yes.
914. So identical timber varies in durability? Yes.
915. There are various ways of testing cement? Yes.
916. Has it been your experience that, in sending a sample of cement to be tested, you would send a sample out of one cask, where you have perhaps 300, 400, or 500, and that would be taken as a sample of the cement you were using generally? Yes.
917. You would send a cask, or a portion of a cask, and have it tested once for all? Yes; otherwise you would be continually testing.
918. As to the open cut and tunnelling, I presume that you were guided to a large extent by the nature of the ground you were working in? Yes.
919. If it were loose, gravelly ground, you would naturally make an open cut? Yes, except sometimes for the convenience of the public.
920. In cases like that of Park-street you would go to considerable trouble, and inconvenience yourself, so as to carry out the work in such a way that it would not interfere with the traffic? Yes. Some portions of the street were tunnelled, and we built the brickwork, and when that was done we lifted the top and removed the timber without packing. That would cause a block for only a very short time. For instance, that portion up Pitt-street where it was opened, and no packing was found in it, it was never intended to have any packing. The timber was being lifted from the top of the tunnel after the brickwork of the tunnel had been completed, and the work was proceeding, and the filling was being put in and tamped when the Water and Sewerage Board men came along and wished to make a connection with the ventilating-pipe in a lane. Mr. Donald then obliged them, and so as not to clash one gang of men with the other, took his men off that portion and sent them on to another part of the work, intending to have them brought back again and complete the lifting of the timber. By some means or other, quite accidental, that happened to be forgotten. As showing the solid nature of the ground, I may say that the top was so firm that it had not been noticed that there was no packing in it. Mr. Donald had always tried to work amicably with all the different bodies in the city, such as the Water and Sewerage Board and Corporation, and if they could point out anything that they thought wanted attending to he would be there at once and have it remedied, and I understood they always agreed to do that; but in this particular case the Sewerage Board men came along with their pipes after this tunnel had been put there. In regard to a great portion of it, they found that everything was all right, and they laid their pipes; but when they came to this part they found a vacancy. The Corporation were at once acquainted with it, and they seized on it and opened the place, and made it look as bad as possible. Unfortunately, a thing like that looks a great deal worse than it actually is.
921. Is it not a fact that water, in the natural course of things, would make to the sides or haunches of your tunnel after percolating through from the surface? Yes.
922. As to the subsidence in Park-street, you drove your polling-boards or laths under what seemed to you solid ground, I presume? Yes.
923. Would it be possible for the disturbance which you caused there to have caused a subsidence between the top of your laths and the bottom of the cement, as shown at present? It do not think it would be possible without our being aware of it.
924. Is it a fact that your action, so far as the driving of the tunnel is concerned, would not in any way assist in causing that subsidence? There is no doubt that in driving the polling-boards there must be some disturbance; but as a proof of the efficient way in which that work was done, I may say that all along the footpath there the subsidence was scarcely perceptible, and the natural inference would be that the men had used the same care in going under that street as they had used in connection with the footpath. In portions of the street you would not have known that a tunnel had been put there, everything was so perfect.
925. *Mr. Cook.*] Was there ever any subsidence in the footpath on the north side of Park-street? Very little—scarcely perceptible.
926. *Mr. Harris.*] Looking at the rest of the work, both north and south of Park-street, are you of opinion that that subsidence must have been caused through something else than your driving the tunnel? Yes.
927. From what we saw the other day of the pipes that were there, would it be reasonable to expect that the subsidence was caused by imperfect ramming by the men there now? It may have contributed to it.
928. The earth is very loose round some of the pipes there now? Yes.
929. That would naturally sag down and settle, and cause a subsidence above, between the cement and the top of the packing? Yes.
930. *Mr. Bavister.*] What was the date of your firm receiving instructions to prepare plans for this work? 2nd March, 1892.
931. Was that previous to the date on which your brother was elected to Parliament? Yes.
932. In regard to the timber, is it not a fact that some timbers will last longer in damp earth, but protected from the air, than they will in a damp position when exposed to the air? Yes.
933. Adverting to Park-street—when you arrived there was it not necessary to divert the tunnel from its intended line in consequence of a sewer being in your way? Yes; that combined with another obstruction.

WEDNESDAY,

WEDNESDAY, 28 *JULY*, 1897.

Present:—

MR. BAVISTER, MR. CANN, MR. F. CLARKE, MR. COOK, MR. HARRIS, MR. ROBERT JONES, MR. McGOWEN.

W. J. LYNE, ESQ., IN THE CHAIR.

Arthur Latimer McCredie, Esq., appeared in person on his own behalf.

Joseph Davis sworn, and examined:—

J. Davis. 28 July, 1897.

934. *Chairman.*] What are you? Engineer for Sewerage Construction, Department of Public Works. I am head of the Branch, and at present I am also acting for the Government Architect while he is in England.

935. You have received instructions, have you not, from the Minister for Works, to examine and report on the telephone tunnels? Yes.

936. Have you made that examination? Yes.

937. And are you prepared with a report? I have made certain notes which I will read to the Committee. It is scarcely in the form of a report; still I think it will answer the same purpose. After receiving instructions from the Minister for Works,—

23*rd July*.—I waited on the Deputy Postmaster-General with regard to making an examination of these tunnels. He informed me that Mr. Walker, the Engineer-in-Chief for Telegraphs, had the work in hand, and that he would give me all the information required. I accordingly saw Mr. Walker, and he explained to me the position in regard to the tunnels, and introduced me to Messrs. McCredie Bros. I examined the plans and longitudinal sections of the work, and they supplied me with copies of the specification for the 2nd and 3rd sections, the 2nd section being from Pitt-street near the Post-office, along Pitt-street to Bridge-street, and was carried out by contract. The 3rd section, for which tenders were invited, but which was eventually carried out by day-labour, is from the west side of Pitt-street along Martin-place to Clarence-street. They informed me that the specification referred to described the class of work and a quality of material that were not only used in the work carried out by contract, but also in the whole which had been carried out by day-labour.

24*th July*.—In company with Mr. A. McCredie, I visited Park-street, and made an examination of the opening which is made in the street, at the intersection of Pitt and Park streets. The Corporation, I found, had removed the whole of the wood-blocks on the line of the tunnel, and had also removed the concrete and earth over the crown of the tunnel, exposing the brick arch for a length of 7 feet by the width of the tunnel. The tunnel had been driven in material composed of clay and ironstone, leaving about 3 feet of earth between the polling-boards and the bottom of the concrete underneath the wood-blocks. The tunnel had been protected by timber composed of 9 in. x 3 in. hardwood uprights, and 9 in. x 3 in. hardwood caps, with polling-boards 2 in. to 4 in. apart, 1½ in. thick, in the roof. The packing immediately over the arch and under the polling-boards is composed of clay, and, while fairly filling the space, had not been rammed. It is evident that when the tunnel was being driven, a larger quantity of earth was removed in the roof than was necessary to put in the timber, and, as a consequence, after the timber had been put into the tunnel a considerable space was left over the polling-boards. Ultimately the earth lying between the cavity and the concrete under the wood-blocks settled on to the polling-boards the whole width of the tunnel. This has had the effect of causing a vacant space immediately under the concrete, varying in depth from 3 in. to 12 in.

Judging by the nature of the ground exposed at this point, and also from what I know of the material immediately under the surface in different parts of the city, I am strongly of opinion that an error has been committed in attempting to tunnel under such circumstances. Even if every care is taken, where a tunnel is so near the surface as the one in question, with such soft ground forming the roof, it is most difficult to prevent cavities forming over the timber. When such do occur, settlement takes place, and finally subsidence of the surface. In addition to this danger, there is the difficulty of packing the spaces between the crown of the tunnel and the inside of the timber, and also the fact that eventually the timber must decay, although, no doubt, that would be a long time hence. Then, again, from a financial point of view, the tunnels in my judgment are a mistake. The excavation in open trench could be done very much more cheaply than a tunnel could be driven, and, in addition to this, the cost of putting the brickwork in tunnel would be more than in open cutting.

26*th July*.—In company with Mr. Arthur McCredie and Mr. Chamier, on behalf of the City Council, I made another examination of the arch of the telephone tunnel where it was stripped by the Corporation, at the intersection of Park and Pitt streets. I had a little more of the packing on each side of the opening removed. This confirmed me in my previous opinion—that, while the space was fairly filled with clayey material, the packing had not been rammed. I also had a portion of the brickwork taken out. This showed the bricks to be of a soft nature, and the mortar very inferior. The bricks had in some cases been very badly bedded, while in others the bedding was fair. I removed one of the bricks and had it tested for porosity, with the result that it absorbed 10·6 per cent. of water. I understand from Mr. McCredie that this brick is a fair sample of those used in the whole of the arch work. It is a wire-cut semi-plastic brick, very rough, and not hard. The first portion of the tunnel examined was that extending from the Post Office at Pitt-street, along Pitt-street to Bridge-street, and for a short distance up Bridge-street, which had been carried out by Messrs. Grocock and Chambers by contract. A portion of the brickwork in the crown of the tunnel was taken out. This disclosed that the bricks were of the same quality as those previously described; that the cement mortar used was excellent, and evidently composed of the proportions of sand and cement specified; that the bricks in the first ring had been solidly bedded; that those in the second ring (with two exceptions, where it was impossible, owing to the presence of caps, for the workmen to have sufficient control of the bricks to properly place them) were also solidly bedded; and that the packing was done in a similar way to that at Park-street. An examination was also made of the concrete in the floor of the tunnel, which was found to be of fair quality, and, in my opinion, composed of the specified mixture, except that Rio stone had been allowed to be used instead of blue-stone.

The next length of tunnel examined was from the Post Office, along Martin-place, Barrack-street, Clarence-street, and on to Darling-street, with its several branches.

This section was carried out by day-labour. An opening was made through the brickwork in the arch of the tunnel, which disclosed that the bricks used were of a softer nature than those which had been used in Park-street and the length in Pitt-street which had been built by contract. The cement mortar was only fair—inferior to that used by Grocock and Chambers, and stronger than that used at Park-street. The bricks had been solidly bedded, and there was no open space between the brickwork and the timbering in the tunnel.

A hole was also put into the brickwork in the arch of the tunnel at the corner of Barrack and Clarence streets. The cement mortar was fairly good—better than that at Barrack and George streets, but still inferior to that used by the contractors in Pitt-street. The bricks had been solidly bedded, and were of a similar quality to those at Park-street.

The next section examined was that along Pitt-street, from the Post Office to King-street. This also was carried out by day-labour. An opening was made in the brickwork at the intersection of King and Pitt streets, when it was found that the bricks had been properly bedded, the compo. fair in quality, bricks of a similar kind to those used elsewhere, and the packing behind the brickwork close. I made a careful examination of the way the work had been finished, and compared the finish of the work carried out by contract with that carried out by day-labour. It is specified for the second and third sections already referred to, that internal faces of the brickwork throughout to be finished off with a neatly-struck joint. I could not describe the finish of the work as in any way corresponding with the specification. The vertical walls have been struck, but certainly not in a neat manner, while the arch is not struck, but wiped off with a bag. This applies

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applies to work carried out by contract as well as by day-labour. Comparing the finish of the contract work with the day-labour work, the first section carried out under the latter system presents about the same appearance as those carried out by contract. The more recent sections, however, carried out by day-labour, are certainly better finished than they were formerly.

27th July.—Again, in company with Mr. Arthur McCredie, I made a further examination of the telephone tunnels and branches which have been carried out by day-labour, from the Post Office along Pitt-street to the Redfern Railway Station. A piece of concrete was removed from the bottom of the tunnel near the intersection of King and Pitt streets, which was fair in quality and compact. A hole was cut in the crown of the tunnel at the intersection of Pitt and Market streets. The bricks were of the same quality as those at Park-street. They had been properly bedded in compo. which I should describe as fair. The packing, as far as could be seen from the small hole made in the brickwork, filled the space between the outside of the arch of the tunnel and the inside of the tunnel timber. The brickwork was tested in the side walls at the intersection of Pitt and Park streets. A brick was removed which is submitted. The bricks were properly bedded, but the cement mortar could only be described as fair; not, however, so poor as that in the arch. A hole was also cut in the crown at the same place, so that it might be seen if the compo. in the inner ring corresponded with that in the outer ring removed yesterday. The compo. proved to be similar in quality (exceedingly poor) in the inner as in the outer ring. A place was pointed out by Mr. Donald, at the corner of George and Campbell streets where certain cement manufactured by Mr. John Try had been used. The compo. was about the same quality as the average used. The square bricks used in the side walls are of very poor quality, much inferior, in my judgment, to those used in the arch, and these latter are very far from being of a first-class description. The specifications state that all material is to be the best of the respective kinds. I do not think that the bricks, either in the side walls or arch, answer to this description. I understand that the cement used throughout the works has not been subjected to any test, and that the sand with which the cement was mixed, was of a varying description, and this being the case, I have no doubt that these facts would account for the varying description of cement mortar which was found in different parts of the work, with the exception perhaps of Park-street, where it is evident too much sand had been used. My examination to-day has confirmed me in the opinion that I expressed at the conclusion of my notes yesterday as to the general finish of the work. I am still of opinion that the first of the sections carried out by contract is equal to the first sections carried out by day-labour, but that the latter sections, carried out on the day-labour system, are an improvement. Looking at the tunnels as a whole I am of opinion, in view of what is required of them, that while the work that has been executed is of a rather inferior quality, it will answer the purpose for which it is intended. Of course, in judging the work as a whole, the cost must be borne in mind. If the Postal Department have value for the money expended, and that which will answer the purpose for which it is required, then no exception can be taken to the quality of the brickwork. In other words, if the Department has only paid for a third or fourth class job, which, in my opinion it is, then it seems to me that the amount paid would correspond with the description of brickwork put in. As to the cost of the work, as far as the brickwork is concerned, I have no means of judging whether it has been reasonable or otherwise. I do, however, think that if, in the lengths where a tunnel was driven near the surface of the streets, an open trench had been excavated, a considerable sum would have been saved, and the brickwork put in at less cost, more satisfactorily, and at the same time all the trouble that has arisen through the packing of the tunnel, and the settlement of the ground over the tunnel, would have been obviated.

938. I think you said that you examined the contract work as well as the day-labour work? Yes.

939. And that the bricks used in the contract work were similar to those used in some part of the work that was done by day-labour? I think the bricks are of uniform quality throughout; the ones in the arch are superior to those in the side walls.

940. But all the same throughout all the works? Yes; the same make of bricks.

941. Is that an expensive or a cheap brick? I should regard it as a cheap brick—I mean a cheap class of bricks for a cheap brick. I would not expect to find double-pressed plastic bricks similar to those we use in sewers, but at the same time I would expect to find a better brick than what I found used in that class of work.

942. Did you examine any portion of the tunnel on the outside at the foot or where the foundations of the adjoining premises may come, to ascertain whether any damage was likely to accrue to buildings along the line? I tested in one place to see whether the counterforts had been put in on the outside of the side walls, and I found they had been. I do not think that when the timber is removed from the roof of the tunnel and the whole ground filled in properly, that there is any reason to suppose that the foundations of buildings will be affected.

943. Do you consider the timber should have been left in? I certainly think that it could have been taken out of the tunnel, and I say it should have been.

944. I want to know whether, in your opinion, it should or should not? Yes; but I would go a step further back than that. I say that the tunnel is a mistake; but if the tunnel had been necessary, then, if the timber could be taken out, it certainly should be; and in this case, the nature of the ground would warrant the timber being taken out.

945. Is it the practice of the Department of Public Works to leave the timber in in tunnels? When it can be taken out safely it is taken out. There are circumstances where it is impossible to remove the timber, such as in sandy or very soft ground, where doing so would endanger the men's lives; but where the ground is sufficiently hard to enable the timber to be taken out safely, it is taken out, both in the open cuttings and also in the tunnels.

946. From that answer, I presume you consider that, from an engineering point of view, the timber should be taken out? Certainly.

947. And if left in, you said, I think, that it is likely in time to come to cause trouble through decaying? Yes.

948. And subsidence above it? Yes. The time when the timber would decay is remote, but still it would decay.

949. Are you a judge of the hardwood timber of this Colony? I cannot say that I am an expert in regard to it, but still I have a knowledge of it.

950. What length of life do you consider that the timber you saw there has? It would depend whether the air could or could not get to it. If the air were completely excluded, then it might be there for centuries; but in this case no doubt the air would get to it, and probably fifty years would see the end of it.

951. It must be pretty good timber to last fifty years when the air gets to it? Well, the life of a bridge is supposed to be thirty years. What I have stated is simply an opinion, that is all.

952. You say you are not an expert in regard to that matter? No, I am not.

953. In reference to the packing to which you have referred in your statement to-day, between the top of the arch and the boards, did I understand you to say the packing was good or bad? I should say that it is as good as you could expect under the circumstances. It is a most difficult thing to do packing under such circumstances, and unless the men are very closely watched they will not go to the trouble of ramming.

954. It was not rammed properly? It was not rammed. That is the only exception I could take to it. But supposing it were rammed you could not make a good job of it, because it had to be rammed horizontally,

horizontally, and in addition to that it is difficult to get the packing solidly into such a small inaccessible space. J. Davis. 28 July, 1897.

955. Does that answer apply to wherever there was packing above the timber? The ground above the timber is a totally different question in my mind. When a tunnel is driven in such ground as that it is not possible to drive the polling-boards or roofing-boards ahead of the face of the tunnel, the ground, therefore, must have been excavated beyond the timber in order to admit of the timber being put in; and there being so many pipes over the roof of the tunnel, I am of opinion that it would be most difficult to take out the ground to the precise size of the outside of the tunnel. The consequence would be that supposing the ground was taken out too much in the first instance after the timber had been put in, the ground would gradually settle on to the timber, and there would be a space left underneath the concrete, as there is in Park-street, or if there were no concrete it would reach the surface eventually.

956. Do you consider that was the cause of the space that appears at Park-street? There is no other reason that I can imagine. I am very strongly of opinion that that has been the reason for the settlement at Park-street.

957. Then as to ramming down the sides of the tunnel, does your answer apply to that as well?. Well, the ramming on the sides of the tunnel should have been done better than it was over the arch, but it would be difficult at this stage to say how that was done; however it would be fair to assume that the conditions there were so different from those over the arch that it would be properly done. I do not see how the men could proceed without doing it properly.

958. Have you any idea of the price of the bricks that you describe as found in the tunnel? Well the price has gone up now very much, but two years ago I should say they ought to have been bought for 30s. a thousand, delivered, and probably the price would be 35s. one thousand now, delivered.

959. And I understand you to have stated that the cement mortar, on the whole, everywhere is of an inferior quality? The cement mortar is very variable. That on the contract works where I tested was certainly very excellent—the best I found anywhere; for some reason or other that was the case most undoubtedly. That at Park-street was the worst. It was for some reason—I do not pretend to say what. It contained very much more sand than it should have done. The cement mortar in the tunnels, except in those two places, was fairly good, but variable.

960. Do you of your own knowledge know anything about a portion of this cement being rejected by the Works Department? That to which I referred in my notes—Mr. John Try's—I understand is cement that was rejected by the Works Department at Johnston's Creek. I was not on the ground at the time the cement was removed from Johnston's Creek; but my officers reported to me at the time that the cement was removed from Johnston's Creek, and taken to the Post Office tunnels. Mr. Donald yesterday told me that that was the case, and that he had had certain portions of this cement put into particular places; and that was the cement that I tested at the corner of George-street and Campbell-street.

961. In your notes read to-day there is some remark to the effect that the excavation of the tunnel was larger than necessary;—to what does that refer? It refers to the roof of the tunnel before the timber was put in and has to do more particularly with what has occurred at Park and Pitt streets. As I have already explained, in my judgment that is how the settlement has taken place there in the ground underneath the concrete under the wood-blocks.

962. Is the packing along Pitt-street or where you examined it, under the boards where stones are used, alright? Well it is as good as I would expect to find under the circumstances in tunnels.

963. *Mr. F. Clarke.*] You mentioned in your evidence that there were wire-cut bricks used? Yes.

964. Would you mind telling the Committee what is the difference between wire-cut bricks and the other kind of bricks—superior class of bricks? The wire-cut bricks are made by machinery—in what is known as a semi-plastic machine. The brick is pressed out through an opening the size of the brick, and as it leaves the opening it is cut by a wire to the shape required: hence the term wire-cut. The bricks that have been used in the arch have been burnt without further pressing; in that condition they left the machine. A sewer brick—which is, I suppose, as good a brick as you could get—is not only plastic but also pressed twice. A dry-pressed brick—what is commonly used in the buildings in and about Sydney—is a brick made from clay without treatment, except being ground and pressed under hydraulic power, and then simply burnt.

965. So that the other brick—what you call a double-pressed brick—is a superior brick? Certainly. You have to pay more money for it.

966. Do you consider that the bricks used are sufficiently good for the work of the tunnel? I believe that the tunnel as it stands will answer the purpose for which it is intended; but if I were going to carry out the work I would not use those bricks.

967. Is the quality of the bricks up to the specification? No.

968. Does your inspection enable you to say whether in the section of the tunnel work carried out by contract the timber was removed? I understood that the whole of the work in Moore-street—and that length was carried out by contract—was done in open cut, and that in the lower parts of Pitt-street, running down towards the Exchange, the timber had not been removed where the work had been done in tunnel.

969. By contract? Yes. I understand, though, that it is to be removed.

970. Do you attribute the space which exists in the opening in Park-street underneath the concrete to the construction of the tunnel? I think there is no doubt that the network of pipes had a great deal to do with causing what has happened.

971. You think that the fact of the Hydraulic Company's pipes and other pipes being there, and on the packing around them, may have had something to do with causing the space underneath the concrete? I would rather put it in this way, that when the tunnel was driven, the fact of the pipes being there made it so difficult to take the ground out to the precise size required that there would necessarily be a space left over the polling-boards when they were put in. Then, again, the space being there, and the pipes intersecting the ground in all directions, would facilitate the ground settling on to the polling-boards. That is the way I regard the matter.

972. Do you think that might have been obviated by having the tunnel done in open cut? I should certainly say in a case like that there should have been an open cut, let the inconvenience be what it may have been. I believe that the reason why it was put in tunnel was on account of causing as little inconvenience as possible to the public. As a matter of fact, as things have turned out, it would have been much better to face the question in the first instance, and have put it down in open cut.

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973. *Mr. McGowen.*] Cheaper for the Department too? Certainly.
974. *Mr. Cook.*] You are not prepared to say that the tunnel is the sole cause of the whole subsidence at the intersection of Pitt and Park streets? I should say that the tunnel was the occasion of it.
975. What do you mean by the occasion of it,—the only cause of it? In other words, if the tunnel had not been driven, the subsidence would not have occurred. The Hydraulic Power Company's pipes were evidently put in in tunnel, and the packing was very loose, and possibly there may have been a small space left over the packing, but at the same time that could not have affected matters either here or there.
976. It would do its part towards it, I suppose? No doubt there would be a small space there after they had finished their work, but when the Post Office Department proceeded with the tunnel that altered the whole aspect of the case. Instead of having a little space—at the most 1 foot wide—you have a space probably 7 feet wide.
977. *Mr. F. Clarke.*] With regard to defective compo. or mortar, do you think that the defects that you mentioned will seriously affect the life or usefulness of the tunnel? At Park-street certainly, but in the other cases I think the compo. in strength would correspond with the bricks. I think one is as good as the other.
978. One would last as long as the other? Yes.
979. But still the compo. was not up to the specification? I would not like to say that in regard to the proportions, with the exception of Park-street. There I would say positively it was not. In the other cases it may have been due to the quality of the cement itself. It is a very risky thing to take cement without testing it. Even supposing that you test a brand of cement to-day, if you get another consignment from the same manufacturers to-morrow it may not be up to the mark.
980. *Mr. Cook.*] Therefore, it is possible for it in every large work to be a little bit inferior now and again? If you do not test it; but I should say that it would be most risky to take any cement, even (say) fifty casks, without having a complete test of it.
981. *Chairman.*] You use the hot water test? Yes; we make a number of tests, and we test every parcel, however small—in fact, we dare not do anything else.
982. *Mr. Cook.*] And, I suppose, sometimes you get a little bit in that is not quite up to the mark? If cement is not up to the mark, we find that out in the test, and reject it.
983. *Mr. F. Clarke.*] Do you often find that an attempt is made to supply you with inferior cement? Very frequently. This cement of John Try's make, at Johnston's Creek, was tested. A twenty-eight days' test was made of it, and it failed. Then the contractors said, "We have a shed there; let us keep it on the ground two or three months, and it may mature"—that is, the free lime which it might contain would have an opportunity of slacking, and the quality of the cement would thereby be improved. We agreed to that, and tested it a second and a third time, and each time it failed.
984. *Mr. Cook.*] That was for sewers? Yes; and it did not comply with our specification.
985. *Mr. Cann.*] The quality of the compo. would be considerably affected by the quantity of sand used? Yes.
986. *Mr. F. Clarke.*] But in that way you could detect it? Yes.
987. When you opened the tunnel, did the compo. adhere to the brick? Yes; there is no doubt about that. The brick, to begin with, is very absorbent and very rough. I hold in my hand a brick which I took out and have referred to.
988. *Mr. Cook.*] Where was that taken out? Out of the side walls at the intersection of King-street and Pitt-street.
989. *Mr. F. Clarke.*] With regard to the shape of the tunnel, do you think the shape was the very best;—as regards the stability of it, is it a good shape? It is strong enough, but I would have preferred that the side walls should have been put in more as a retaining wall with a slight batter on the face. Another engineer might think differently.
990. *Mr. McGowen.*] You say, in your general comparisons between the work done by day-labour and that done under the contract system, that the worst of the work done by day-labour is equal to that done by contract, and, if I understood you rightly, that the later work is somewhat better than that done by contract? The last sections that have been carried out by day-labour, as far as the finish of the work is concerned, are certainly an improvement on the first sections, and also an improvement on the contract work.
991. And in stability are equal to the contract work? Yes; they are very similar in that respect, with perhaps an exception here and there, as at Park-street. The compo. was excellent in the contract work. I did not find any compo. in the daywork equal to that in the contract work.
992. *Mr. Cook.*] At how many places did you test the contract work? Only one place. There are 3 miles of these tunnels, and I might have been going on testing for a week. I asked Mr. McCredie, and he agreed with me that one place was sufficient to test in the contract work, and six or seven in the day-labour work.
993. *Mr. McGowen.*] In judging this contract work, are you judging it by the standard you apply to the Sewerage Department's tunnels? I am judging it by my experience and what I know of compo.
994. *Mr. Cook.*] Have you ever built any tunnels? Yes.
995. *Mr. McGowen.*] The Sewerage Department, in putting down their tunnels, would have to make them absolutely water-tight, because sewage matter would go through them? Yes; it is desirable that they should be absolutely water-tight.
996. In this case that was not required? Certainly not, but at the same time I should say that if a tunnel had to be below the foundations of buildings it would be most wise not to make it water-tight, because from my experience I know that drawing off the water from under a foundation does more harm than almost anything else, and will cause more settlement than almost anything else. But as it happens these tunnels are above the system of sewers, with the exception of two or three places, and the water is drained off by the sewers and the tunnels are not affected by it. The tunnels are fairly dry.
997. But in the case of tunnels put in for sewerage the water is inside them, and if a tunnel were not water-tight the water would get out through it and loosen the earth alongside it? Certainly.
998. But in this case for the water to get inside this tunnel it would have to be in the earth surrounding the tunnel? Yes.
999. What injury would the water do to the tunnel? None whatever. I have not said that it would.

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1000. The standard of the compo. used in the sewerage tunnels would necessarily have to be higher than that of compo. used in a tunnel of this description? All I say is, that Mr. McCredie did not think so. When he drafted these specifications he stipulated for precisely the same mixture as we specify in the Sewerage Department.
1001. Do you think the standard should be as high in a tunnel of this description as you would fix in regard to a tunnel for the Sewerage Department? I would not make any difference in the compo., but I certainly would make a difference in the bricks. I would not specify the same quality of bricks for this kind of work as for sewerage works.
1002. In your opinion, was this compo. which was used in these tunnels sufficiently high in standard for the work that was required of it? I have said that I thought the tunnel would answer the purpose for which is was intended.
1003. But questions have been asked about the compo., and I want to have it recorded whether this compo.—on which something will hinge—was in your practical opinion up to the standard for the work that was required of it;—was it good enough for that class of work? You must bear in mind that it is very difficult to come to any definite conclusion about a thing of that description; but, from the examination that I have made, I should say that the compo. is fair; but I would add this, that it has been a most risky thing to take cement without testing it, and it is highly probable that if I were to make twelve more tests in the same way as I made those the last two or three days, the results might have been worse. Under the circumstances I should expect to find that the compo. varied a very great deal.
1004. Would you expect to find it inferior to what you have already tested? I would not use the word "inferior" in regard to the compo., except at Park-street. I will say, as I say in my notes, that it is a third or fourth class job. It is not a first-class job. The only point is whether it is what the Postal Department want. You can buy any kind of coat, of course; you have to pay for the coat you buy.
1005. You are not prepared to say whether, in your opinion, this compo. was good enough for the class of work it was used for? I should say that the compo. was as good, if not better, than the brick.
1006. You have unmistakably expressed it as your opinion that this kind of work should be done in open cut instead of in tunnel? Most decidedly—where the tunnel would be so near the surface.
1007. Did you ever in your experience tunnel so close to the surface? Yes.
1008. Why did you do that? Because we were obliged to do it.
1009. Knowing full well that there was an element of danger, so far as subsidence was concerned? Yes; there was no help for it.
1010. Did I understand you to say that in tunnelling there is no way of preventing subsidence either to a great or less extent taking place? Certainly there is a way, if you like to go to the expense, of doing it. There are two or three ways of doing it; it is only a matter of cost. For instance, you can drive a tunnel with a shield. Then again, if you have the necessary appliances you can drive the boards into the ground before the ground is excavated, and then take the ground from underneath the boards.
1011. *Mr. Cann.*] Is that not the usual way of doing it in loose ground? But this is not exactly loose ground. It is not such loose ground that you could drive an inch-and-a-half polling-board, 12 inches wide, into it.
1012. *Mr. McGowen.*] In the tunnels which the Sewerage Department carried out, did you tunnel in either of the ways you have mentioned, to prevent the possibility of subsidence taking place? We never used a shield in Sydney, as there was no necessity.
1013. Did you ever do any tunnelling on the same lines as this tunnelling was done? Yes, much of it.
1014. *Mr. Cook.*] In the city? I do not think there is any tunnel in soft ground in the city, except perhaps a little at the railway station, and that was very soft. To the best of my recollection, some years ago we were able to drive the polling-boards ahead of the excavation.
1015. *Mr. McGowen.*] You have said that in this form of tunnelling there is a risk of subsidence? Yes.
1016. And yet you say that in some cases you have tunnelled on these lines close to the surface? Yes; we were obliged to do so. We had to tunnel under a terrace of houses at Belmore Park—a three-storey terrace facing the park—and we came within about 1 foot of the floors of the houses, and we did that without any settlement at all. It is merely a matter of cost.
1017. At Park-street you say they took out more ground than they ought to have taken out? Yes.
1018. Was not what they did necessary to get the tunnel in? It is not necessary to take out more ground than to get the timber in.
1019. I thought you meant that it was larger than the tunnel; but of course it had to be larger than the tunnel? Yes; larger than the brickwork.
1020. Did this subsidence at Park-street, in your opinion, take place at the time they made the excavation? No; it must have been subsequent to the timbers being put in. The ground resting on the timbers shows that.
1021. Was there enough space between the timber of the arch and the tunnel to account for the subsidence you saw in Park-street? That has nothing whatever to do with the subsidence in Park-street. The packing in the tunnel is one thing. It may be properly or improperly done, but it has nothing to do with the subsidence. The cause of the subsidence is above the timber, and the space on the outside of the timber was no doubt left at the time the timber was put in, and, as I have explained, the network of pipes facilitated the ground settling between the timber, naturally putting a space over the timber and leaving a space under the concrete.
1022. Supposing that the hydraulic main pipes to which you have referred were put in after the cement was laid down and were done in an imperfect manner, would that lead up to any of this settlement;—you have already said, in reply to Mr. Clarke, that that may have contributed to it? I think that facilitated the settlement.
1023. Would it materially assist settlement in this kind of work, supposing that those pipes were leaking? If they had been leaking, I judge that the men would not have been able to put the tunnels in at all.
1024. *Mr. R. Jones.*] But what about leaking since? There is no indication of their having leaked since.
1025. *Mr. McGowen.*] Were the tunnel for the Hydraulic Company and the tunnel for the Post Office Department made after the wood-blocks were laid in Park-street? The telephone tunnel certainly was, and I believe that the Hydraulic Company's tunnel was too. The Hydraulic Company's tunnel was made before the telephone tunnel.
1026. Do you know of any other tunnelling put down under that portion of the street since the wood-

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blocks were laid? No; I do not. There was no indication of any others. I should say that the other pipes there were laid in open cut.

1027. *Mr. Bavister.*] In reference to the ramming of the work, as you have been inspecting that portion of Park and Pitt streets, did you pay any attention to the manner in which the ramming or filling had been done over the excavation for the Hydraulic Company's main? Yes.

1028. Was that done in an equally good manner, or what difference was there between the manner in which that was done and the way in which that for the telephone tunnels was done? I do not think the filling over the Hydraulic Company's main was done as well as the filling over the arch of the telephone tunnel.

1029. Was there any evidence of the work over the Hydraulic Company's main having been rammed at all? No, I saw none.

1030. And you examined it for the purpose of being able to express an opinion? Yes.

1031. Can you say what thickness of solid or unmoved ground existed between the outer edge of the telephone tunnel excavation and the Hydraulic Company's main? I could not say positively. I did not measure it, but perhaps it was from 6 to 12 inches—certainly not more. That would be the distance between the bottom of the pipe and the top of the tunnel excavation, but the pipe is not quite over the tunnel—it is on the side.

1032. Speaking of the outer excavation for the telephone tunnel as being comparatively perpendicular, what amount of solid earth was left between the two excavations—not between the pipe and the tunnel, but solid earth between the two excavations, for the respective purposes? They practically join there as far as I could see, that is to say, the east side of the tunnel would correspond with the west side of the excavation made by the Hydraulic Company.

1033. *Mr. Cann.*] As a matter of fact, the polling-boards in connection with the telephone tunnel would go straight through the excavation of the Hydraulic Company's main? Something like that. I did not notice that very precisely, because I did not know that I would be asked any questions in reference to it. But that is the impression I got.

1034. *Mr. Bavister.*] Supposing 6 or 9 inches of unmoved earth to have been left between the two excavations, and the Hydraulic Company's excavation not to have been rammed, would not the entrance of any water into that have a tendency to break down the solid earth? I have already expressed that opinion, not in regard to water, perhaps, but the general question. In my opinion, the fact of the Hydraulic Company's and other network of pipes being there has facilitated the settlement.

1035. Even in the absence of water, would not the atmosphere itself have a tendency to cause such ground as that to fall? Yes. I do not think water could get in very well, as the concrete is impervious. I certainly think that has facilitated the settlement.

1036. Did you see anything to enable you to form an opinion as to whether the subsidence did exist over this Hydraulic Company's pipe before anything took place in regard to the telephone tunnel? I would not call it a settlement; I say it had not been properly filled.

1037. Was there anything that presented itself to your observation which would lead you to form the opinion that a cavity had existed over the Hydraulic Company's pipe excavation and under the concrete? Yes.

1038. Have the packing and ramming in this telephone tunnel been done in a manner similar to that done in works carried out by contract in your Department? In similar works where we have had to drive tunnels in soft ground the packing has been done with ordinary material such as that which has been used in these tunnels.

1039. And in a similar manner? Yes.

1040. In reference to the cement, you say it varies greatly, but as you made only one test in the contract work your statement, I take it, must apply to the work done by day-labour, and you mean that the compo. cement used there varied much in quality? I could not say as to the contract work, because I only tried it in one place, but most certainly that compo. was very much superior to that which we tested in the day-labour work.

1041. If it became your duty to carry out two works in tunnel—one being for sewerage purposes and the other for such a purpose as this telephone tunnel is for, not to resist or conduct water—would you specify the compo. to be of the same quality in each of those works? Yes.

1042. If not doing that work for the Department, but if you were building on your own property, for yourself, a water-tank underground, in brickwork, and also simply an underground passage, would you specify the same quality of compo. to be used in each case? Well, the quality of the compo., as a rule, is the same as is used pretty well in all kinds of trades, in all kinds of positions; that is to say, it is usually a compo. consisting of one part of cement and two parts of sand. That strength of compo. has been specified in this case of the telephone tunnels, and also in the sewerage works; it is done pretty well right through the Public Works Department's works. It is generally done by builders.

1043. If two works were being done for yourself for which you had to provide the money, one being a work required to carry and resist the escape of water, and the other not being required to do that, but simply to be used as an underground passage way, would you insist on the quality of the compo. being the same in each case, and standing the same test in each case, and also being used in the same proportions as regards the admixture of cement and sand? Well, to begin with, as regards the tests, I say most positively that the same tests should apply to all cement, and with regard to the quality I would say "yes" and "no" to your question. I say yes I would make a difference under some circumstances, but under other circumstances for the kind of work which you have described I would make no difference, because other factors might have to be taken into consideration to counterbalance the one you have named in regard to the water.

1044. You say it is customary to make compo. in the proportion of one of sand to two of cement? Yes.

1045. Is it specified in all the contracts of your Department? Yes.

1046. Are there no specifications in connection with your Department which provide for three parts of sand to one of cement? Not to my knowledge,—certainly not as far as I am concerned.

1047. I believe you said that cement might be tested and passed satisfactorily, and the same cement at a later date might not come up to the test? That is not quite what I said. What I said was that a parcel of cement of a certain brand might be tested and a second parcel of the same brand might be subjected to the test to-morrow—the first parcel might pass the test and the second might not.

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1048. *Mr. Cook.*] What do you mean by testing every parcel—every cask? No; every parcel.
1049. How many casks would be a parcel? Take 100 casks. What we would do would be to take so many samples of cement from those 100 casks. We would open four casks out of the 100. If there were 1,000 casks we would open forty and take samples.
1050. So it is possible that in the case of 1,000 casks, 900 of them might be bad, even with your test? Anything is possible, but it would not be probable.
1051. *Mr. Bavister.*] Works constructed for sewage purposes should resist the escape of any liquid matter? Yes.
1052. And unless they did it they would not be considered by you, as the head of that branch of your Department, as being satisfactorily executed? No; I would not consider they were right.
1053. Such work is done by your Department under contract, is it not? Not that I am aware of.
1054. Is not sewerage construction work done under your Department by contract? Yes.
1055. Has some recently been done in connection with the Western Suburbs sewerage scheme? Not that I am aware of.
1056. Has any been done, whether recently or at any previous date, in connection with the Western Suburbs sewerage scheme? I will tell you what has happened frequently. When a tunnel is constructed through wet sand, after the sewer is finished for some little time the water will sweat through the brickwork and possibly through the compo. It is almost impossible to get bricks altogether impervious. We stipulate that the sewer-bricks shall take up only 3 per cent. of water when tested for porosity; therefore it is reasonable to expect that water, when the sewer is under pressure, will percolate to some extent through the brickwork. In time the pores of the bricks get stopped up, and then the sweating ceases. It has frequently happened under such circumstances that the bricks have been damp, and the water has sweated through the bricks. Perhaps that is what you refer to. Then, again, when there has been a large quantity of water in the tunnel it has been necessary to make provision for the water to get into the sewer while the brickwork and concrete were setting, and when the brickwork and the concrete have set the weep-holes have been stopped up. Perhaps, again, that is what you refer to.
1057. Would the chances of such works being well done be greater if they were done in the open instead of in tunnel? Yes.
1058. Is there not a place near Arncliffe where such work has been done above the surface of the ground? The aqueduct. The outfall sewer in some cases is above the ground.
1059. Has that been completed satisfactorily? It is not completed yet.
1060. So far as it is completed does it give satisfaction to the Department's officials? I should say "yes" and "no" to that question, too.
1061. Has that work been recently examined and been found to permit the escape of water in large quantities? No, not at Arncliffe, certainly. I made an examination of it the other day.
1062. In consequence of what? In consequence of a question that was asked in the House; but no water was put into the sewer.
1063. Was any water coming out of it? No; there was none going through it.
1064. Were any leakages taking place? No; there was no leakage, because there was no water in it.
1065. Does it show any signs of settlement or fracture? There are some cracks in the first section. They have been there for the last two years, I suppose. They occurred through the contraction of the material with which the aqueduct is built.
1066. Have any steps been taken to fill them up? No.
1067. They have never been filled up to pass further inspection, and the material has fallen out again? They may have been, but before the work was taken over from the contractor he would be called upon to make that good, as a matter of form, if nothing else.
1068. Were the bricks used in that work double-pressed bricks? Yes.
1069. They were specified as double-pressed bricks? Yes.
1070. Has it always been looked upon by people connected with the trade and using them that double-pressed bricks should be used, and were intended for facing purposes? They are used for that, but they have been used in the sewers, too.
1071. Is it not a fact that the bricks used in the sewers are special plastic-pressed bricks? Yes; but they are double-pressed.
1072. But speaking of double-pressed, in the ordinary sense of the term, does that not apply to a brick manufactured under the dry process but passed through the pressing-machine twice? I should not say so. I should say that a double-pressed plastic brick is what I am speaking about. A dry-pressed brick is a dry-pressed brick, even if you press it a dozen times.
1073. Now in regard to the quality of bricks, one of which you produce here, would you consider that a brick not pressed after being cut off to dimensions, but made by a plastic or semi-plastic process, was a more desirable brick than a double-pressed brick made by the dry process? If you put the two classes of bricks—and now I am speaking of a fairly good dry-pressed brick manufactured in and about Sydney—I would take the dry-pressed brick infinitely before the bricks that have been used in this tunnel.
1074. Is it not a fact that bricks made by the dry process, after the skin of (say) $\frac{1}{8}$-inch in thickness on the outside of the brick has come off, the other can, by very slight friction, be ground down to powder? Some of them, but not the ordinary dry-pressed bricks used in Sydney such as I am speaking of. They are very good bricks indeed—better than these.
1075. Would a double-pressed brick, after the first $\frac{1}{8}$-inch had been removed from it, succumb to friction more quickly or less quickly than the bricks used in this tunnel? I should say most decidedly that the bricks used in the tunnel would succumb to friction very much sooner than ordinary dry-pressed bricks. I have a very decided opinion about those bricks. The bricks that have been used in the tunnel I certainly would not under any circumstances have put in myself.
1076. Did you make any examination of the contract work other than by cutting one hole in it? Two holes, and superficial examination.
1077. Did you see anything to enable you to form an opinion as to whether the bricks were identical? Yes; I think they are the same. I am informed that they were bought from the same maker. They look very much the same.
1078. Bricks may be made at the same yard and still be of different qualities; but was there any evidence of that in your inspection? No; I think they are about the same quality.

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1079. Supposing that a large stock of cement were got in at one time—2,000 or 3,000 casks—and supposing the bulk were tested by what I understand is the ordinary method, namely taking a sample from each 25th cask, on its first arriving in stock, and supposing that the use of it extended over twelve or fifteen months, would you consider it necessary to make further tests at a later period? No, not if it were properly packed and passed the satisfactory test in the first instance.
1080. It would not deteriorate by keeping? Not if it were properly packed, and passed a satisfactory test in the first instance. There might be, when the test was made, something to indicate that the cement would deteriorate by keeping, and then it might be necessary to make another test; but under ordinary circumstances, certainly not.
1081. It is usual for the person selling cement to furnish a guarantee as to what test it has passed? No; I do not think so. The test made by the Public Works Department is now generally accepted, I think, in Sydney, and the merchants know that, and they submit their cement to the test.
1082. Is it tested by the Department for anyone who chooses to submit it free of charge? Not free of charge. They have to pay so many guineas for a test.
1083. Are you aware what amount of cement was rejected on this contract to which you have referred at Johnston's Creek? I think about 3,000 bags—the cement was in bags.
1084. Do you know from Mr. Donald or anyone you have spoken to on the matter, whether the cement obtained by him was in bags or in casks? He told me yesterday it was in bags.
1085. The excavation at Park and Pitt streets was not made directly over the line of the tunnel, was it? It included the excavation made for the Hydraulic Company's main. On the other side it corresponded with the side of the tunnel—that is, on the eastern side of the excavation it corresponded with the side of the tunnel, but on the western side it included the excavation made for the Hydraulic Company's main.
1086. Can you, from memory, speaking roughly, say to what width the blocks and concrete have been broken into? About 8 ft.
1087. What is the width, over all, of the brickwork in the tunnel? Six feet, at the outside.
1088. What width was the excavation for the Hydraulic Company's pipes? About 15 to 18 inches wide
1089. With 6 or 9 inches between? Yes.
1090. Thus making 8 feet of excavation? Yes. That was what I found when I was there the day before yesterday.
1091. I was under the impression that the western side of the break-through of the blocks and concrete was over the span of the arch, about 1 ft. 3 in. away from the side of the excavation on the western side of the tunnel, and 3 ft. or 3 ft. 6 in. back under the break-through of the concrete? I would not say positively. I did not regard the measurements as important, as I did not know I should be questioned about them. I merely give you my impression.
1092. Did you see any evidence of water to any extent having passed through any of the excavated ground? No; I did not.
1093. Could it have done so without attracting your attention? I think I should have seen evidence of it if there had been water running through there.
1094. *Mr. Harris.*] I think you said that the clay was taken out before the polling-boards were put in—that the polling-boards were not driven in? In my opinion they were not driven in. I do not think it is alleged they were.
1095. What distance would there be between the top of the polling-boards and the clay on the top of that ground? There must have been at least a space corresponding with the space that appears now immediately underneath the concrete—that is to say, a space varying from 3 to 12 inches.
1096. *Mr. Cook.*] Supposing that the earth had been close to the concrete at the time? Well, it is not usual for earth to consolidate and leave a space like that. The space there must have been caused by tunnelling, and I have given it as my opinion that the way the space has been caused there is through a cavity being left over the polling-boards.
1097. *Mr. Harris.*] What space would there be between each of the polling-boards? About 2 inches.
1098. Then the Hydraulic Power Co. put down their tunnel, and their ground did not consolidate—was it likely that that clay would run through these openings? No; I do not think so.
1099. The traffic would not cause the clay on top to go down? No; the two excavations were not connected, so I do not think that could have happened.
1100. Did you ever use any of Try's cement before? I believe that one small parcel was used some years ago, but I do not think more than one parcel, by the Sewerage Branch.
1101. Did you find it came up to the test? Certainly, or it would not have been used.
1102. Is it as good kept in bags as in casks? No; it is not as good.
1103. And it may have lost some of its strength by being in those bags a certain time? The question was whether it ever had the strength; apparently it had not.
1104. Of what parts does the specification say compo. is to be made? "The brickwork throughout is to be set in cement, gauged two of sand to one of cement."
1105. Do you think that that was carried out in Park-street? No, I do not; on the contrary, I am sure it was not.
1106. How did you find the compo. was adhering to the bricks in Park-street? It did not adhere at all there.
1107. What sort of joints were there? In two or three cases they were very defective; the rest was fairly good.
1108. *Mr. Cann.*] Had the use of inferior cement anything to do with the subsidence in Park-street? Nothing whatever. Neither the brickwork nor the packing of the tunnel had anything whatever to do with the settlement there.
1109. Then the subsidence in Park-street or anywhere else was actually independent of the brickwork and the packing of the tunnel itself? Yes; that is manifestly the case, because the brickwork has not given way, or the timber over the brickwork. Both are there just as they were put in. What has happened is that certain settlement has taken place outside the timber.
1110. Is it a usual thing to take out the full quantity of ground for a set of timber in work of this kind? In a small tunnel like that I should say it would be, under ordinary circumstances.
1111. If you had 200 feet head in that sort of ground, would you take out the ground for a full set of timber before you drove your laths home? Possibly not, but I could not give an opinion unless I knew all the circumstances.

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1112. Would any excavations that have taken place round the crown of the tunnel facilitate the crumbling of the ground before they got the laths in;—in taking out your ground to put in a set of timber, if the ground had been disturbed before, and had not been properly rammed, the ground would keep crumbling until you got a full set in? Most certainly.
1113. It might account for the subsidence? No; I do not think so. I think that the only way to account for the settlement is the way I have mentioned.
1114. *Mr. Cook.*] You are quite certain that the ground has been excavated to a certain depth, and that then the timber has been deliberately placed so much below the roof of the drive? I would say it has been placed there certainly; and, in proof of my theory, if you can regard it as a theory, I would point out that where the water and the gas pipes cross the tunnel transversely no settlement has taken place on to the timber, because the ground was supported by the pipes underneath it, and at these places no cavity has occurred at all underneath the wood-blocks.
1115. It is really only a pothole where this thing has occurred? Exactly; where it could settle freely down on to the timber.
1116. *Mr. Cann.*] Did you see any indications bearing out your theory in the opening as it stands now? I could see where the ground had broken in on each side of the tunnel, and settled down on the top of the tunnel.
1117. Are those indications to be seen there now? I think so.
1118. That is the cracker from the virgin ground where it has settled down on to the timber? Yes.
1119. *Mr. Robert Jones.*] If a continuation of that excavation were made up or down Park-street, and you found the same cavity under the concrete as is over the tunnel, would it alter your theory? It might confirm it, supposing there were no tunnel there.
1120. I mean where there is no tunnel? It would be altogether contrary to nature to find a cavity there with nothing at all to cause it.
1121. If it could be shown to you that where there is no Post Office tunnel, a cavity is proved to exist under the cement similar to the cavity over the tunnel, would that alter the conclusions you have arrived at? It might or it might not. I could quite understand a cavity existing underneath the concrete over the tunnel. Say that the concrete had been laid on ground which has been recently filled in, and the ground has not been properly consolidated, or even if it has to some extent, the water that has been put into the concrete has gone into the ground below it and has caused it to go more compact than it was previously, and the cavity has been left there. But there is no such case at the place in question. It is solid ground; no filling there.
1122. Will you say that there is no loose ground—sufficiently loose for you to take it up in your hands without even using the pick or shovel and fill a barrowful? I have, on the contrary, said that there is loose ground.
1123. Will you say that that is solid ground and has not been filled in at Park-street? Over the tunnel, certainly.
1124. Will you say that over the Hydraulic Company's main the ground has been rammed in such a way, but it is not liable to shrink and settle. I should say that that is loose; but that is not over the tunnel.
1125. The Hydraulic Company's main ground has never been rammed? I have said that.
1126. That being so, would it not have contributed largely—more than facilitated—to the settlement between the concrete and the top of the ground? If the tunnel had not been driven, the vacant space under the concrete would never have been there; but the tunnel having been driven, then I say that the fact of the Hydraulic Company's main excavation being alongside the tunnel has facilitated the settlement of the ground.
1127. If the telephone tunnel had never been driven, would the want of packing not have shown itself under the concrete at the Hydraulic Company's main? I believe it did, and is to be seen there now.
1128. You believe, then, that a cavity did exist through the hydraulic main without the telephone tunnel at all? I agree with you on that point so far; but I say that the two settlements are quite independent, except that the smaller settlement has facilitated the second.
1129. In your opinion, would there have been a cavity if there had been no telephone tunnel driven? There would not have been that cavity.
1130. Would there have been a cavity over the Hydraulic Company's main? There was one.
1131. Then that would more than facilitate the cavity there at present? I do not think so.
1132. If No. 1 had been there, and No. 2 had not been driven, there would, of course, have been no connection between them, and the cavity would still have been there? I have already said that there was a space over the Hydraulic Company's pipe before this tunnel was driven.
1133. *Mr. Cook.*] Have you examined over the tunnel where the subsidence has taken place to see whether there is a sewer pipe there? I did not notice a sewer pipe, but it is very probable. There are a number of pipes about there.
1134. *Mr. Robert Jones.*] Do you know of your own knowledge that cement was shifted from Johnstone-street to this job? If you mean by my own knowledge, did I see it done, I cannot say that it is of my own knowledge; but I have every reason to believe, and it is not denied, that it was the case. I did not follow the carters round.
1135. You cannot say of your own knowledge that it was so shifted? I annot say anything beyond what I have already said.
1136. Did you notice any places where the water had percolated through the cement and made an opening through the cement on to the top of the tunnel, through the concrete, at Park-street? No; I did not notice any place where the water had found its way on to the telephone tunnel.
1137. Did you carefully examine the north-east side where the opening is made, where there is a distinct hole through the percolation of the water? No; I did not. I saw a hole had been made through the concrete, but whether any water had gone there or not I did not observe. Very possibly the water may have gone there.
1138. I am not referring to where the hole was punched through, but the eastern side of the cut, well towards the north end? I did not observe it.
1139. In your experience of cuttings similar to these, in sewerage and other work, have you ever had subsidences as bad as you have noticed in this tunnel? Yes.
1140. It would naturally follow that where difficulties arise in ramming you may expect defects to occur afterwards? Yes; but I say that you should take precautions beforehand to prevent that sort of thing happening.

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1141. You have said you have found similar subsidences? Yes; and for that reason I would say that my experience would lead me not to drive tunnels at all in such a case as this, but on the contrary to put down open cuttings, for I know how difficult it is to get the men to put the packing in in a satisfactory manner—how almost impossible it is.

1142. *Mr. Cook.*] Having regard to the traffic in that street, and its narrowness, do you think it is possible to put down an open cut 12 or 13 feet the whole length of that street, and do it with any degree of rapidity—do you think that the people would let you do it? I certainly think, if you put it on that ground, that the people have suffered a very great deal more inconvenience from the way it has been done than they would have suffered supposing the difficulty had been faced in the first instance, and you had shut your eyes to the inconvenience, and an open cut had been put down. No doubt inconvenience would have been experienced, but at the same time work of that description cannot be carried on without inconveniencing some people.

1143. *Mr. Robert Jones.*] But you are of opinion that it was done in the way it was with the object of causing as little inconvenience as possible? I have no doubt it was. It was more costly to do it in that way, and those who carried it out must have known that, and they thought of facilitating the convenience of the public by doing it in that way.

1144. *Mr. Cook.*] Supposing that you had been doing that work, and the City Council had written to you practically insisting that you must not do it in open cut? If they had done so, I would have insisted on doing it in open cut, and I would have told them that they did not know what they were writing about.

1145. *Mr. Robert Jones.*] Do you know why the excavation at Park-street was made wider than necessary by the City Council in opening up this cutting again? I do not know all the circumstances connected with the Park-street episode. I understand that there have been some very strange transactions there.

1146. You are aware that a cutting has been made there much wider than could serve the purpose of showing merely the work done by the telephone tunnel people? I cannot say anything about that from my own knowledge.

1147. I think you you have said that the cutting was much wider? If you mean the cutting is sufficiently wide to embrace the excavation for the Hydraulic Power Co.'s pipe as well as the telephone tunnel, I say, "Yes, certainly"; that is a physical fact.

1148. It would not have been necessary to make it as wide as it is in order to find out all about the tunnel? It would not have been necessary to make it as wide as it is if you only wanted to examine the tunnel.

1149. Have you noticed in the open cuts in this work in several places slight subsidences have taken place as well? Yes, but nothing material.

1150. It would be reasonable to expect that? Yes.

1151. It is admitted that it is almost an impossibility to ram in the same amount of earth into a place as you took out of it? Yes; almost impossible. With clayey material like that, my experience is that it would settle, do what you may. The best course is to ram it in and well water it.

1152. As to testing the cement, is it not customary for the Department in connection with contracts up country to take one test from a parcel of 50 or 100 casks of cement—to take a test from the merchant you buy the cement from, and the whole is passed on that test? No; we do not take any test from the merchant; we examine the cement ourselves, and take from the parcel the samples required for making the test, quite independently of the merchant. What is more, we do not test any cement so long as it is in the hands of the merchant. It must be in our own hands, either on the works or in bond under our care.

1153. What I mean is this: If I buy 100 casks of cement from any firm in town, and get that parcel sent up country, I can send a sample of that parcel to Sydney to be tested;—is it not customary for the Department to accept that? An officer of the Department would send back a sample of 100 casks, and the cement would be kept until that sample had been tested.

1154. There are various tests equally as good? Yes. I have heard some people say that you can test cement by tasting it, but I would not care to do that.

1155. You put it through various modes of testing it? Yes.

1156. There are various ways of testing cement equally as good as the hot-water test? No; I would not say that. I think that the hot-water test is the best of the whole lot.

1157. *Mr. Bavister.*] Is the sewer work to which you have referred, as showing cracks and fractures now being covered with an earth embankment? No. The filling to which you refer, I presume, is part of the filling that is necessary to be done in forming the sewage farm. A road is being made, beds have to be formed, and so on; and this filling is being done in conjunction with that work.

1158. At the position referred to, the work is above the general surface of the ground, is it not? Yes; the surface of the ground where the aqueduct you speak of is constructed is probably 12 or 14 feet below the sewer, and the surface of the ground is virtually under the influence of the tide, except that the tide is excluded; and then the filter-beds for treating the sewage have to be made on the top of that original surface with sand, and that is being done, and roads formed round those filter-beds; and I presume that the filling you refer to is what is being done in conjunction with that.

1159. But is the aqueduct itself being surrounded by an earth embankment on both sides? Yes.

1160. And a roadway formed on the top of it? No, certainly not. But that is in a different length from the one to which I referred. That is not in the length where the cracks have developed, but it is another length of sewer altogether—it is on the Botany side of Muddy Creek.

1161. But where those cracks have developed and shown themselves, is that portion of the work being protected or covered by an embankment? No; but there is no doubt that a roadway will have to be made alongside that in the same way as one has been made alongside the other, in order to give access to the farm, but at present that is not being done. We have not reached that—we are half a mile away from it.

1162. But if it is to be done will it be necessary to make a roadway on each side? Not at present, but eventually we shall have to do it, for the farm is on the other side.

1163. *Mr. Robert Jones.*] Have you calculated in any way the weight per square inch or square foot that the street over the tunnel would carry with perfect safety? So far as the tunnel is concerned there is no danger of anything happening from weakness of the work or anything of that sort.

1164. In your opinion is it of sufficient stability to carry several times the weight that it is ever likely to be required to carry? In the position it is, it is amply strong enough. It is 3 or 4 feet in all cases at least, and in many cases 20 feet, below the surface. 1165.

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1165. Would the part nearest the surface be perfectly safe to carry several times the weight that it is ever likely to be required to carry? I think it is quite strong enough for all that will be required of it.
1166. Those wood-blocks are laid with a convexity of 6, 8, or 9 inches across the width of Park-street;—with the wood-blocks laid as they are with that convexity, and with the concrete underneath them with a similar convexity, what weight would they carry, although this cavity existed, and without being supported by anything? I should say they would break down with ordinary traffic. It is a little surprising to me that the concrete did not break down in this case, for in my judgment there must have been close on 7 or 8 feet between the bearings.
1167. *Mr. Cook.*] Have you tested that matter carefully? I have made many tests with beams. The thing in this case which would assist is that the concussion caused by the horses' feet on the blocks would be cushioned to some extent by the blocks, and consequently the duty the concrete had to perform would be lessened; but if the concussion had come directly on the concrete, I am sure that it would have been broken through.
1168. Are you aware that a weight of 20 tons may have passed over that in its present position, and did not have any effect on it? Possibly, because it did not extend the whole width of the street; it was in pot-holes.
1169. *Mr. Bavister.*] Can you inform the Committee what would be the carrying capacity of this concrete in conjunction with wood-blocks over an area of 10-feet bearings? I cannot say now.
1170. Could you say if the Committee gave you time to consider the matter? I could certainly.
1171. *Chairman.*] Did I rightly understand you to say that the Hydraulic Power Company's tunnel had never been filled? Never properly filled, as far as I am able to judge.
1172. Do you mean to say that there were any cavities in connection with it, or that it had not been properly rammed? The filling put into the tunnel had not been properly rammed, and it appears to have settled to some extent, and a small space was left immediately under the wood blocks.
1173. Have you any idea what space? It could not be measured—probably enough. The earth was so loose that the concrete would not take its bearings on the filling put into the tunnel.
1174. That space would be very small indeed? Yes.
1175. Can you give the Committee any idea of the extra cost entailed through moving the timber now? I could supply the Committee with an estimate of what it would cost—it is rather a costly process—but I would not like to say precisely now what it would cost.
1176. Have you any idea what the difference of cost would be between good compo. cement and that which you have described as being used in these tunnels? A good compo. would probably cost from 50s. to 55s. a cubic yard. As a matter of fact, compo. is never measured except in the brickwork, and if it is measured in facing it is measured by superficial yard.
1177. What should that compo. which you have described as having been used in these tunnels cost? To begin with, as I understand it, they have used sand which has been brought into the harbour as ballast, and consequently that should not cost very much—at any rate it would not be worth very much. Good sand would be worth probably 6s. 6d. to 7s. a yard, but that used ought not to cost very much more than the cartage—say, 2s. a yard.
1178. Can you give me an idea of the total difference? Probably there would be 10s. a cubic yard saved.
1179. Have you any idea of the number of cubic yards in the work? I could not say. I do not know what brickwork there is.
1180. *Mr. Robert Jones.*] How much cement would it take to make a cubic yard of compo.? There would be 27 cubic feet of sand and about 3½ casks of cement in a cubic yard of compo.
1181. You are quite sure that there would be 3½ casks of cement? It might vary a little—3¼ or 3½.
1182. *Chairman.*] In reply to a question just now, I understood you to say that you had had cases where a subsidence had taken place similar to that in Park and Pitt streets? Not exactly similar, because in the case which I had in my mind there was no such element as you have there—no wood-blocking, no concrete, over the tunnel; but subsidence has taken place in several places where it did not matter at all.
1183. To what extent? It would probably go down 3 or 4 inches over the tunnel, but it would be perhaps in a sandhill or something of that sort.
1184. *Mr. Bavister.*] In the cases to which you have referred, was the subsidence assisted or aggravated by a parallel excavation unrammed? In the case I have in my mind there were no elements similar to what you have in Park-street—no wood-blocking, no pipes. It was simply an ordinary tunnel through waste ground, where it did not matter what settlement took place.
1185. *Mr. Robert Jones.*] What would a cask of cement cost? Cement varies very much in price. I believe you could get some for 10s. a cask.
1186. What would be the average cost of the best cement by taking a parcel during the last five years? Well, cement has gone up as high as 17s. a cask, and down as low as 9s.
1187. Well, at 11s., what would the fair cost of a cubic yard of compo. be? The cost of material would be 45s.—the prime cost of material without any labour in connection with gauging or mixing or anything of that kind.
1188–9. The cement in that would cost 38s.? 38s. 6d. and sand 6s. 6d., making 45s., and I said that 50s. to 55s. would be the total cost of good compo.

Isaac Ellis Ives, Mayor of Sydney, called in, sworn, and examined:—

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1190. *Chairman.*] You know something of this inquiry as regards the telephone tunnel? I know something of it; but to what particulars do you refer?
1191. You have seen some portions of the ground above the tunnel opened? Yes; the first occasion on which my attention was drawn to the matter was on the 14th May.
1192. To what was your attention then drawn? To an opening over the tunnel.
1193. Where? Near the excavations for the Civil Service Co-operative Company's new building, at the corner of Pitt and King streets.
1194. By whom was your attention directed to the tunnel at that point? By some of the aldermen who were passing by.
1195. Which of the aldermen? Alderman Waine was one.
1196. Were there any others? I could not specify any others.

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1197. But there were others? Yes; but I could not say positively who the others were. There were two or three present when my attention was drawn to the matter.
1198. You inspected the work at the point you have named? Yes; at 1 o'clock, or a little after, on the day I have named.
1199. What was the result of your inspection? I at once went round to the Postmaster-General's Office to see if he was in. I found that he was out at the time, and I left word for him, as soon as he returned, to ring me up on the telephone at my private office, as I wished to speak to him.
1200. Did he do so? Yes; he rung me up. I was at the Post Office at half-past 2, and met him there.
1201. What did you do then? He and I, with Mr. Gordon, the acting City Surveyor, and Mr. Palmer, Assistant Town Clerk—I am not sure whether Mr. McCredie was at the Post Office, or whether we met him on the ground; but I know that he was there—went to see the tunnel near the excavation to which I have referred.
1202. You examined the work there? Yes; the work was partially uncovered near the excavation, and we could see it.
1203. What part of the work was uncovered? The side of the tunnel. The ground seemed to be all open. We could see the crown.
1204. What was the result of your examination? It seemed to me that the work was defective.
1205. In what way? From the fact that the timber had been left in, and that the packing was insufficient. Of course I am not a professional man, and I am not speaking from a professional standpoint.
1206. You are referring now to the packing at the side and on the crown of the tunnel? Yes.
1207. Had any complaint been made by the architect of the building to which you have referred, or by the workmen? Not that I am aware of.
1208. What was the anticipated danger from the point of view of the City Corporation, causing you to examine the excavation? It appeared to me that in the event of rain getting underneath the pavement it must collapse through the cavities which existed under it—that is, between the crown of the tunnel and the surface.
1209. Was the defective packing which you noticed at the side of the tunnel? Yes.
1210. In your opinion it was undoubtedly bad? Undoubtedly.
1211. In what respect? At the sides of the tunnel there was simply soft clay.
1212. Was it rammed or unrammed? It did not appear to me to be rammed; a long-handled shovel would penetrate it without any pressure.
1213. Was that course adopted to test the work? Yes; the shovel was used on several occasions.
1214. What was your object in getting the Postmaster-General to accompany you? I understood from my officers that the work was carried out by the direction of the Postmaster-General's Department.
1215. You wanted the Postmaster-General to do what? To see the unsatisfactory nature of the work which had been carried out.
1216. I presume your object would be to get the Department to make good any portion of the work which might be bad? Undoubtedly.
1217. Have you seen any other place open besides that which you have described? Yes, several.
1218. Will you describe them? On the 20th May the Water and Sewerage Board were excavating for the laying of water-pipes in Pitt-street, between Liverpool-street and Goulburn-street; the nature of the tunnel work was again mentioned to me, and I went round and inspected it.
1219. What did you find there? The same class of work that I had found at the other place;—if anything, worse.
1220. You mean that the packing at the side of the tunnel was defective? Yes; and on the crown also.
1221. How had the packing been done? Some portions which I saw open had nothing but clay between the boards and the crown.
1222. Were there any spaces left without anything at all? Yes.
1223. You mean that in certain places there was absolutely no packing? No packing whatever.
1224. You are speaking now of spaces underneath the laths? Yes; I do not know what you would call them. There are what I should call longitudinal and horizontal boards; the spaces were under the horizontal boards.
1225. Was the Postmaster-General with you on that occasion? No.
1226. Who was with you? There were several aldermen present. We went round to the Town Hall to look at the work. The acting surveyor informed the Post Office of this further opening.
1227. Were there any other openings which you saw? Yes; there was an opening at the corner of Goulburn-street; the crown of the tunnel there was a very little distance below the lower edge of the kerbstone.
1228. How much below? I did not measure the distance, but I do not think it would be 2 feet.
1229. Was the defective work there similar to that which you had previously described? Yes; it was apparently the same class of work.
1230. Are there any other places of which you know where defective work was discovered? Yes; an opening was made in Liverpool-street, where similar work was found; then, coming further along, the work was opened out at Park-street.
1231. You mean at the corner of Park and Pitt streets? Yes.
1232. Who opened that portion of the work? I had that done.
1233. Why? Because I considered the place unsafe for the vehicular traffic from the vibration.
1234. At that time you had not seen underneath the work, had you? No.
1235. It was the vibration which caused you to believe that some spaces must have been left in the work? Yes.
1236. Therefore you had it opened up? Yes.
1237. What did you find there? I found a subsidence between the concrete which carries the wooden blocks and the earth which has been used for covering the crown of the tunnel. There was a space, I think, of from 9 to 15 inches. That was the space between the cement and the top of the clay.
1238. The clay you speak of was resting on the boards? Yes.
1239. *Mr. Cann.*] What did you mean just now when you said "the earth used for covering the crown"? It was the original soil, I presume, which had been left from the tunnel. At all events there was the cavity I have mentioned between the top of the soil and the bottom of the concrete.
1240. *Chairman.*] You yourself saw the cavity? Yes. 1241.

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1241. At the time the place was opened out? Yes.
1242. Were you there when the work was opened out? While that portion was being opened.
1243. Did you see any cavities underneath the boards at that particular place? Yes.
1244. Did you see the boards taken out? I saw some.
1245. And you were sure they were cavities? Yes.
1246. Of what size would they be? Some of them were fully 6 inches deep. I may mention that at the opening between Liverpool-street and Goulburn-street the boards had slipped.
1247. But what was the case in Park-street? There were cavities under the boards; I did not measure them.
1248. Have you any idea of the depth of them? I should say there was a clear space of 6 inches in many places under the boards.
1249. Were there any other places you had opened? No; that was the last place that was opened.
1250. You said something about the boards having slipped at the place opened out in Pitt-street between Liverpool-street and Goulburn-street? Yes; that was uncovered by the Post Office authorities. The cross-boards had slipped and were tilted; they were down about 6 inches at one end. I am referring now to the covering boards. The 1½-inch boards had slipped from the cross-pieces, and underneath there were cavities.
1251. Did you see such a thing at any other place? I did not see it so bad as that.
1252. When you saw that, the men were taking the top of the work out? Yes; they were opening it out.
1253. I understand you to mean that the boards which support the top earth had slipped from the cross-piece? Yes, one end had. It was lying in this position [*position described*]. I was standing watching the operations, and the men at work, knowing who I was, endeavoured with their shovels to fill up the space underneath. I asked them to wait until I myself got down into the trench and had a look at the work, and I did so.
1254. Was anyone present at the time? Yes; Mr. Gordon was with me.
1255. Was there anyone else, do you remember? I am not sure. I think the Town Clerk was there, but I cannot be certain.
1256. Have you noticed any subsidence of the footpath over this tunnel? Yes; there was a complaint made to us about the subsidence of the pavement in front of the Criterion Theatre. There was a distinct spring in it.
1257. Did you have the work opened there? Yes; I do not remember the date, but I know that it was opened. The granolithic pavement is laid down in one piece—it is put down like cement. The pavement was cracking right across the whole 12 feet of the footpath, and it was quite springy.
1258. What did you discover there? I discovered a cavity between the granolithic pavement and the soil covering the crown of the tunnel.
1259. Of what size? It would be about 6 or 7 inches in depth. Mr. Gordon took the exact measurement.
1260. Was the packing there similar to that which you have described elsewhere? Yes.
1261. You took the action you did, I suppose, for the protection of the city footpaths? Yes. It was a very serious matter for the City Council to discover that work of this character had been done under the streets. It was thought that unless prompt action were taken it might cost the Council some thousands of pounds in the near future to put the footpaths in order again.
1262. Tunnels are made in various parts of the city, are they not, for the laying of pipes of different kinds? I do not know of any except this one.
1263. Do you know whether the Hydraulic Power Company excavated any tunnels for the laying of their pipes? I am not aware of it.
1264. Did you explain to the Postmaster-General the effect of all this faulty work? Yes; I pointed it out to him on the very day on which I saw him. Later on I had an appointment with him at the Post Office. That was on the 18th June. I was to meet him there by his own appointment at 2 o'clock. When I got there they told me that he had gone out, and that they did not know when he would be back. I was asked to wait until he came in. That was an impossibility, as I had something else to do.
1265. Did you take any action to secure the safety of the public in connection with this work? Yes; when my attention was drawn to the state of things in Park-street I at once had the work opened up. The traffic, as the Committee are well aware, I daresay, has been stopped, pending, as I understood last week from Mr. Gordon, the examination of the work, at your wish, by an expert.
1266. How long was it after the work was opened up that Mr. Gordon told you that I wanted it kept open until it could be properly examined? I do not know. Mr. Gordon was here last week, was he not?
1267. The day on which the Committee examined the opening in Park-street would be the day upon which I asked Mr. Gordon to keep the work open until it had been examined by an expert;—how long would that be after the work was first opened? It was opened on the 12th July.
1268. You are aware that the Committee inspected it on the 20th July? No; I have no report.
1269. Was it on the 20th or on the 21st that Mr. Gordon told you I wanted the work kept open for inspection? I could not tell you that. He said he had been here, and that he had been examined, and that you wished to have the opening of Park-street examined by an expert. That is all that passed between us.
1270. Was that on the day he had been examined? Either on that day or on the following morning; it would be about a week ago. I do not wish to lead the Committee astray in any way. The work was kept open at the request of the Chairman of the Committee, who, I understood, wished to have it examined by an expert.
1271. The work was kept opened before that? Undoubtedly it was.
1272. Have you any idea of the cost of making the footpath good in cases where you know it has become defective through the bad construction of this work? I do not know the amount; but it will be pretty considerable. It will be simply a matter of measurement. If the Committee wishes to know, I daresay Mr. Gordon could give you the information.
1273. Do you know whether the City Council at any time made a request to the postal authorities that this work might be done by tunnel instead of open cutting? I have no record of anything of the sort.
1274. *Mr. F. Clarke.*] In your evidence with reference to that part of the tunnel in front of the Civil Service Co-operative Stores, you said there was an open space between the building-line and the side of the

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the tunnel;—I want to ask you whether, in your opinion, that opening might have been caused by the excavation for the building? There is not the slightest doubt that stuff had been removed by the contractor for the building. It could not remain there, because it was so loose. Looking at the building on the northern side it was evident that there had never been any packing whatever put in on the side of the tunnel. It was simply slush.

1275. You are of the opinion then that whatever stuff was taken away by the contractor's labourers was soft stuff, and was not solid material? That is so.

1276. With regard to the numerous openings which you have mentioned, did they remain open, or were they filled up by anyone? I think only two openings were made by the Council; the other openings were made by the Water and Sewerage Board.

1277. Two openings were made by the Council, exclusive of the one in Park-street? Yes.

1278. And these were filled up afterwards? Yes; the opening between Liverpool-street and Goulburn-street was filled up. The Postmaster-General sent down to me in reference to the holidays coming on. It was thought that this opening might be dangerous, and it was filled up.

1279. With your consent? We had boarded over one of the openings to make the place secure.

1280. Was it afterwards filled up? Yes; it was filled up by the Postmaster-General.

1281. With your consent? Yes.

1282. Did you at any time verbally or by letter ask the Postmaster-General to make good the defective work? The Postmaster-General himself either sent a message or wrote to say that they would make good everything which was defective, and that they would withdraw the timber. I think it was on the 28th June.

1283. That would include all the timber, not only where defective work was observed but in other parts of the tunnel which had not been opened up? So I understood. I was informed timber was only in certain portions of the line.

1284. *Mr. Cook.*] You say you were informed;—did you not yourself read the letter? There is no necessity to quibble about words.

1285. There is no quibble; it is a matter of fact? If you wish to see it you will find the letter at the Town Hall with my initials upon it. I read everything which comes to the Town Hall.

1286. *Mr. F. Clarke.*] Your action in this matter has been purely what you conceived to be in the interests of the ratepayers? Undoubtedly.

1287. *Mr. McGowen.*] You were referring to your notes when you first spoke, and you said that on the 14th May, at 1 o'clock, you went round to see a portion of the work which had been opened up;—are you sure of the date? I do not think there is any reason why I should not be sure of it. I have here in my pocket-book a note of what I did on that day. I had an appointment at 12 o'clock, I had one at 11 o'clock, and I was at Pitt-street at 1 o'clock and also at 3 o'clock.

1288. That was the time when you went with the Acting City Surveyor? Yes.

1289. At 3 o'clock on the day to which you refer the Postmaster-General and several others were with you? Yes; I went to the Post Office, and got there a few minutes after half-past 2 o'clock. I was a little late.

1290. You have reason to believe from your notes that it was on the 14th May that you made this inspection? Yes. A man is not in the habit of writing up memoranda unless he has done certain things on a particular day. I am reading the entries to you now exactly as they were written at the time.

1291. I only mentioned the matter because the 15th has been mentioned to us as the date? The 15th May was on a Saturday.

1292. Was this defective work brought under your notice in the usual manner? It was brought under my notice by one of the aldermen.

1293. At a Council meeting? No. I am at the Town Hall every morning to transact public business. The aldermen come in sometimes every day, and sometimes once a week. They come into the office and report to me anything they think of any importance.

1294. During your mayoralty there have been subsidences of the nature you have described in cases where tunnelling has been carried out under the pavements by the Water and Sewerage Board and the Hydraulic Power Company? I have not heard of it. It has never been brought under my notice officially that there has been anything of the kind, and I was not aware that the Hydraulic Power Company had done any tunnelling.

1295. You do not know of any other case where there has been a subsidence after tunnelling under the streets of the city? Personally, I am not aware of any other tunnelling in the city; there may be, but I am not aware of it.

1296. *Chairman.*] You have forgotten the Water and Sewerage Board's tunnelling? Yes; I had forgotten that for the moment.

1297. *Mr. McGowen.*] I was going to ask you whether it is usual when subsidences of this kind occur to bring them under the notice of the Mayor? No subsidence has ever been brought under my notice.

1298. Do you not know that as a matter of fact the Hydraulic Power Company has done some tunnelling? No.

1299. You mentioned that when some boards were pulled out there was no packing between them and the crown of the tunnel;—are you sure that there was no packing at all? There was a very small amount of packing. Some loose soil had been put in apparently.

1300. There was no stone or rubble of any kind? I never saw any stone; all that I saw was loose soil.

1301. *Mr. Cook.*] You said that you have no knowledge of any request on the part of the Council that this work should be done by tunnelling, and not by open cutting;—you have no knowledge of any such direction on the part of the Council? I have no knowledge of any such instruction.

1302. I have here a letter under date of 13th May, 1895, from the Town Clerk to the Deputy Postmaster-General; it is in these terms:—"Sir,—In reply to yours of 3rd instant, *re* the construction of the second section of the underground tunnel for telegraph and telephone wires along Pitt-street, I have the honor to inform you that permission is granted for the street to be opened up without prejudice to the rights or the future requirements of the City Council, and conditionally that the work be proceeded with as may be directed by the Corporation, and all operations carried on underground, and disturbed surfaces made good to the satisfaction of the City Surveyor";—do you know anything of that letter? No; that is the first I have heard of it.

1303. Do you know anything of an acknowledgment ordered to be sent in reply to that letter, to the effect that everything would be done in strict conformity with the Corporation regulations—the letter is dated 20th May? No.

1304.

1304. What do you suppose would be meant by the statement that the "work would be proceeded with as directed by the Corporation"? I cannot say. The matter may have been before the Council, and there may be a minute on the subject. I am unable to say what the statement you refer to would be intended to convey without making a reference.
1305. Since your advent to office, have you given any direction as to the way in which this work should be proceeded with? No.
1306. Then you do not know what the meaning of the term "as directed by the Corporation" would be? No; I was not aware that such a letter was in existence until you produced it.
1307. *Chairman.*] Would you consider the letter which the Postmaster-General has read a direction that the work should be done by tunnelling? I suppose the letter would be in reply to a letter sent from the Postmaster-General, asking for permission to do this work, and stating in what way he proposed to do it. Unless I had the correspondence before me I could not say.
1308. The letter refers to disturbed surfaces, and what I want to know is whether from its wording you would consider it a direction to have the work done by tunnelling? Not entirely by tunnelling; it would permit of tunnelling, because it provides for any disturbed surfaces to be made good. I should like to see the first letter, and read it in conjunction with that in reply.
1309. Would the Mayor read every letter that comes to the City Council? Yes. As long as I have been in the Chair all matters have come before me. I go through the whole of the papers, and mark them for the Committee or for the various officers for report. This letter from the Postmaster-General would be read by the Mayor, and, in all probability, following the usual course, he would mark it for report by the City Surveyor, under whose department it would come. The letter would be returned with the City Surveyor's report, and on that the Mayor and Council would take action. The answer would be framed accordingly.
1310. *Mr. Cann.*] Could the letter which was sent to the City Council be produced? Yes.
1311. *Mr. Cook.*] Referring to the openings made down near Goulburn-street, can you tell the Committee what occurred in connection with that matter;—you have already stated that I sent round asking your permission to open these places, and that you declined to give it to me? I do not know what openings you are referring to.
1312. I am alluding to the place which I had opened up between Goulburn and Liverpool streets, and down beyond the Natatorium;—do you remember Mr. McCredie coming to you, and asking you to go and look at some work? I remember his coming to the Town Hall. He came, perhaps, more than once.
1313. Was Mr. Jessep there at the time? He is there almost every day.
1314. Was he there on that particular day when Mr. McCredie asked you to come and inspect some work? I think he was there one day when Mr. McCredie was there, but I could not say positively.
1315. Have you any resolution of your Council with respect to defective packing over these tunnels? Yes.
1316. Asking us to at once remove the timber throughout? Yes.
1317. Was any reply sent? Yes; we received a reply to the effect that you would remove the timber.
1318. Was that being done at the time the Park-street roadway was opened up? I could not say. I believe the men were at work on different parts of the route.
1319. Why did you open up that place? Because I considered it dangerous to the public.
1320. Did anyone call your attention to it? Scores of people.
1321. Whom were these? Hundreds. People have the same opinion in regard to the crossing from Barrack-street to the General Post Office. They are desirous of seeing that part of the work opened up.
1322. You say you authorised the opening up of this place in Park-street? Yes.
1323. Could you not say who suggested it? No one in particular suggested it. Scores of citizens spoke to me about it. I myself stood there to see the place opened up.
1324. Why did you take the trouble to do that while we were engaged on the work? It was portion of my duty. I have to consider the safety of the lives of the people of the city.
1325. Did you consider it part of your duty, after having asked us to do a thing, and after we had given you an undertaking in writing to do it, to rush in just at the point which we had reached, and open up the street? I do not think you had reached that point.
1326. You do not know whether we had reached it or not? I do not know where you were working. You worked first of all down the hill, and now apparently you are working up the hill.
1327. You had no idea that we were working at that spot? I do not know where you were working. I do not profess to know. I do not keep a record of where you are working.
1328. Will you tell the Committee what occurred on that day to cause the sensation which resulted in the bringing down of the police? Your Department, or someone representing it, sent down some men to fill in the excavation.
1329. At Park-street? Yes.
1330. Did these men tell you that they were working there? They were not working; they came there to work, and brought all their tools and other appliances with them.
1331. Did they bring them there specially that day? Undoubtedly. I was there.
1332. Where do you say they were brought from? I do not know where they were brought from.
1333. You are sure they were brought there on that day? Yes, according to what they said. They said that the men had come to fill up the excavation.
1334. Did they tell you that they had only come to do that, or were you told that the men were working there? They did not say anything of the sort. They were not working there.
1335. Will you swear that they were not working there? I have already said that they were not working there.
1336. Do you mean that they were not working anywhere near there? I do not know anything further than this—that they brought their tools into Park-street, where I was at work on the crossing.
1337. That is all you know about it? Excepting that their instructions were that they were to fill in the excavation which was made.
1338. You swear that that was all they told you? They did not tell me anything, and I do not say that they did. They did not talk to me. It was no part of my business to go and talk to these labouring men.
1339. Who were the inspectors you were talking to on that day? I did not speak to anyone. I got the information from my officers.
1340. You did not speak to any of the men at all on that day? I did not.
1341. You did not poke your umbrella at one of them? No; I did not.

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1342. You did not tell him that if he filled the excavation up he would have to fill it up at the point of the bayonet? Certainly not; I had no communication with the men.
1343. Why did you go to Mr. Fosbery? To maintain the rights and dignity of the citizens.
1344. Where was the necessity for it? I was afraid that my position was about to be assailed by an outside authority.
1345. Who was it? These men who were sent there to do the work.
1346. What reason had you for supposing that they were sent there; you said you had nothing to say to them;—how did you form your conclusions? I saw the men there, and, as I have told you, I was told that they were sent there to fill in the excavation.
1347. Without saying a word to them, you asked Mr. Fosbery to send the police? I did not.
1348. What happened, then;—put it in your own way? I have already told you that, when I saw there was likely to be an interference on the part of some other workmen with my workmen, I thought it necessary to take certain steps to protect the interests of the city.
1349. What reason had you to fear an interference of which you speak? I have already said that the men were there.
1350. But they were doing nothing; I suppose, as a matter of fact, there were hundreds of men there on that day? I did not see hundreds.
1351. Did you fear that there would be a breach of the peace? I thought there was every probability of it.
1352. What were your grounds for that fear? I have already explained them to you as far as I possibly can. A body of men were sent ostensibly to interfere with work that I was carrying on.
1353. Who told you that they were so sent? I have already replied to that question.
1354. Did you see Mr. Brunker on that day? I did.
1355. At what time did you see him? Between 5 and 6 o'clock. It was gaslight when I got to Mr. Brunker's office.
1356. Were our men in the street then? The men were in the street then.
1357. Suppose some of them came here and said they were all home before 5 o'clock;—what would you say to that? I had no means of recognising them. I could not say whether they were or not.
1358. You said you did not talk to the men at all on that day;—did you see anyone belonging to the Post Office? I spoke to no one in connection with the Post Office.
1359. Did you send us word that you were going to open up this place? No; I certainly did not.
1360. Your only reason for opening it was that you believed it was dangerous? That is what I have said.
1361. And you do not know whether our men were working in the vicinity or not? I do not know where the men were working. I do not go to see where they are working.
1362. *Mr. McGowen.*] Did you not know that the Post Office men were working in front of the "Criterion Hotel," on the pavement going up towards Park-street? They were working there about that time.
1363. That would be in the vicinity of the place you had opened up? Yes.
1364. *Mr. Cook.*] Have you complained to the Department, in writing, about any other parts of the defective work—for instance, the work lower down towards Goulburn-street and other places? Yes; I believe there has been some communication to the Post Office in reference to them.
1365. You are quite sure on that point? I am not quite sure, but I believe there was a communication in reference to it.
1366. Do you remember my trying to get an interview with you by a letter dated 23rd June;—do you remember my asking you to see me to talk over the matter? Yes; I said I could not see you the next day, as I was engaged; but that I would see you on the following day, at noon, at the Town Hall. Just before noon I got a note to say that you could not come.
1367. Did you receive this letter:—"Mr. Cook presents his compliments to His Worship the Mayor, and regrets that it will be impossible for him to go to the Town Hall for the purpose of an interview mentioned in a previous note"? Yes; previously to that I had been to the Post Office, and could not see you there. I concluded that when you asked if you could see me you wanted to see me.
1368. Was it explained to you when you called at the Post Office that I was at a Cabinet meeting? No; they said they did not know where you were, and that if I came in before you came back I was to wait.
1369. You say that nothing was said to you about a Cabinet meeting? No.
1370. Did you know that I called round at the Town Hall on that evening? I was not aware of it.
1371. Your officers never told you of that? I never heard that you were there.
1372. You did not hear that I came round that evening to the Town Hall? No; I should not be likely to be there in the afternoon.
1373. You had just gone away, as a matter of fact; is it not rather remarkable that I should have gone round to see you, and that you should not have been made aware of the fact? It all depends upon whom you saw.
1374. Colonel Walker was with me at the time; he went in and got word that you had gone home? Whom did he see?
1375. An officer, I presume? Did he make himself known?
1376. I presume so, and also the object of his visit; is it not remarkable you should not have heard it? I do not understand why, if you went to the Town Hall that afternoon with Colonel Walker, especially seeing that this was a matter of every-day conversation, and that Mr. Walker made himself known, I should not have heard of it on the following morning.
1377. You think it remarkable? I do think it remarkable, and I shall make it my business to inquire into the matter at once.
1378. Will you read the letter which I handed you, dated the 18th June, conveying the resolution of the Council in reference to the timber, and signed by the Town Clerk;—does it not strike you as being rather a bald way of writing a letter? I think it follows the official routine in these matters.
1379. Strictly official? You surely did not expect the Town Clerk to go into any details. He simply conveyed the resolution of the Council. I do not know that he could add much to that.
1380. You are a member of the National Association? No.
1381. You are not connected with it? Not in any shape or way.
1382. If your name appears as one of the Vice-Presidents it is without your consent? I am not a member of the National Association, and they have no authority to use my name as you indicate.

WEDNESDAY,

WEDNESDAY, 4 AUGUST, 1897.

Present:—

Mr. BAVISTER,	Mr. HARRIS,
Mr. CANN,	Mr. ROBERT JONES,
Mr. COOK,	Mr. NELSON,

Mr. McGOWEN.

W. J. LYNE, Esq., in the Chair.

Arthur Latimer McCredie, Esq., appeared in person on his own behalf.

Isaac Ellis Ives, Esq., Mayor of Sydney, recalled and further examined:—

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1383. *Mr. Bavister.*] In reply to Question 1212, "Was it rammed or unrammed?" your reply was, "It did not appear to me to be rammed; a long-handled shovel would penetrate it without pressure";—are we to understand from that, that if a long-handled shovel were set on the top of the earth, handle downwards, it would penetrate the earth by its own weight at the mere pressure of something like 6 lb. to an inch? No. When I say "without any pressure" I mean that I saw a long-handled shovel used, and it did not require as much pressure as a man would generally use in using a long-handled shovel.
1384. It was the handle of the shovel that was pushed in? Yes.
1385. Can you say to what extent? From 2 to 3 feet.
1386. That was in the soil between the packing? That was between the building-line and the line of the tunnel.
1387. In reply to Question 1218, you state that an excavation was made in the course of laying water-pipes;—did you see that excavation made? I saw the Water and Sewerage Board men at work excavating and laying pipes.
1388. But the tunnel was there before you got there, I suppose? In some places.
1389. So you could not say whether the whole of the subsidence was due to defective work in the tunnel, or whether, in the course of their work, the Water and Sewerage Board men, in making the excavation, had, from necessity or for any other reason, removed something? As far as my recollection goes, they had only worked on the street-side near the kerbstone, and they cut away some of the head-pieces.
1390. But you could not say what had taken place before you arrived there? No.
1391. And when you arrived at this particular position can you describe to the Committee how far the excavation had progressed—what depth it had attained at the place where the defective work was disclosed? I did not measure the depth.
1392. Can you say what it was, roughly speaking? I should think not more than between 3 and 4 feet below the surface.
1393. Can you say what depth the crown of the arch was at this position? No.
1394. Would that be the place where you describe the crown of the arch as being less than 2 feet below the kerbstone? That was at the corner of either Pitt and Liverpool streets or at the corner of Goulburn and Liverpool streets.
1395. Was the depth to the crown of the tunnel from the surface at this position somewhat similar to that where you speak of it as being only 2 feet below the kerb? Something similar.
1396. You said that the depth to the crown of the tunnel from the surface of the street or roadway would be about the same as where it was less than 2 feet below the kerb? Somewhat similar distance.
1397. So the depth of that position from the surface to the crown of the arch should not have been more than 3 feet? I could not say what depth it was.
1398. Could it have been more than 4 feet? I could not give you the depth; I did not measure it.
1399. But you have already said that you thought it was from 3 feet to 4 feet? Yes; from 3 feet to 4 feet—that is, speaking from memory.
1400. Well, that being so, and the depth of the excavation being only slightly below the crown of the arch, it could not have been as low as the side walls were? I saw this excavation when the whole of it was uncovered.
1401. Yes; but I asked you what depth the deepest part of that excavation which disclosed defective work in connection with the tunnel had reached when you first saw it, and your reply was 3 or 4 feet? I think it would have been from 3 feet to 4 feet. I could not say positively. I did not measure it.
1402. Can you say how close the excavation for the Water and Sewerage Board work was being put down to the tunnel? The Water and Sewerage Board men were laying a line of pipes, as they generally do, clear inside the kerb-line, on the footpath.
1403. And was the tunnel also inside the kerb-line? Undoubtedly; their pipes were between the crown of the tunnel and the kerb.
1404. Can you say whether the excavation for the tunnel occupied the whole of the width between the building-line and the kerb? I cannot say.
1405. Can you say whether it occupied two-thirds of it? I really cannot tell you.
1406. Can you say how far from the outer edge of the kerb was the nearest side of the tunnel? No.
1407. You saw it? I have seen it, but I could not tell you the distance.
1408. Can you form any opinion within a yard? I suppose I could do that, but I could not tell you the exact distance.
1409. Do you think that there was the space of a yard between the outer edge of the kerb and the nearest wall of the tunnel? I really do not know. I do not know what the size of the tunnel is. The pathway is 12 feet wide, including the kerb—from the outer edge of the kerb to the building-line is 12 feet.
1410. Can you say within a yard what was the space between the outer edge of the kerb and the nearest side wall of the tunnel—was it 2 yards? I should not think so; I did not make any measurements.
1411. Was there sufficient room between the kerb and the side of the tunnel for the water-pipes to be laid in, without encroaching on the roadway or removing the kerb? Oh, yes; they were laid inside the kerb—that is, on the footway.
1412. And the footway is 12 feet wide, including the kerb? Yes.
1413. And the kerb will be not less than 11 inches? It will probably be 12 inches there.]

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1414. So between the kerb and the building-line there will probably be a space of 11 feet? Yes.
1415. It is stated that the size of the tunnel is 6 feet over all, which deducted from 11 feet would leave 5 feet of space? Yes.
1416. Do you know whether the tunnel is close up to the building-line on one side? Not where I saw it opened.
1417. Do you know whether it is, comparatively speaking, in the centre of the footway? Yes; I think that where I have seen it, it was pretty well in the centre between the kerbstone and the building-line.
1418. That would leave 2 ft. 6 in. between the kerbstone and the side wall of the tunnel? Yes.
1419. Do you know what size pipe the Water and Sewerage Board were putting down? It must have been a 12-inch pipe, I think.
1420. Can you say whether it was put close to the kerb? No; it was not close to the kerb.
1421. I mean close in line with the kerb? It was not abutting on to the kerb. The pipes are never laid close to the kerb.
1422. I suppose that is to prevent the kerb from breaking down in consequence of the earth being removed from below it? I do not know the reason why they do not put the pipes near the kerb.
1423. Supposing that the excavation for the tunnel were cut out neatly, and no more earth removed than necessary for the putting in of the work, do you think it would be possible to make the excavation for the water-main without breaking right into the side of the tunnel and allowing the earth to come down which had been previously disturbed? But there had been no excavation here from the surface.
1424. That I am quite willing to admit; but there must be excavation done to form a tunnel, must there not? Oh, yes.
1425. And whether it is done from the surface or below, the earth will have to be removed? Oh, you are speaking of earth below the crown of the tunnel. I thought we were discussing the upper portion—between the tunnel and the footpath.
1426. Was the timber left in at this position? Yes.
1427. In excavating for the water-main, did the side of the excavation nearest the tunnel expose any of the timber of the tunnel? I saw some of the timber exposed—in fact, the Water and Sewerage Board men cut some of the 9 x 3 head-pieces, to get their pipes in.
1428. Do you know on which side of the upright they cut those head-pieces? I could not tell you. I did not take particular notice.
1429. Did you notice whether the uprights were left in? I could not tell you; I did not notice.
1430. Then, it may have been that the head-pieces were cut between the crown of the tunnel and the uprights? Some of them were cut and removed; but where they were cut I could not tell you. I did not look at the place from the best point of view.
1431. Can you say what effect the cutting and removal of timber had had on the work done by the Post Office authorities? No, I cannot say.
1432. For anything you may know to the contrary, the timbers may have been cut clear of their supports, and, if that had been done, would that, in your opinion, have helped to bring about the settlement of the earth there? Of course the Water and Sewerage Board had the flagging up, and lifted the whole of the soil out, and Mr. Smail has informed me they removed the timber, and that it took a certain number of extra loads of soil to fill up, and they rammed it all in and made it good.
1433. Have you ever had a complaint as to the settling or subsiding of footpaths after work done by the Water and Sewerage Board? Not for some time past.
1434. You have at some period? Not during my term of office.
1435. Would you say, then, that during your term of office the work done by the Water and Sewerage Board has been done in such a manner that no subsidence of footways has taken place in consequence of their work since you have been in office? Nothing has been reported to me.
1436. Could such a thing take place without its being reported to you? It would go to the City Surveyor, and he would intimate to the Water and Sewerage Board, but not report to me.
1437. And such things might be put in a proper state for the safety of the public without coming under your observation at all? Yes; a small matter of that sort.
1438. Where would you draw the line of distinction as between a small matter and a large one? I cannot say personally that there have been any defects in the laying of the mains by the Water and Sewerage Board.
1439. I would not suggest that that had taken place; but I was simply inquiring, had the filling in and making good of footpaths after the laying of pipes by the Water and Sewerage Board ever resulted in settlements of footpaths requiring after-attention? I am not in a position to answer that question.
1440. You paid, I think, particular attention to the position at Pitt and Park streets, which was one of so serious a nature as to require special attention? Yes; the roadway.
1441. Have you had any information since your last examination in connection with that? No.
1441½. Has it been brought under your notice that there was an old shaft for some purpose at that exact position? No.
1442. You do not know that such has been discovered to be the fact? No.
1443. The concrete was opened from the kerb-line near the "Criterion Hotel" to about rather more than the centre of the roadway; the other portion of the concrete was cut about half-way through by gads, and left;—do you know why it was left, after being cut through? I do not.
1444. Do you know whether the settlement under the earth showed that was as great in extent as the portion that was taken out? I was not there when it was taken out. I did not see the other portion.
1445. Then you can make no contrast? I only saw the northern end; I did not see the portion towards the "Criterion Hotel."
1446. I am speaking of the portion under the concrete that was only partially cut through and left in position? Yes; I saw that.
1447. Do you know what the subsidence was under that? I did not measure it, but I believe it was from 9 to 15 inches.
1448. Has the information which has reached you enabled you to form any opinion as to whether that was the portion where the subsidence was greatest? I have no information on that point.
1449. If it were stated by any persons who saw the work done that the portion left with the concrete over it for its protection was that portion where the settlement was greatest, you would not be in a position to contradict it? I am not.

1450.

1450. And if that were so, you would, perhaps, not consider the matter so serious a one as you have hitherto thought it to be? I think that was quite sufficient to make it serious.
1451. Did you not think that there were cavities under the concrete and above the earth to a greater extent than the 9 inches you referred to as being under that concrete left in position? No; I could not form any opinion as to what the cavities were until it was opened out.
1452. Have you not in your evidence stated something about 15 inches? I did not measure it, but I understood it was from 9 to 15 inches.
1453. Then are we to understand that 9 inches was the smallest space there was between the concrete and the earth? At that particular spot. I am only speaking of the one place you are asking about; I did not see the other.
1454. You speak of your attention being called to the danger that existed to the general public and the traffic;—how was your opinion formed that it was dangerous? There was a great deal of vibration there when a 'bus or other vehicles went over the crossing.
1455. Is that not rather a common feature of the wood-pavements? Not so common as it was there. It was a very distinct vibration there.
1456. Is it not a fact that owing to heavy rain some time since the wood-blocking in some portions of the city streets was lifted, and formed an arch—of course, with a cavity underneath it? I am not aware.
1457. There were statements made in the Press, after rain some five weeks ago, or perhaps not quite so much, that certain of the city streets presented a very peculiar aspect in consequence of the rain having got under the wood-blocks, or having caused them to swell, and the streets being made into rolls and curves;—was that brought under your notice? No.
1458. Then there may be very serious dangers existing as regards the safety of the public without you, in your position of Mayor, knowing anything about them? I did not see that report in the paper, and I heard nothing of it. Newspaper reports are very often very much exaggerated.
1459. But I believe that there have, at different places in the city, occurred decided ruptures in the footpath—from pressure on the outer edge of the kerb, the footpath has buckled up in some cases as much as 9 inches;—do you know how that has been brought about? I have never heard of its being buckled up to the extent of 9 inches.
1460. Have you ever heard of its being buckled up to the extent of 3 inches? I have never heard of any measurement being made at all; but if any blocks have been laid without sufficient allowance being made for the swelling of the blocks, the kerb has had to be taken up and reset, owing to the pressure of the blocks.
1461. Do you know what has taken place recently in Moore-street;—has it been necessary to take up a portion of the footway on the inside of the kerb on the eastern side of Moore-street, without interfering with the kerb at all? I am not aware.
1462. About half-way up on the eastern side of Moore-street there is a portico leading into the building supported by iron columns standing on the kerb, and from about that position, up as far as the building goes, or rather higher, the path has been interfered with, in consequence of the buckling up of the blocks? I am not aware of anything of that sort.
1463. If such a thing has taken place there, has a similar state of affairs been brought to your knowledge in other parts of the city caused by pressure of the wood-blocks on the kerbstones? I do not know what has taken place there.
1464. Have you known in any portion of the city of necessity arising to interfere with the kerb or the footpath immediately adjoining the kerb in consequence of some pressure causing a rising of the footpath next the kerb? I am aware, as I have said, that the kerbing has had to be shifted on account of the swelling of the blocks when there has not been sufficient space left for them to swell. The earth is supposed to be rammed in along the kerb, and if there is not sufficient of it, that causes the wood-blocks to swell, and the kerb has to be reset.
1465. Does your knowledge enable you to say whether the same sort of thing would be brought about by a settlement of the foundation of the blocks along the centre of the road, causing a pressure, or would it be brought about by moisture entering the blocks, and causing them to swell? I should say the wood swelling.
1466. You do not give that opinion as an expert, I suppose? No; I do not.
1467. Do you know whether such disturbances of the footpath have been frequent or extensive? I do not think they have been very extensive.
1468. Do you know how many times the pavement or asphalt has had to be taken up and relaid between the corner of George-street, opposite the old Police-station, and the corner of Harris-street, along the northern side of George-street? That is a long way.
1469. Well, do you know how many times the portion of the path on the northern side of George-street, between those two points, has had to be taken up and relaid in consequence of pressure from the wood-blocks putting it out of position? I do not.
1470. You have had no information given to you which would enable you to form an opinion as to how high the footpaths have been pressed up by such pressure? No. The Acting City Surveyor or the Inspector of Footways will be able to give you that information.
1471. I think the first portion of this work your attention was called to was in Pitt-street near King-street? Yes.
1472. Do you know who called your attention to that? As I mentioned the other day, the first who drew my attention to it was Mr. Alderman Waine.
1473. Do you know who drew your attention to the danger supposed to exist at Pitt and Park streets? Several persons did that.
1474. Could you name one of them? Well, it was a matter of almost general talk.
1475. But you cannot any one individual who specifically called your attention to it? My attention was called to it by the officers.
1476. Do you know which officers? The Acting City Surveyor called my attention to it specially.
1477. Are you aware that the Acting City Surveyor, in reply to questions, stated to this Committee that he could not find any cracks or any indications, other than vibration, that this particular position was any way dangerous? No; I have not the remotest idea what evidence he gave.
1478. Did you ask him whether he had seen any cracks, or did you yourself look for such indications? I did not.

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1479. If a roadway were likely to become dangerous, would you consider that that would be one of the indications sought? It never occurred to me to look for cracks in the roadway; but the granolithic pavement in front of the "Criterion Hotel," which was put in as one solid piece, was all cracks, and it was springy when you walked over it.

1480. Do you know that cement does frequently develop cracks without there being the slightest indication of its being hollow—that is, cement known as "fiery" cement will show cracks no matter how solid it may be? I do not know.

1481. You said, I think, in a portion of your evidence, that you were not aware that the Postal authorities, at the time of your causing Pitt-street to be opened, were then engaged, and had for some time been continuously engaged, in taking out the timbers in connection with the tunnel? I know they have been taking them out in various places.

1482. Seeing how great a matter of interest it was to the general public, as affecting their safety, and considering your opinion of the danger that existed, did you not cause some check or inspection to be kept on how they were proceeding with that work of taking out the timbers? I had a man there to see what was going on.

1483. And would it not be a portion of his duty to report to you the progress they were making? He would report to the officer, no doubt.

1484. Before opening up Pitt-street, did you think it worth while to inquire from that officer to whom such a report would be made as to whether the Postal authorities were continuing their work in that direction? No; I did not cause any inquiry to be made.

1485. If you had been convinced, as the result of inquiry, that the Postal authorities were following a straightforward course—starting at one point and working towards the other end, and taking all the timbers out in their course, and making good the pathways—would you still have considered it your duty to break through that roadway? I considered it very dangerous at the time.

1486. Still, if you had known that the Post Office authorities were, with expedition, trying to remove all source of danger, would you have interfered with it? I think I was perfectly justified in taking the action that I did.

1487. You did not know at the time whether the Postal authorities were continuing this work? I did not, personally.

1488. Did you think, then, that the public welfare would be best served by unnecessarily getting up an agitation, or contributing to an agitation? I had no desire to make any agitation over the matter.

1489. We have reason to believe that you have heard of a great deal that has not been seen by you, and that you have heard it has been stated or put in evidence that the Postal authorities claim that, at the time of your breaking through Pitt-street, they had brought the work of taking out the timbers from the tunnel up to the Criterion Theatre, and had, after filling in the pathway there, gone back some distance to remove the portion of timber left in for the purpose of not interrupting traffic, and that they were intending to continue along Pitt-street the whole way down wherever timber had been left in;—you did not make yourself acquainted whether that was or was not true? No; I did not.

1490. From your experience of the manner in which the Postal authorities have done other work, and the time occupied in doing it, do you think that Park-street would have been blocked to traffic for so long a time as it has been since you made the opening there? I cannot say.

1491. You know the width of Park-street? I think it is a 66-foot street.

1492. Including the pathways? Yes.

1493. Which are 12 feet each? Yes.

1494. Leaving 42 feet of roadway between the kerbs? Yes.

1495. When was that portion opened by your instructions, or when was the street blocked against traffic? On the 12th of July.

1496. When was the street reopened for traffic? I do not know.

1497. Could it have been opened without instructions from yourself? It was on last Friday, I think, that I wired to Mr. Lyne, asking him to say if there was any necessity to keep the hole open any longer, and I sent word round then to the Postmaster-General.

1498. Was last Friday the 30th July? Yes.

1499. Have you known any portion of the work where a width of 42 feet has occupied the Postal authorities eighteen days to reopen and reinstate? I am not aware.

1500. You do not know? I do not know.

1501. Do you know the date when the first complaint reached you as to the danger existing at this particular point of Pitt and Park streets? No; I could not tell you the date.

1502. Can you give us an opinion as to when you first became convinced of danger existing there? It was on a Monday that we opened it, and as far as I can say it was on the previous Friday and Saturday.

1503. It was opened on a Monday, and you were convinced of danger on the previous Friday or Saturday? My attention was drawn to it on the Friday or the Saturday—Saturday afternoon especially.

1504. Can you tell us who it was drew your attention to it? I have already told you that the Acting City Surveyor drew my attention to it specially.

1505. That was the first complaint you received as to its danger? No; several citizens spoke to me in reference to it.

1506. You do not know the dates on which they called your attention to it? No; it was during the time the other matter was being talked about and was going on—when the Water and Sewerage Board was doing something.

1507. Have you had any complaints from business people in the neighbourhood as to losses inflicted on them by the stoppage of traffic there? There has been no complaint made through the Town Hall.

1508. You have heard a good deal of current rumour;—have you heard any current rumour as to losses incurred by business people from that cause? I have heard it rumoured that there were losses, and most fabulous figures have been stated, too. One publican, I heard, said he was losing £20 a day.

1509. And you do not think that possible? Well, I had not the remotest idea that any man was doing such a business. I was only too happy to hear that he was doing such a business.

1510. Then would you believe that mistaken ideas sometimes get about as to things of this sort—that is, as to losses incurred and statements generally? Oh, yes.

1511. And it is not wise to attach too much importance to them until their truth or otherwise is proved? Yes; I did not pay any attention to the rumours I heard. No complaint was made to the Town Hall.
1512. You sometimes consider that in the public interest it is necessary to act without a formal complaint being made as to any particular matter, do you not;—if anything comes under your own notice you do not wait for a person to complain, but you act in the public interest? If I saw anything radically wrong I would draw the officer's attention to it for the purpose of inspection.
1513. Did you cause any inspection or order any report to be made to you by any of your officers previous to making the opening in Park-street in relation to Park and Pitt streets? No; the nature of the work in front of the "Criterion Hotel," and the subsidence there, were sufficient, I think, without any report.
1514. Then you had a report as to the work in front of the "Criterion Hotel"? I had no report.
1515. How did you know anything of the work there, referred to in your answer? The granolithic pavement had all been removed, and it was patent to everybody.
1516. Then, did you see it yourself? Yes.
1517. Why was that granolithic pavement removed—was it because the Postal authorities were taking the timbers out from underground? The pathway had subsided, and, as I have explained, this granolithic pavement, which is the best description of pavement we have, and is all in one piece, had cracked from the building-line to the kerb in various directions, and had sunk down.
1518. Then you instructed this opening to be made in the roadway in Park-street before the Post Office people had got to the Criterion Theatre and started to take the timber out? If my recollection serves me rightly, they had taken the timbers out there.
1519. I want to know when it was you found out the state of the work in front of the Criterion Theatre? When it was uncovered by the Postal authorities.
1520. And that was not until they were removing the timbers, was it? I have said as plainly as I possibly could say it, that the granolithic pavement was all cracked and had subsided.
1521. Did you see this before the timbers had been removed at that position by the Post Office people? I did.
1522. Do you know how long before the 12th July? No; I do not.
1523. *Mr. Cook.*] Did I correctly understand you to say that the Post Office authorities opened the granolithic pavement in front of the "Criterion Hotel"? I think we opened a portion of it, and you removed the rest.
1524. *Mr. Bavister.*] Then, really, something was done, by your instructions, to make some investigation of the tunnel work before the opening of the wood-blocking in Park-street? Yes.
1525. Was that done before the Postal authorities had got up to that position in their act of removing the timbers? They were not near that position, so far as my memory serves me.
1526. Can you say whether the Post Office men were engaged in removing timbers at the time you caused the opening to be made near the Criterion Theatre? To the best of my recollection they were working further down Pitt-street, near Liverpool-street or Goulburn-street.
1527. Then, did you cause Park-street to be opened in consequence of what you saw of the telephone tunnel work when you had the footway along Pitt-street, to the west of Park-street, opened? Yes; from what I saw of the work there I thought it my duty to have the opening made in Park-street.
1528. Can you now say on what date you caused the footway to be opened in Pitt-street? No; I cannot.
1529. Would it be possible to get that information? Mr. Brown or Mr. Gordon will be able to tell you.
1530. *Mr. Harris.*] Was not this tunnelling going on during your term of office? I could not say from memory, but I think they were working near the railway.
1531. You never had any complaints from any of the officers about this tunnelling? No.
1532. You never communicated to the City Council the fact that you were going to make the opening in Park-street? No.
1533. Have you ever ridden on a 'bus across that part of Park-street? No; I do not think I have.
1534. Is it the people about who have complained of the vibration? Yes; several citizens spoke to me about it.
1535. How did you come to know that it was dangerous—the vibration would not give you any indication of its being dangerous? Well, from the nature of the work adjoining I concluded that if it was anything like that it must be dangerous, and after it was opened we proved it was dangerous.
1536. *Mr. Cann.*] Are there any other subsidences in the city besides this one at Park and Pitt streets which you have had any reason to take notice of? There is nothing at the present time.
1537. But at any time have you ever had any similar subsidences in the footways, &c., in the city in consequence of the tunnelling? They have not been brought under my notice.
1538. Is it a fact that the flags were down 5 or 6 inches in front of 271 and 375, Pitt-street, on Monday morning, 26th July—that is, on the opposite side of the street to the tunnel? I have no information in reference to that.
1539. I suppose that if that was so, we could get information from your officers? Yes.
1540. Do you know if there was a subsidence in the road and the blue-stone guttering at the intersection of Irvine and Abercrombie streets, forming a hole 7 feet long by 6 feet wide and 2 feet deep? I do not.
1541. There is no tunnel there, I suppose, if that did happen? I do not know.
1542. *Mr. Robert Jones.*] You have stated that you had the opening at Park-street made owing to a report made to you by the Acting City Surveyor? Yes.
1543. If the Acting City Surveyor has stated here on oath that he knew nothing of it, and took no action and made no report, but was guided in what he did solely by you, would that be true or false? No written report was made to me.
1544. You have stated that you did it solely on your own responsibility, and without any report—that you foresaw the danger, and to avert that danger you did it;—is it true that you did this on your own responsibility? Mr. Gordon was there with me, and after some conversation on the matter I instructed him to make an opening in the streets—after a consultation with him in reference to the condition of it.
1545. If Mr. Gordon has stated that he in no way reported to you about this matter, and that what he did was done solely at your instance, would he be speaking correctly? Mr. Gordon did not report to me in writing. He consulted with me in reference to it, and I gave him the ultimate instructions.
1546. If the Acting City Surveyor has stated that he did not call your attention to it, but that you called his attention to it, would that be correct? Mr. Gordon called my attention to the matter.

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1547. As a matter of fact, Mr. Gordon called your attention to it—you did not call his attention to it? I was talking to Mr. Gordon on the spot in reference to the matter.
1548. How did you come to be there together? We went there by previous appointment.
1549. Did Mr. Gordon report to you or did you draw his attention to it first—which of you took the initiative in the matter? As far as my memory serves me, Mr. Gordon drew my attention to it.
1550. Mr. Gordon made a report to you on the matter? Yes; a verbal report.
1551. That in his opinion it was dangerous? Yes.
1552. And on that you further investigated the matter, and caused this opening to be made? Yes.
1553. Relative to the question Mr. Cann has just put—if a subsidence of such an extraordinary character had taken place near Abercrombie-street, would it not have been the duty of the Acting City Surveyor or of the Pavement Inspector to report the matter to you, when they report trivial matters such as we have heard as being reported in connection with these tunnels? I do not know what the nature of that subsidence was, but in all probability they took steps to remedy it.
1554. *Chairman.*] In regard to a question to the effect that the subsidence at Park and Pitt streets was only 7 feet in extent, I desire to ask you whether that opening and the fault between the concrete and the earth was not very much longer than 7 feet? Yes; the portion I saw was more than 7 feet.
1555. Was it not 15 feet or 20 feet? It was half-way across the road.
1556. *Mr. Cook.*] I presume you did not measure it? No.
1557. *Chairman.*] I did. I understand there was a spring in the formation of the concrete at that particular spot;—was there any spring that would cause a space between the top of the earth and the bottom of the concrete, owing to the wet weather affecting the blocks? Certainly not. The wet could not get through the concrete.
1558. If, as one or two questions tend to show, there has been a subsidence near Abercrombie-street, I suppose that subsidence could not take place unless there was a fault of some kind underneath? Undoubtedly there must have been some fault below.
1559. A question was asked you about an old shaft;—do you know anything about finding the remains of a shaft of any kind? I do not.
1560. *Mr. Robert Jones.*] You have stated that the filling on the sides of the tunnel was soft slush? That was in reference to the opening at King-street corner.
1561. You used the words "soft slush";—what would have caused that soft slush if no water got in? If I used the word "slush" I meant soft material.
1562. In answer to another question you said, "There are several places in the footway that would take a considerable sum to put right";—can you state where those places are? No. I may state that I do not recollect that question being put to me previously.
1563. Then you do not know where any of the places which it would take a considerable sum to put right are? I think I was speaking generally in regard to the matter.
1564. Your answer was that there are several places in the footway which would take a considerable sum of money to put right;—do you know any of those places? I was speaking generally—along the route of the tunnels.
1565. But you cannot refer to any one place now? No.
1566. You have stated that there were signs of breaches of the peace, which caused you to go to the Inspector-General of Police;—can you tell us what those signs were? I explained when I was here last week that I had made a certain opening in the street, and towards the evening a number of workmen were sent down with tools, and they said their instructions were to fill it up.
1567. A number of men were sent down from where? I presume by the Post Office authorities, or the person who had charge of the tunnel work.
1568. What time of day was that? It was 5 o'clock in the afternoon when I saw them.
1569. I believe you went to the Inspector-General at a later hour, and got there by gaslight? Yes.
1570. Did you notice anything which caused you to conjecture that there would be a breach of the peace;—were there any hostilities attempted? No; but they were hostile enough in bringing their tools and instruments there to carry out what they said, verbally, they were going to do.
1571. Did you ask any of them their names? No.
1572. And you did not know any person who was there? No.
1573. Do you know of your own knowledge that they had anything to do with the Postal authorities? No further than that they told my officer that they were sent to fill in the excavation.
1574. You do not know of your own knowledge that it was so? No; my officer informed me.
1575. Did you state that to the Inspector-General, or did you state you saw sufficient to warrant you going to him and to Mr. Brunker? I saw the men there, and I considered that was quite sufficient, especially when they came there with that message.
1576. Did they tell you they came there for the purpose of filling up the excavation? They did not.
1577. Did you hear anyone say they were there for that purpose? I heard some of them saying they were going to fill it up.
1578. Did you ask them upon whose authority they were working? No.
1579. Do you know of your own knowledge that these men came from the Postal authorities? No.
1580. And on the strength of that you thought it was sufficient to justify you in going to the Inspector-General and stating you required a posse of police to protect you in your duties as Mayor? Yes.
1581. That is what you did, although you did not know of your own knowledge for what purposes these men were there? I saw quite sufficient to justify me in my action.
1582. Although you did not know who they were, you went to the Inspector-General of Police, and took certain action? It was useless to say I did not know who they were. I could see who they were.
1583. But you did not ask them what they were doing? No.
1584. *Mr. Nelson.*] I think you originally carried on business as a contractor? No.
1585. Mr. Bavister asked you a question with regard to certain timbers that were cut;—these timbers being cut—that is to say, the caps where the pipes were put in—would cause a subsidence? Yes; but the Water and Sewerage Board, where they cut the timbers, removed the whole of the timbers and filled the stuff in.
1586. I was under the impression that the fact of the caps being cut allowed the poling-boards to come down? No; they remove the whole of the timbers and fill it in.

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1587. Is it customary, at times, for the Borough Council to do work in the streets for the Water and Sewerage Board—for instance, pipe-laying, or any special work in connection with the laying of pipes? We have never done any pipe-laying for them.
1588. Have you ever done any for the Hydraulic Power Company? No.
1589. Are you sure? We do not do any pipe-laying.
1590. But has not the Borough Council the opportunity of doing work required to be carried out by the Hydraulic Power Company, and charging the company for it? I am not aware of it.
1591. Whilst this class of work by the Hydraulic Power Company is going on, have your officers supervision? Yes.
1592. I suppose that work has to be done to the satisfaction of your officers? No; they work under their own Act. I do not think we supervise their work in order to see in what way it is done.
1593. As you are likely to give evidence again, will you kindly look into the matter, and let us know? Yes.
1594. *Mr. Bavister.*] Will you look at Question 1250, and the answer to it. The latter portion of it says, "The cross-boards had slipped and were tilted; they were down about 6 inches at one end. I am referring now to the covering-boards. The 1½-inch boards had slipped from the cross-pieces, and underneath there were cavities";—would such a displacing of boards have been likely to have occurred in consequence of the cut timbers—the cross-pieces—to which you have referred as having been done by the Water and Sewerage Board? No; this was in a different place. This place was where they commenced to draw the timber.

George Chamier, M.I.C.E., sworn, and examined:—

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1595. *Chairman.*] Have you made an inspection, at the instance of the Mayor, of the telephone tunnels? Yes; I received a request from him to examine and report.
1596. Have you made a report? Yes; I sent in a short report.
1597. Have you a copy of it? I have not got it with me. The inspection was confined to one point—the crossing at Park and Pitt streets. I also had a look at some of the work going on in Pitt-street, near the Lyceum Theatre.
1598. Could you get a copy of the report? I suppose the Council would forward it if you asked for it. Of course I have a press copy.
1599. Which particular point did you report upon? The condition of the work as I found it in the opening, and what causes probably brought about that result, and the steps I thought necessary to be taken in order to insure the safety of the street.
1600. You have now obtained the report to which you referred as having been made by you to the Mayor? Yes; I called at the City Council's offices and mentioned that the report had been asked for, and they handed me the original document.
1601. Will you kindly read it? Yes; it is as follows:—

To the Town Clerk, Sydney.

Sir,

In accordance with instructions received from His Worship the Mayor, I made, on the morning of the 26th instant, an inspection of the opening above the telephone tunnel at the crossing of Pitt and Park streets, and I examined the foundation of the roadway, as revealed by this excavation at this place, and also the character of the timbering and the filling which had been placed round the tunnel. This inspection was made in the presence of Mr. J. Davis, of the Public Works Department, Mr. McCredie (the engineer of the works), Mr. W. M. Gordon, Acting City Surveyor, and others.

I have since visited the site in Pitt-street where the work of removing the heading timbers and refilling the trench under the footpath is being done. From these observations, and the information obtained on the ground, I have the honor to report as follows:—

The headings that were driven under the streets for the construction of the telephone tunnels were timbered, as far as I can ascertain, after the fashion of ordinary mining galleries, with 9-in. x 3-in. posts and bearers, and 9-in. x 1½-in. poling-boards. These timbers were left standing after the construction of the culvert, and the spaces between the walls and roof of the excavation and the brickwork have either been left partially open, or only been roughly filled in with loose stone and other material from the excavation. I could see no indications of any close packing having been done round the sides or above the top of the brick culvert.

In consequence of these voids and the loose material under the roadway, the footpaths and the street-crossings over the tunnel have been undermined, their natural foundations have been disturbed, and they have been rendered unsafe, if not dangerous, to the public traffic. At the crossing of Pitt and Park streets it is really a matter of surprise that the roadway has not broken down, for the ground under the concrete bedding of the wooden blocks has bodily sunk, leaving a cavity from 4 inches to 9 inches deep, for the whole width of the excavation. The roadway is thus hanging over a hollow, from 8 to 10 feet wide, between the points of support, and only held up by the tenacity of a thin layer of concrete and a certain amount of resistance to collapse afforded by the wooden blocks. How such a state of things can have been brought about is easily explained. The material under the roadway, at this spot, is of a light and friable description, and it evidently dropped through the spaces between the poling-boards, and gradually found its way into the voids above the culvert, and into the interstices of the rubble-packing, and by this falling in of the top stuff a considerable cavity was formed under the concrete bedding of the roadway.

The ground was quite dry when I saw it, nor were there any indications of the action of water, or of any other causes for subsidence.

These are the facts. With reference to the remedy, the only thing to be done is what is being done now. Trenches will have to be opened out for the whole length of the tunnels, the timbers must be removed, and the excavation everywhere filled in under the footpaths with suitable material, hard-rammed into position. At the street-crossings I am of opinion that the whole of the spaces should be filled in with concrete, so as to afford a perfectly unyielding foundation for the street pavement.

I have, &c.,

GEORGE CHAMIER, M.I.C.E.

I may mention that the report is dated 28th July, 1897.
1602. In that report you say that there are spaces left under the concrete;—do you mean us to understand that such spaces have been left at other points on the work besides that to which you have referred at Park and Pitt streets? Yes; on an examination I made of the ground, which was being opened in Pitt-street, I saw, when the planks were being removed, that there were hollow spaces under them. The packing, where it was done with stone, was full of interstices, and the openings were visible. There were voids between the boards and the brickwork; voids into which you could put your arm.
1603. Of what nature was the packing at the sides of the tunnel;—did you examine it? It was very loose—so loose that you could easily get your hand in and take out handfuls of stuff. Small hollows were visible in every direction. I may say that my examination was limited to a few places, but the information

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supplied to me at the office of the City Surveyor, and the plans actually taken on the ground, show that in places there were very large voids. I am stating the results of my own observation.
1604. You stated, I think, that some of the spaces under the cement were caused through the earth dropping through between the poling-boards? Yes; the poling-boards were not placed close together. In some cases there were 2 or 3 inches, and in other cases as much as 4 inches between them, and as the stuff above them was of a light, sandy nature—in fact, almost of a powdery nature in places—it would naturally fall through these crevices.
1605. If it fell through in the way you indicate, there must have been spaces left underneath the boards? I consider that there were. I take it for granted from what I saw and from information supplied to me that there were many spaces left.
1606. From defective packing? Yes; in places I should say there could not have been any proper packing at all.
1607. Do you know whether it is customary to leave in the ground after the work is finished the timber that is used in the tunnelling? Not for permanent works, certainly not. In mining works it is generally left in.
1608. But you think it should not be left in in the case of city work? No.
1609. Then you are of opinion, I suppose, that the whole of this timber should be removed? Undoubtedly so, because it is perishable material. It could not be expected to last many years, and when it rotted away it would leave open spaces, which would endanger the foundations.
1610. Are you an expert as regards the life of timber? I am not. Although I have had a great deal to do with timber works generally during my thirty-five years' of practical experience, I should not call myself an expert in New South Wales timbers. They vary very much in durability.
1611. Have you any idea of what would be the length of life of timber such as you saw in the position you have described? Some of the planks, I should think, would not be safe for more than three or four years.
1612. But taking the general average, what would be the life of the timber you saw? I do not think you could reckon upon it remaining sound for more than five years. In the case of red gum I have known timber placed in a damp situation to stand for thirty years, but that is quite an exceptional timber. All the lighter timber, such as spotted gum and messmate, gives a very different result.
1613. Do you know what this particular timber is? Some of it, I should say, was spotted gum. Some of it also looked very much like stringybark, but I could not be sure. At any rate, it was not very durable timber.
1614. Did you make an examination of the bricks used in the construction of the tunnel? I saw only a little of the brickwork. A few bricks were knocked out from the top of the arch at the crossing at Park and Pitt streets. I examined them. I did not go inside the tunnel.
1615. What was the result of your examination? Well, the brickwork is fairly good, but the mortar appeared to me to be very inferior. One reason I can give for saying that is that the mortar scarcely adhered to the brickwork. Several bricks were taken out perfectly clean with just a little tap of the gad. There was hardly any mortar clinging to them. If the work had been properly done, and if the mortar had been good, it should have been quite as strong as the bricks. The mortar and the bricks should have adhered so tightly together that it would be difficult to get rid of one without breaking the other.
1616. Was your inquiry, as directed by the Mayor, confined to the work in so far as it affected the interests of the City Council? Entirely so. My instructions were merely to have a look at the spot I have indicated, and to report to the Mayor what I thought of the work, and also what I thought ought to be done. I had no instructions to examine the brickwork, or the character of the design.
1617. You did not examine the whole length of the tunnel? No; I examined it only at the sites I have named.
1618. I thought you said in your report that you had examined it at some other places? I went on two occasions—I think on two successive days—to see the excavation which was being made close by in Pitt-street. I watched the men opening up a trench just to satisfy myself that the work there was of a similar character to that which I had seen in Park-street.
1619. *Mr. Nelson.*] Have you had any experience of this class of work? Yes.
1620. In the Colony? Not much in this Colony; but I have been connected with practical work for thirty-five years.
1621. You are a civil engineer? Yes; I am a member of the Institution of Civil Engineers.
1622. The portion of the work to which you confined your examination was that in Park-street? That was the principal site.
1623. In regard to some of the earth under the poling-boards, your contention is that the poling-boards not being close together some of it fell through them? There were several spaces left between the poling-boards, and a drawing was shown to me, taken from the work in another place, and guaranteed by the Acting City Surveyor as being accurate, in which there was a space of as much as 4 inches between the boards.
1624. Your statement is that the soil is of a friable nature, and that it percolated through these apertures on to the surface of the crown? That is my belief.
1625. You cannot say that you saw anything to warrant you in speaking positively upon that point? I handled the earth and found it to be of a powdery nature, such as would naturally fall through any crevices which might exist.
1626. Was there anything visible to warrant you in saying positively that the soil did percolate through these apertures? It is an inference which I have drawn from certain facts. In the first instance the concrete must have been laid on a firm foundation, and evidently that foundation has sunk. From the loose character of the material, and from the existence of apertures or crevices between the boards, I naturally assumed that earth had fallen through. It is only assumption, of course.
1627. Do you think it would have been possible for the packing to be done better than the work you saw? Certainly. I think that under the roadway the only really safe way of doing the work would have been to put in concrete.
1628. Would you consider it preferable, under the circumstances, to tunnel, or to do the work by open cutting? I would have open trenches by all means.
1629. What, in your estimation, would be the difference in the cost? It would be difficult to give you right off an exact estimate, but I should think there would be a very large increase in the cost of tunnelling as compared with the cost of doing the work in the other way.

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1630. It is your opinion that it would be cheaper to do the work by open cutting than by tunnelling? Not only cheaper, but better.
1631. You say you have had some experience in this class of tunnel work; would you kindly give me an illustration of how you would carry it out; for instance, presuming you had your excavation, and were beginning your brickwork? In the first place the poling-boards ought to have been driven in very closely together, so as not to disturb the stuff above them; and if the timber were removed, which is certainly often a matter of difficulty, the greatest care should have been taken under the circumstances in ramming in suitable material in the space all round. I may say that it would have been a difficult job in any case to do the work thoroughly, because there is so little room—the space is so very small. But it could have been done with trouble and expense far better than it has been done.
1632. But how would you commence to construct your brickwork? I would build it in the usual way adopted inside a tunnel.
1633. You would build two perpendicular walls? Yes.
1634. But you would have to ram in something to fill to space behind them? Yes.
1635. This would be 9-inch brickwork;—would it, in your opinion, be possible to ram behind 9-inch work solid without disturbing the brickwork—that is, with the material you saw taken out of the cutting? You could not ram it as thoroughly as you could if there were an open trench. But brickwork in cement sets rapidly, and it would be possible to make a good job of it if you allowed sufficient time and trouble. It would be a slow and tedious process.
1636. Do you think the filling in of the space with sand would be preferable to ramming? It would have filled in the space better than would the stone which was put in. The putting in of the stone involved the leaving of certain spaces or voids. The sand would naturally form a closer packing.
1637. But do you think it is possible to ram behind 9-inch brickwork so as to make the work solid? It is possible to ram to a certain extent. As I said, you would ram under considerable difficulty.
1638. There would be a possibility of shifting the brickwork? Yes.
1639. You have two vertical walls to erect before you fill in your arch;—would not the brickwork, as a natural consequence, be wet? Yes; but if it were done with cement it would harden very rapidly.
1640. Do you think it would harden sufficiently to warrant the workmen in ramming it closely, so as to make solid work between the brickwork and the side of the cutting? You would have to allow a certain space of time to elapse. It would be a slow job. You could not rush the work.
1641. Supposing you had your sets in, and your arch in its position, what system would you adopt to put in the key? I am not aware that any particular method is required.
1642. What I want to ascertain is, what method you would adopt to fill in the spaces? After the arch is built, you would have to obtain suitable material—sand would be a good material—and fill in the spaces as carefully as you could from the end. Naturally, the work could not be done quickly.
1643. If you had had any experience in this class of work, you would know that bricklayers have strong objection to leave off laying bricks and to wait while the labourers are ramming? They have a very strong objection to it; but, in the first place, I say that it was a mistake to tunnel at all. Having undertaken the work by tunnelling, it could only be done well with extra care and consumption of time.
1644. Do you consider that extra care was taken in the work? I do not think that the packing has been attended to at all well. The stuff has just been shovelled in anyhow. That is what strikes me, from the sketches with which I have been supplied by the City Surveyor.
1645. *Mr. Jones.*] Had you not better confine yourself to the results of your observations? I think not. My examination was so cursory that I had to rely to some extent upon the information with which I was supplied.
1646. *Mr. Nelson.*] What I want to get at is your opinion as to the best method of filling after the brickwork is completed;—assuming that you had your crown in, what would you consider the best method of filling in the spaces? To make a thoroughly good job, there is only one way of doing the work, and that is to put in concrete.
1647. Between the side of the cutting and the brickwork? Yes. That is what is done in the case of many railway works, where there is tunnelling. It is generally done for the simple reason that you cannot pack loose material properly under such conditions.
1648. You think, then, that the space between the side of the cutting and the brickwork ought to be filled in with concrete? That is the only way of making a thoroughly good job of it. Next to that, I should say sand, carefully put in, would be the best material to use, but it would be a very tedious process. The work would have to be done very carefully.
1649. Did you notice anything peculiar about the bricks used in the tunnel? I only saw some half-dozen bricks; but those which I saw appeared to be ordinary bricks.
1650. What sort of bricks were they? They were rather a common type of brick; some of them were not hard burnt. I should say they were of average quality.
1651. Were they wire-cut or pressed bricks? I did not notice particularly; they were an ordinary class of brick.
1652. Did you examine the mortar used in the work? Yes. It was very inferior; much of it you could crumble between your fingers. It did not adhere to the bricks firmly.
1653. *Mr. Harris.*] How did you come to make an examination of the work; did the Mayor send for you;—had you done any work for the Mayor before? I never did any work for the City Council before. Mr. Gordon called upon me a few days before this inquiry, and mentioned that I had been recommended to him. He asked me if I would undertake to examine this work, and report upon it. That is all that passed between us.
1654. Who recommended you? I think he said that I had been recommended to him by the Public Works Department. I cannot recollect that any names were mentioned.
1655. You have not carried out any tunnelling in this Colony? Not in this Colony. I have been mostly engaged in hydraulic and railway work.
1656. What was the space between the crown of the tunnel and the timbering? I do not know whether I made a note of it. I do not think I did; but I should say that it would be between 3 and 4 inches.
1657. Was there a space between the top of the poling-boards and the soil? The earth was down on the poling-boards at the crossing in Park-street closely; but I noticed in the other excavation in Pitt-street that it was rather loose in places. I did not see any actual voids; but it appeared to me to be loose.

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1658. Were not most of the poling-boards gone at Pitt and Park streets? Some were left, I know, because I remember taking the dimensions of them. Some of them had been removed. I could not tell you how many were there.
1659. You say, in effect, that the packing was done as well as it could be in the circumstances? No; I do not think the work could have been packed at all properly.
1660. Did you not say that the work was done as well as it could be under the circumstances? No; I fancy there must have been a great many voids left, from what I saw. I have already said that under any circumstances it would be difficult to make a thoroughly good job of the work, on account of the cramped space for working in.
1661. Were the poling-boards driven, or was the excavation made first? My impression is that the excavation was made first, and that the poling-boards were put in afterwards.
1662. And that the clay was taken from the excavation and used for filling-in? Yes; they filled in, I suppose, as well as they readily could. They put in loose stone, and shovelled earth in round about where they could easily get at it. That is the impression I formed.
1663. You say that the life of the timber used would be from four to five years? That is the life we should allow for timber of that description. I do not say that it might not last much longer; but I would not trust that sort of hardwood in a position of that description for more than five years. Many of the boards were 1½ inch thick.
1664. Suppose the boards decayed, what spaces would they leave? They would leave open spaces very nearly equal to the size of the scantling.
1665. How much would the footpaths go down, you suppose, owing to the decay of the boards? There would be two causes of subsidence. In the first place the actual thickness of the boards would be only 1½ inch. Supposing there were any cavities under the boards, and the boards gave way through getting rotten, you would have to take into consideration the depth of the cavities. With such loose packing between the tunnel and the boards, it would be difficult to say exactly what subsidence there would be. It would depend very much upon the nature of the packing. There would probably be several inches altogether.
1666. In the case of the work you saw in Park-street, what do you suppose the concrete would take over it before it would go down? It is a surprise to me that that concrete is standing, considering that there are spaces of 8 feet between the supports. Under such circumstances concrete could barely be expected to carry much more than its own weight; in fact, if you were to work it out by formula, as a beam, 6 inches deep and supported at both ends, it would not carry its own weight with safety. It is a matter of great surprise to me that it has stood the traffic. It must be due, I think, to the resistance offered by the wooden blocks. They are tightly wedged in together, and they form a sort of a flat arch.
1667. Would you be surprised to know that a load of from 8 to 10 tons went over the roadway there a few months ago? I should have been sorry to be in the conveyance going over it with that weight. But things do sometimes last in an extraordinary way beyond the limits allowed for by engineers. Concrete of that sort, 6 inches thick, and with 8 feet between the supports, could not be expected to carry a heavy load. It is not suitable material for resisting a transverse strain.
1668. *Mr. Cann.*] You say you have had considerable experience in this class of work? Not in this particular class of work, but I have been connected with engineering works for many years.
1669. Did you ever construct a tunnel? I am acquainted with railway tunnelling, and I have constructed small tunnels for water works.
1670. Of what size? The railway tunnels were large enough for a single line of railway.
1671. But you have never constructed a tunnel of this kind? No; I have had a good deal to do with hydraulic and drainage work, but we generally worked in open trenches.
1672. Did you ever see a tunnel constructed with such a short distance between the crown of the surface above? No; I never have.
1673. What dimensions of ground would it be necessary to take out in the excavation to give room for a set of timber in this tunnel;—can you say approximately? It would have to be about 7 feet by 9 feet, I should think. I have not the exact dimensions of the tunnel. I did not go inside the tunnel. I have only seen the top of it, and the plans.
1674. I suppose I should be within a fair limit if I said that it would take an area of 7 feet by 6 feet by 5 feet to take a set of timber? Yes; I could not tell you exactly without looking at the plans. I should think, however, that such dimensions would be a scanty allowance.
1675. You say that that area of ground would have to be taken out before your laths or poling-boards were put in? I think so. I should say from the character of the work that the excavation was made before the timbering was fixed.
1676. And yet you say that the ground which would stand to permit of all that being taken out, would slip through 4-inch spaces between the poling-boards? Yes; it would take time. The action of slipping does not occur in a moment. It is gradual. The earth would fall in little particles, and would gradually settle down. It must have taken many months for this subsidence to occur. If you dig a trench in open ground, it will stand vertically for some time, and will then gradually fall in.
1677. Did you see any indications of the earth having come through between the laths? I saw only the general result. I noticed that the laths were some inches apart, and afforded space for the material to fall through.
1678. But you could see no indications of the earth having gone through these apertures in particular places? No. The soil would find its way through the gaps into the spaces among the stones, and to the different hollows at the sides. There is no means of tracing it exactly.
1679. But if the earth had gone through between the spaces in the laths, would you not see distinct lines showing that it had gone through? No. It would find its way down gradually, it would fall in particles, and would slowly fill in the interstices between the stones, and any spaces which may have been left. This work has been done for a good many months—fourteen months I am told, and that would allow ample time for a subsidence to take place.
1680. What space was there between the crown of the brick-work, after the arch had been built, and the timber? About 4 inches.
1681. What was the area of the subsidence between the concrete and the earth? It varied from 4 inches to 9 inches.

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1682. Do you think it possible to get that quantity of ground into the space between the arches and the laths, allowing for subsidence? Yes; some of it would find its way along the sides, especially where there were considerable cavities behind the side-walls. It would have to find its way somewhere—it certainly has not gone into the air; it must have gone down into some spaces, and I naturally suppose that it has gone down in the manner I have described.
1683. Did you ever put in timber in a tunnel? I have done a lot of timbering of various sorts in connection with work, but I have never done any of this particular kind.
1684. You have never put in a set of timber in what is known as quick-ground? I have done something of the same class of work for the purpose of draining mines, but it has not been work of a permanent character.
1685. Can you always rely on keeping the ground in just the right spot where you want it;—can you always keep your laths tight up to the ground? If they are driven ahead you can make a better job of it than when they are laid in loosely, some inches apart. It would be difficult, as I have explained, with the most careful management to avoid hollows, and a certain amount of subsidence. But I saw evidences of the work having been done in a very rough manner. I cannot speak absolutely as to how it was done.
1686. Did you examine the sides of the excavations upon which you were asked to report? As far as I could at that spot.
1687. Was there virgin ground in front of you on either side of the excavation;—what I mean is this: If the soil went through between the laths, as you have described, would not the subsidence be towards the middle of the cutting? The subsidence was rather towards the middle of the cutting. There was a greater depth at the middle of the cutting than at the sides. It was only about 4 inches at the sides, and it got larger towards the middle.
1688. Did you see any indications of the ground having broken away from over the tunnel;—I am speaking now of the sides? Yes; a good deal of stuff had evidently fallen from the sides. Under the concrete there were holes showing, as I think, that the ground had fallen away. It was not a clean wall; it was broken ground.
1689. That would show that the ground was not inclined to crumble much? It looked very crumbly. You could put your hand right into it, and take it out in handfuls.
1690. *Mr. Robert Jones.*] You are of opinion that tunnelling in this ground was, in the first instance, a great mistake? I think it was an error of judgment.
1691. In your opinion the work should have been done by open cutting? I think so.
1692. Do you know why it was done by tunnelling? No; I never heard any allusion to the work until I was called in to look at it.
1693. You do not know of any cause for the work being done in the way in which it was? I have heard in conversation that the object was to avoid impeding the traffic; but I really do not know what reasons were put forward.
1694. Prior to your inspection on the 26th, you had a conversation with the City Surveyor? Yes.
1695. And you had his version of the matter? He offered no explanation whatever of the matter. He merely told me what he had seen, and showed me some sketches he had made.
1696. I say, therefore, that you had a version of the affair from him? Not as to the cause of the results I have mentioned. He did not offer any explanation. He merely gave me the facts.
1697. It amounts to the same thing;—you had a conversation with him, and he gave you his version of the affair prior to your inspection? He showed me certain sketches and measurements.
1698. You first had a communication from the City Surveyor by direction of the Mayor, I understand? Yes.
1699. You went and saw him, I presume? I saw the Mayor on the day on which I made the inspection.
1700. You saw the City Surveyor first? Yes.
1701. And he supplied you with certain information relative to the tunnel? He gave me some sketches.
1702. And supplied you with other information? Yes.
1703. You went more by the information you received than by your own observation? I do not put it quite in that way. The results I mentioned in my report were from ocular observation; but I am strengthened in my opinion by certain sketches and plans shown to me by the City Surveyor, who assured me that they were taken on the spot. They endorsed and supported my view. I might put the matter in this way: I came to certain conclusions from what I saw, and I then found out, from information supplied to me, that similar conditions obtained elsewhere, although I was not in a position to see them. I was shown drawings and dimensions taken on the spot, which I accepted in good faith.
1704. You formed an opinion upon them? I formed my opinion principally upon what I saw. My opinion was supported by the information which I afterwards received from the Acting City Surveyor.
1705. You say that in places there was no packing at all;—where would those places be? I do not say there was no packing at all.
1706. I think those were the words you used;—you said that in places there was no packing? Well, the stuff was loose—that is what I would call no packing. I did not see any large voids. There were places into which, perhaps, you could put your arm. I came to the conclusion that there were a great many of these spaces, which were afterwards filled in from the stuff above falling.
1707. What caused you to come to that conclusion? From the fact that the stuff had caved in, and also from the loose packing I saw, also from the drawings and information supplied to me in regard to other portions of the tunnel. I can, if you like, show you the drawings which were supplied to me.
1708. Did you see any place where you are satisfied that loose earth came away? I found that the material round the boards, both between the brickwork and the boards, and at the sides, was loose, and full of small hollows. In one place I saw an opening into which you could easily put your arm, and the conclusion to which I arrived was that the packing had been very deficient.
1709. Did you observe anything which caused you to think that the settlement might be due to some cause apart from the construction of the telephone tunnel;—I refer now to the cutting in Park-street? No; I know of no other reason, nor can I imagine any.
1710. Did you carefully inspect the whole of the opening? Yes; at Park-street there was nothing showing any cause for subsidence beyond that which I have mentioned.
1711. Did you notice that mains were put in there for various purposes? I saw one main.
1712. Was the ground round about it carefully packed? The ground appeared to be tight.
1713. It was apparently well packed? Yes.

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1714. You do not think that these mains could have contributed in any way to what you saw? No; I do not see how they could, unless the pipe had burst, in which case there would have been a general collapse.
1715. You think, then, that the subsidence could not have proceeded from the putting in of any of those mains? I do not think so.
1716. Were you shown by any persons what is known as the hydraulic main? I know that I saw a large main. I do not know the name by which it goes.
1717. Did you examine the packing round it? I could see only one side of it. It seemed to be all tight. I saw no cavity in connection with it.
1718. Was it firmly packed? As far as I could see.
1719. In what position was it relatively to the telephone tunnel? Just at the side, leaning on the timber.
1720. It would be over the perpendicular walls or haunches of the tunnel? Yes. One of the flanges of the pipe was resting on one of the cross-timbers.
1721. *Mr. McGowen.*] What was the space between it and the crown of the tunnel? I could not say definitely from memory, but it would be only a few inches.
1722. Something over 12 inches? Yes, I think so; but I could not be quite sure. I did not take any measurements beyond the size of the boards and the spaces.
1723. *Mr. Jones.*] Have you had considerable experience in Colonial timber? I have had a good deal. I have done a great deal to bring the question of Colonial timber under the notice of the Institution of Civil Engineers.
1724. In what class of work have you had experience of Colonial timber? Mostly in marine work—such as docks; also in bridges.
1725. Under the Department of Public Works? No; in other colonies mostly. I was engineer for the Port Adelaide Dock, which is all built of timber.
1726. But the timber varies very much in each colony;—you do not find the same class of timber used in Adelaide that is used here? No; the names also vary very much.
1727. Even the same kind of timber has a different degree of durability in the different colonies? Yes; I believe so. I have already said that I am not an expert in timber.
1728. You have expressed the opinion that the timber used in this work would not last more than from three to five years? That would be the life of an ordinary class of hardwood in this situation. You could not depend upon it; it might last longer.
1729. Is it not the case that in regard to an inferior class of timber its life would be longer than the period you have named? I have seen timber taken out after five years in position showing signs of decay. I saw a plank taken out from this trench a great portion of which was rotten.
1730. Where did you see it? In the City Surveyor's office.
1731. Then the City Surveyor did supply you with information? He showed me that plank.
1732. He supplied you with information before your inspection—that is to say, he showed you this inferior timber in his office? I asked him if he had any sample of the timber, and he showed me a plank which he said had been taken out of the trench.
1733. Which, in your opinion, was inferior? It was rotting away.
1734. Did it present any appearance of having commenced to rot before it was put into the work? I could not say. I know that messmate, spotted gum, and other timbers of that class cannot be relied upon in underground positions to last for any length of time. That is my experience. Red gum, jarrah, and other good timbers would, of course, give different results. I have known red-gum posts after being thirty years in the ground to be thoroughly sound.
1735. What is the best class of Colonial timber? I could not speak positively as to the timbers of this Colony; but the best timbers, speaking generally, would be jarrah, red gum, and ironbark. Copious notes as to the different classes of timbers were supplied to me when I went to England, but I could not repeat them all from memory.
1736. Could you distinguish one from the other if you saw them cut? No one but an expert could do that definitely, and I do not pretend to be an expert in timber.
1737. Are you aware that the timber, concerning which you have expressed so poor an opinion, is largely used by wheelwrights, and is considered by them to be first-class timber? Some of the best timber for strength is not lasting timber in underground situations.
1738. But you are of opinion that spotted gum is an inferior timber, so far as lasting qualities in the ground are concerned? I would not rely upon it for any length of time.
1739. *Mr. Cann.*] Is the timber to which you have referred spotted gum or stringybark? I could not say for certain. One piece I took to be spotted gum, but I could not swear to it. I could not undertake to discriminate between a lot of samples of timber.
1740. *Mr. Jones.*] Are we to understand that you are not up in the lasting qualities of New South Wales timbers? Yes. I do not not pretend to be an expert in timber.
1741. And that you wish us to understand that any statement you may make as to the life of New South Wales timbers would be of little value? It must be taken from my general experience in Australia. I could not discriminate between every class of timber—that is, as to what its life is likely to be.
1742. You have had no experience of the use of timber in New South Wales? Except as sleepers, and in connection with railway stations.
1743. Would it surprise you to learn that evidence has been given to the effect that the life of this particular timber would be equal to fifty years? From my own experience in timber-work I should be very sorry to trust to it for that period.
1744. Would it surprise you to know that an engineer, who is considered a very good authority in these matters, has given evidence that the life of this timber would be equal to fifty years? Opinions vary so much that one is hardly surprised at anything.
1745. You took particular notice of the bricks which had been used in this work? I noticed a few of them which had been knocked out of the top of the tunnel.
1746. What class of bricks were they;—were they single-pressed, double-pressed, plastic, or what were they? I could not say; they appeared to be a fairly good brick.
1747. But the mortar you say was inferior? It did not adhere to the bricks.

1748. You say that you watched the men working in Pitt-street to see if there were any openings left in the packing? Yes. G. Chamier, M.I.C.E.
1749. Was that a portion of your instructions from the Mayor? I was told that it would be well if I visited the excavation on two occasions to satisfy myself as to the class of work. 4 Aug., 1897.
1750. What was the result of your visits? I saw the men open the trench and remove the timber. I looked carefully to see if there were any signs of good packing. I saw that the ground was very loose, and that in many places there were open spaces.
1751. In what part of the street? Just opposite the Lyceum Theatre.
1752. What class of packing do you say there was? It was very loose.
1753. What was the material? In some cases it was stone thrown in, with spaces left between. There was nearly as much void as solid. In other places I saw cavities into which you could easily put your arm.
1754. Between the stones? No; between the timber and the arch.
1755. Would that be under the boards, or over the boards? Under the boards. I may mention that I was not there many minutes altogether.
1756. You say that after the boards were removed you saw hollows or voids in the earth under them? Yes.
1757. All the way along? No; in some places the ground was pretty close, in other places there were cavities.
1758. In what part were they? Mostly towards the corners or sides. I saw them take out only a few lengths of board.
1759. You said, in reply to Mr. Nelson, that fairly good packing could be done alongside a 9-inch wall;—you said that the cement would set quickly, and that consequently the pressure of the packing would not interfere with the wall? It would be a tedious process: You would have to allow a certain amount of time to elapse. You could not push the packing in with a spade and ram it as you could in other places.
1760. Is it your opinion that it would materially interfere with the wall if the packing were done on the day after it had been set in cement? If it were carefully packed the work ought not to interfere with the wall on the day after its erection.
1761. You think that the packing could go on on the day after the bricks had been laid? The work would have to be done carefully. It would not do to ram it recklessly.
1762. But you think that with care the packing could be carried out efficiently on the day after the bricks were set? Yes.
1763. You said you had had a fair amount of experience in this class of work;—where did you gain it, and upon what work? I mentioned that I had never superintended work similar to this; but I have been connected with brickwork in culverts and the headings of tunnels, and work of that sort, for over thirty years.
1764. In what country? I was engaged on the first railway built in Tasmania—that is, the line from Launceston to Deloraine. Then I was for four years in the Victorian Water Supply Department, where we had a great deal of work in the shape of canals and tunnels and settling-ponds; in fact, brickwork of all sorts. I was also engaged upon the railways in Victoria and South Australia and Western Australia for a great many years. I have also had a good deal of experience as consulting engineer for large contractors, and I have acted for companies. I have been in private practice for many years.
1765. You have had some experience of Victorian timber? Yes.
1766. Do you consider the red-gum of Victoria a good timber? Yes; it is lasting. It is not a good timber in some respects. It will not stand a big strain, but it is considered the best timber there for lasting qualities.
1767. You referred to it being a difficult matter to pack at the sides of the tunnel walls, from the cramped position the men would be in;—do you know the height of the opening? It would be from the very bottom to the top about 8 feet.
1768. Would you not consider that sufficient room for any man to work in? The height would be sufficient, but you have to consider the space all round. You would be in a very cramped situation.
1769. You would not consider a man working in a space 6 feet wide and 8 feet high was in a cramped position? You have a narrow space to get at. The heavy ramming you could do in a considerable space is a very different thing from ramming stuff into a few inches all round an excavation.
1770. Are you of opinion that there was sufficient room to pack the sides of the tunnel as well as it was necessary to pack them? It would not be possible without a great deal of trouble and difficulty to make a thoroughly good job of it. The work should have been done in concrete.
1771. What effect would the putting of concrete into loose ground like that have? It would form a solid mass against the solid ground. There would be no giving or subsidence to take place.
1772. But this ground was rather of a loose nature, easily broken away;—would the putting of a solid wedge such as you would have with concrete into it be the best possible way of doing the work? It is the only way of doing it if you are to prevent any sort of subsidence.
1773. Would it not have the same tendency as the driving of a big iron wedge into a solid mass of clay? It would keep the solid portion undisturbed, and give it no means of subsidence. As it is, the slightest subsidence which takes place in the packing might produce subsidence in the upper portion. For instance, supposing this tunnel were filled over with stuff carefully packed, if you put a body of cement concrete over the surface, you might rely upon it that in a short time it would crack in all directions.
1774. *Mr. Cook.*] Then are all the crossings of the city cracked? I do not know. I do not believe that if you packed with any ordinary material you would be able to prevent a general cracking of the concrete in the course of time.
1775. Therefore, it would follow that you would expect that the concrete would be cracked at every crossing in the city? I do not know that I am in a position to say that.
1776. But does it not follow from what you have already said? Not at all, because this concrete has been laying there for years, and was firmly bedded in a solid mass. I am not aware that that mass has given way in every case.
1777. *Mr. Cann.*] Would you be surprised to learn that this concrete was put in since the tunnel was built? I do not know when it was put in.
1778. *Mr. Jones.*] Have you noticed anything which would lead you to believe generally that the subsidence occurred from the settlement of the earth away from the concrete? It must have been so. No other explanation is possible to my mind. The concrete, I presume, was put in on a solid foundation, and the foundation has given way.

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1779. Would it affect your theory or judgment in the matter if there were open spaces where no tunnel had been put in—if it were found that the concrete had been standing by itself—that the ground had given way from under it to the extent of 5 or 6 inches, just as you saw in the case to which you referred;—how would that be brought about? I cannot say. It might be in recently made ground, in which case there might have been a subsidence.
1780. But there must have been some cause? Made ground would subside, and the subsidence might last for many years.
1781. If this work had been done by open cutting all through, and had been rammed as well as it was possible to ram it, the greatest care being taken, are you of opinion that there would have been a subsidence to the same extent? There would be a subsidence in any made ground, especially if water got into it by any means.
1782. Then you think that even if the work had been carried out by open cutting it would have been impossible to so ram it that there would be no subsidence afterwards? You could not rely on made ground, especially where there was a possibility of water getting to it.
1783. Have you noticed any opening under the concrete in the course of your inspection which you thought might have been caused by water getting through? No.
1784. *Chairman.*] You spoke of Victorian red-gum;—is not a great deal of the Victorian red-gum, as it is called, taken from the New South Wales side of the Murray? Yes. The same gum extends over a large portion of New South Wales territory.
1785. *Mr. Robert Jones.*] Then your experience would be not of the Victorian but of the New South Wales red-gum? No doubt there is a large quantity of red-gum in Victoria as well as in New South Wales.
1786. Did you notice how many inches the hydraulic tunnel came over the edge of the telephone tunnel at the opening in Park and Pitt streets? It must have extended some 5 or 6 inches at least from the sides, speaking from memory.
1787. *Mr. McGowen.*] In your report you said you could see no indications of close packing having been done round the sides of or above the brickwork;—how many places did you examine? I examined the opening at the crossing of the two streets—Park and Pitt streets—and also some of the opening in Pitt-street.
1788. Is it possible, in your opinion, in this tunnelling to do the class of work which you described as close packing in your report? It would be carried out with considerable difficulty. There are degrees of packing. You could not do the work as well as in an open trench.
1789. *Mr. Cann.*] If you put concrete in, how would you put it in? In the ordinary way. It being wet material it can be shovelled and packed in anywhere.
1790. Could you get in concrete behind the caps? I am supposing that you removed the timber, and filled in the space with concrete. That is what is done in tunnelling.
1791. *Mr. McGowen.*] But, as a matter of fact, it is almost impossible, in such a case, to do close packing? Yes; that is why concrete should be used.
1792. *Chairman.*] As to your statement in regard to removing the timber;—do I understand you to mean that as you work along you remove the timber next to the place at which you are at work? Yes; we draw the timber out as we advance.
1793. And you then fill up the space with concrete? Yes.
1794. *Mr. Cook.*] Would you open out the top to do that? No; you draw the timber out from the front as you go on. It is a general thing to draw the timber out in tunnelling. It is only in particular cases that it is left in.
1795. *Mr. McGowen.*] But in the case of soft ground, would not the ground fall in? If it is very soft the timber is not removed, but this ground was not of that soft description.
1796. *Mr. Cann.*] What I want to know is how you would get the concrete behind the caps? You would simply fill in the open spaces.
1797. But your caps are 9 inches by $3\frac{1}{4}$ inches;—how could you get the concrete behind them? I see no difficulty in filling in the spaces with concrete just as well as with any other material—in fact, it could be done better than with other material.
1798. As a matter of fact, they have not packed these spaces, because they could not do so? They have not packed them; I am quite sure of that. Whether they could do so or not is another matter.
1799. *Mr. Cook.*] Was it behind the caps that you saw the spaces to which you have referred? I saw spaces in a number of instances. I could not tell you the exact number. In some cases loose stones were simply thrown together in the spaces, and between the stones there would naturally be voids here and there. You could look in and see them without any difficulty.
1800. They looked very bad? For packing, the work was very bad indeed.
1801. *Mr. Bavister.*] You said something as to the difficulty arising in consequence of the cramped working space;—looking at the matter from that point of view, do you think the packing was as good as you could reasonably expect it to be in the circumstances? No; I think it would have been done better. But under the most favourable circumstances it would be attended with a great deal of difficulty and trouble.
1802. You said in relation to concrete that the scientific formula led you to the conclusion that concrete of that quality and thickness would barely support its own weight, supposing the supports to be 8 feet apart? It could not be relied upon. In engineering we do not reckon upon the ultimate strength; we reckon on what we call the working strength—the safe load.
1803. When you say that the concrete would barely support itself you are not providing for any load at all? Quite so. If I had a slab of concrete of that quantity with 8 feet between the supports, I should reckon that it was as much as I could expect of it that it would hold itself up with safety.
1804. This is apparently one of those cases in which actual facts entirely upset scientific theory? No, I do not think so, because the wood-blocking might be the means of strengthening it. If the concrete were there alone, I do not think it could stand the weight of the traffic.
1805. Will you give us your opinion as to what the wood-blocking would carry;—would it not depend on the amount of thrust that the kerb would receive before it gave? It would act like a flat arch; the thrust would be very great.
1806. Do you know the depth of the kerb in that position? No.
1807. Then are you in a position to express an opinion as to what weight an arch so formed with wooden blocks would carry with the resistance offered by the kerb? Working it out mathematically—and I tried

it as a sort of experiment—I found that an arch of such flatness could not be relied upon to support a heavy weight at all, but it might under some circumstances offer a considerable resistance. If I were designing a work of that sort, and I were asked what weight it would support, I should have to put it down at a very low figure indeed.

1808. Will you take into consideration the situation of the wooden blocks next the kerb where it would receive the pressure. Suppose there is 6 inches between the top of the kerb and the upper side of the blocks, and that the other side is stiffened by the granolithic pavement at the top, if any pressure were brought to bear on the kerb, it would become pushed inwards at the bottom and outwards at the top? If there were a thin layer of wood forming a flat arch there would always be a tendency for it to buckle up.

1809. But you admit that if such an arch is to carry any weight it must do so from the support it receives at the extreme edges? Yes.

1810. If any pressure is brought to bear from the weight-carrying capacity of the wooden blocks, seeing that the granolithic pavement at the top of the kerb would prevent it from bodily going back without fracture, would not the thrust cause the kerbstone to recede at its lower edge from the roadway and turn over towards the roadway at its other end, causing a fracture in the granolithic pavement; did you see any evidence of that? No, I saw no evidence of that.

1811. Having in view the importance of the inquiry in which you were called upon to take part, and the danger which is supposed to exist to traffic, did it not strike you as being necessary that you should make yourself acquainted with such facts? No, my instructions were extremely limited. I asked specially whether I was to go fully into the matter, and investigate the whole question, but I was told that I was not to do so. Perhaps economy may have had something to do with it. My instrustions were simply to look at the work at the site to which I was referred, and to express my opinion in regard to it.

1812. In certain particulars? Upon what I saw there. I have not had an opportunity to investigate the whole matter fully.

1813. You were asked then to make only a partial inquiry? I was asked to make a report upon what I saw at that particular spot. I have mentioned in my report precisely what my instructions were.

1814. Has your investigation been of so exhaustive a nature as you would have liked it to be? It depends upon the purpose for which it was required.

1815. Let us assume that there is a desire to get at the whole facts of the case? To get at the whole facts my investigation has not been nearly sufficient.

1816. But do you think it has been sufficient to get at what you were instructed to obtain? Yes.

1817. Can you inform the Committee what time you devoted to that portion of the work in Park-street? I was there, I suppose, with the other gentlemen I mentioned, altogether about half an hour.

1818. Did you while there notice any evidence of other excavations beyond that required for the telephone tunnel? Not on that occasion. On the following day I watched the excavation going on in Pitt-street. I saw nothing but what I have mentioned.

1819. Was your investigation of such a character that you did not see evidences of a separate excavation for the hydraulic main? I saw nothing but what I mentioned. I saw the position of a main there.

1820. Did it run parallel with the telephone tunnel? Yes.

1821. You did not examine it as to how the ground had been filled in? No.

1822. You formed no opinion whether it had been put in position by tunnel or by open cutting? It must have been put in by open cutting.

1823. Would you be surprised to learn that it was put in by tunnel? I should.

1824. Did you examine the manner in which the filling was done over that hydraulic main? I could only see the surface of the ground, which seemed to be closely packed. I saw no hollows above it or around it.

1825. Did you make any examination of that particular portion? I saw the character of the ground over and around it. There was nothing further to examine.

1826. You saw that there was a main, and you must have known that some excavation must have been made to get it in;—did you examine the way in which the ground had been replaced? I saw no cavities around it; there was nothing to examine.

1827. Did you make any examination to find out whether the work was solid, taking into consideration the fact that you have already stated that the ground through which the tunnel passed was of a friable nature? No.

1828. That did not come within the scope of your instructions? No.

1829. Do you know the date upon which the opening which you were asked to examine was made? No; I got no information on that point.

1830. Was not that an important factor in estimating the character of the work;—would it not make a great difference whether the excavation had been made one day, or whether it had been made a month? I do not think it would if the ground were properly covered up. There would be no effect from the weather. Of course, if there were an open excavation it would made a great difference.

1831. In ground of such a character, has not the operation of the air almost as great an effect as rain would have, unless it fell in great quantities? The air would certainly affect the sides after a time, but it would be a slow process. What I saw was quite sufficient to convince me as to the causes I have alluded to. What I saw could not have been accounted for by the fact of the trench having been open a week or two.

1832. *Chairman.*] The fact that the ground had been opened a week or two would make no difference, you think, as regards the result of your observations? I think not. Some of the ground had just been removed on the spot. Mr. Davis had had a portion of the end work opened. I put my hand down into perfectly new ground which had not been disturbed before.

1833. *Mr. Bavister.*] So that the excavation extended to a different position from any disturbed ground from the tunnel operations? I am referring to ground which had not been removed by the first opening.

1834. If evidence has been given to this Committee that the hydraulic main showed no evidence of having been rammed, would it cause you any surprise? Perhaps the main was put in after the tunnel was built.

1835. As a matter of fact it was put in before the tunnel was built? Then I do not consider that it would affect the question much.

1836. What is the distance between the edge of the tunnel excavation and the edge of the hydraulic main excavation? I could not give it you exactly.

1837. Would a 6-inch wall in such earth be sufficient to carry the superincumbent weight of the roadway and 2 feet of earth;—would not the 6 inches collapse immediately the weight came on to it? It would depend upon what was underneath it.

WEDNESDAY, 11 *AUGUST*, 1897.

Present:—

MR. BAVISTER,	MR. ROBERT JONES,
MR. CANN,	MR. COOK,
MR. HARRIS,	MR. F. CLARKE,
MR. HAYES,	MR. NELSON,

W. J. LYNE, ESQ., IN THE CHAIR.

Mr. G. McCredie and Mr. A. L. McCredie appeared in person.

George Chamier, Esq., M.I.C.E., recalled, and further examined:—

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1838. *Mr. Bavister.*] When the last meeting of the Committee terminated, I was inquiring of you whether you had any knowledge of the width of undisturbed earth which remained between the excavation for the tunnel and the excavation for the hydraulic main;—can you now give us that information? No; I did not make any measurements at the time.

1839. May I ask if you have obtained any further knowledge respecting that particular portion of the work since the last meeting of the Committee? I have had a look at the excavation at the opening in Market-street.

1840. I am referring now to Park-street;—have you any further knowledge concerning the work at that point since you were last examined? No.

1841. We did not quite clear up the matter as to how the wood-blocks would act in the carrying of any weight to which they might be subjected if they were not receiving any support from the concrete;—I do not think I made myself clear upon that question? I think I understood what you meant—that if the wooden blocks really acted as an arch and threw the whole weight on to the abutments, there would be a tendency to turn over the kerbing. That, no doubt, would be the case. The resistance all round would be such, however, that I looked upon the support given by the wooden blocks more as spreading the pressure over a wider surface. I do not think you could reckon on a direct pressure such as would be brought to bear in the case of an independent arch. I think the wooden blocks must have greatly strengthened the roadway.

1842. Were you not under the impression at your last examination that the wooden blocks must have supported the whole of the weight, inasmuch as you stated that the concrete would be barely self-supporting? I should like to explain what I mean in reference to that matter. Concrete has great strength for compression; but it is not used for any transverse strain. It is not a material which has any strength to resist a cross-pressure; and the consequence is that we have really little data to go upon as to what it would stand under such circumstances, acting as a beam; but a few experiments have been made, and they give very weak results. I was treating this concrete as a beam built 6 inches deep, and supported at both ends. The actual strength of such a beam would not be more than sufficient to safely carry its own weight. When I use the word "safely" I should explain that what we call the strength of a structure in engineering is not the breaking weight. If I say, for instance, that a bridge will carry 10 tons, you must not understand me as meaning that if 11 tons were put on the bridge it will break down. What is meant is that the bridge could not be safely relied upon to carry more than 10 tons. In this case you have to reckon that the concrete has side support, as well as end support; that it is supported all round, like a large surface, with a hollow in the middle of it. In that case the strength would be considerably greater than I mentioned. It would not do to look upon it purely as a beam supported at both ends; and that fact, taken into consideration with the support given by the wooden blocks spreading the pressure over a wide surface, is no doubt, in my mind, the cause why it stood.

1843. Getting back to the quantity of earth left undisturbed between the two excavations, and assuming that there were 6 inches left undisturbed, and that on one side the earth was entirely unrammed, would the ramming or consolidating of the earth on the other side of that 6 inches of undisturbed ground have a tendency to break it down or push it through to the unrammed portion of the other excavation? If one side of the excavation were loose and full of hollows, no doubt the ramming on the other side would tend to loosen it still more.

1844. I will put it in the other way—not that one side was loose and full of hollows, but that it was full of unrammed, fine, loamy material;—would the ramming on the other side have a tendency to break down the 6 inches of earth not previously moved? It would have that tendency.

1845. Especially when you consider that the ramming would be horizontal, and not vertical? The shaking that it would receive would fill up the hollows and bring down the stuff from the other side.

1846. Can you tell the Committee upon what works you have been engaged in New South Wales? I have acted as consulting engineer for railway contractors, and I have been connected with various commissions and inquiries. I have not had the actual charge of any work.

1847. You had been engaged upon an inquiry similar to this? I do not think so.

1848. Have you not been engaged as consulting engineer or expert upon contracts in connection with which disputes have arisen? I have given evidence at inquiries.

1849. You gave evidence before the Public Works Inquiry Commission respecting the contracts of Messrs. Carter, Gummow, & Co.? Yes.

1850. May I ask upon what works in other colonies you have been the engineer in charge? I was the engineer in charge for the construction of the Torrens dam, the Port Adelaide dock, the Grange railway, and several lines of tramway. I also designed and carried out a number of smaller works (hydraulic and other works) in various parts of South Australia. I also acted as consulting engineer for several large firms of contractors who were carrying out big railway contracts.

1851. On any of the works carried out under your direct control, did any question arise as to their satisfactory completion? Do you mean any disputes at the end of the contract?

1852. I mean, either when the work was completed or at any period of its being carried out, did any question arise as to whether it was properly done? There were frequent cases during the carrying out of large contracts where the work was questioned and inquired into, but I am not aware of any serious matter having arisen.

1853. The Torrens dam is a South Australian work? Yes. It is a work I did not design, but I was called in by the City Council owing to the work having been grossly scamped in the first instance. It was thought to be thoroughly defective. The work was started by contract, and it was found to be so defective that fears were entertained that the whole of it might have to be removed. I was called in to examine, report upon, and complete the work.
1854. Was that work being done by contract for the South Australian Government? No; for the City Council.
1855. Are the City Council the authority there in the matter of water supply? No; the Torrens dam is an ornamental dam, throwing back the waters of the Torrens, and forming a lake. It is a large concrete work.
1856. I presume the Port Adelaide dock-works were carried out for the Government? No; they were carried out for a company. It was a timber work.
1857. Were any of the works of which you had control done under contract for the South Australian Government? I was never in the service of the Government of South Australia. I acted independently of the Government either in private practice or for contractors.
1858. Were any of the works of which you were in charge works which were ultimately taken over by the South Australian Government? Yes. I was engineer for contractors who carried out immense works for the Government, such as the Northern railway—the line from Petersburg to the New South Wales border—and a number of other works which were Government contracts. I acted as consulting engineer for the contractors.
1859. Did you do so in the case of any dock or harbour work? No; but I have given expert evidence in cases connected with marine work. I never had charge of the works.
1860. I gathered from a remark you made that you had been devoting further attention to these tunnel works since your last examination? Yes; I visited the openings made at Market-street and also in Pitt-street, nearly opposite the Post Office.
1861. Did you observe anything there which you think should be brought under the notice of the Committee? In Market-street the foundation seemed to be quite solid. It is a stiff, solid clay. I could see no signs of any disturbance. In the packing both there and also in Pitt-street, near the Post Office, I considered that there were the same defects which I previously pointed out. It was made up to a large extent of stone, brick, and rubbish which had been put in, and which, of course, left a certain amount of space unfilled.
1862. Have you any knowledge of how long it is since the work you saw opened up in Market-street was completed? Not beyond what was told to me—that is to say, about fourteen months.
1863. Having regard to the fact that the work has stood a test of fourteen months in a position where the traffic is at least as heavy as the ordinary traffic of the streets, and that it had stood that test without showing any defect, would you consider it a satisfactorily-executed work? It is, so far as standing the weight of the road is concerned. As I stated, the material is a stiff, heavy clay. I could see no source of weakness.
1864. I suppose the inspection you made there was a continuation of the instructions you received from the Mayor? Yes; I was asked to have a look at the opening in Market-street in addition to what I had already done.
1865. You saw the opening actually made? I was there when the opening was made, and when the poling-boards were removed.
1866. Did any of the City Corporation officials accompany you on that occasion? The Acting City Surveyor was there for a portion of the time.
1867. Did the two of you go together to the work? We went together to the work. I paid some visits to it afterwards by myself.
1868. Did your first inspection, then, take place by appointment made with the Acting City Surveyor? Yes; he asked me to inspect the work, and I called at the City Council offices on my way there.
1869. You may remember that on the occasion of your last examination I asked you whether you were satisfied with the scope of the examination you had been called upon to make;—have you received instructions to extend your investigations at Park-street? No.
1870. I believe you expressed yourself as not being satisfied with your examination for the purpose of giving this Committee a thorough knowledge of the facts of the case? Undoubtedly my examination was not nearly sufficient to enable me to report fully on the whole subject.
1871. In your opinion, should your inspection have been of a more exhaustive nature than it was to have been of service to this Committee? It is a matter of opinion.
1872. It is your opinion we wish to obtain? It would depend very much upon what purpose my report was required for.
1873. I believe your instructions were to examine the work and to report as to the cause of what existed there? It was put to me simply verbally that I should inspect this particular site, and report to the Mayor what I thought, and also what had best be done under the circumstances. I received no official instructions beyond the mere verbal communication I have mentioned.
1874. Could you give an opinion satisfactory to yourself as to the cause of what you saw unless your inspection had embraced the whole of the possible causes leading up to it? I think that as regards that particular place, I was able to arrive at a conclusion, but I wish that my remarks should be limited to that particular place.
1875. I am referring to that particular site? I think I was able from what I saw to form the opinion I expressed. I may be mistaken, but it seemed to me that the cause of the subsidence was very clear.
1876. If you had made a more exhaustive inquiry into the surroundings, whatever might have been your statement of the cause, you yourself would have had more confidence in regard to what you said? I should have been able, no doubt, to speak with more certainty on the whole question involved.
1877. With more certainty than you were able to speak after the inspection which did take place? Yes.
1878. *Mr. G. McCredie.*] The reply you gave to Question 1666, leads me to understand that you took it that the wooden blocks have practically supported the concrete—that is, held it up;—you say that the concrete would scarcely carry its own weight? As I have explained, I was alluding to the strength of the beam supported at both ends. I was not taking into consideration all the lateral support. I never supposed that the blocks supported the concrete; as I explained, they would spread the weight over a wider surface and affect the concrete to some extent, relieving it from the pressure of the traffic. 1879.

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1879. But you said that the blocks would act like a flat arch having two abutments? To some extent they would act in that way; but, as I explained afterwards, the blocks were so flat that it would be extremely difficult to calculate what strength they would have in that capacity. I looked upon the blocks more as spreading the weight over a larger surface.
1880. If they were a flat arch helping to support the concrete it would be necessary for them to have good strong abutments? Undoubtedly, if the strain were transmitted direct from the arch to the abutments; but, as I explained, the concrete and the blocks are so mixed up that unless you had a steady heavy weight for a continuous time you could not get the strain transmitted at once to the abutments.
1881. You are not perhaps aware that there is a clay-joint on each side of the roadway between the blocks and the kerbing? I am not exactly aware of how the road is constructed.
1882. I suppose you would take it for granted that if there were a clay-joint there would be practically no abutments for the arch—no supporting power? Not to stand a steady strain; but the blocks in themselves would, no doubt, relieve the concrete of a certain portion of the pressure. A sudden weight coming on to a portion of the roadway would be spread over a much wider space, and would find resistance all round; consequently the concrete at the weak spot would be relieved of much pressure.
1883. If there were a clay joint of 1½ inch on each side allowing for the spreading of the blocks, so as to prevent the blocks going against the kerb and knocking up the inside of the kerb, would not those clay joints take away from the supporting power of the blocks, as a matter of fact preventing them from becoming a flat arch? They would no doubt weaken the arch if the full weight were thrown on to the abutments.
1884. When you examined the opening in Park-street, did you notice how many pipes crossed the tunnel? There was a number of pipes running in all directions.
1885. You mentioned in one portion of your report that you considered that the packing over the tunnel should be of solid concrete, are you still of that opinion? I think so. In order to make a perfectly solid job, I think I would have filled in the space between the brickwork and the solid excavation with concrete. Whether it would be necessary now that the work is opened, I do not say.
1886. Do you think you could make a solid job of concrete in that position without putting it in from the top? You would make the best job it would be possible to make, because you would be putting in a material easily rammed into spaces, and which would harden to the consistency of stone, admitting of no possible depression.
1887. In dealing with the filling over arches in a city like Sydney underneath the footpaths, and in close proximity to buildings where excavations are constantly being made to connect with water, drain, and gas pipes, do you think it would be a wise thing to put in concrete and to compel persons to excavate through that concrete in order to make the connections to which I have referred? Yes; and I think it would be wise in another respect, having regard to the possible breakage of a main and the flooding of the works. Concrete would prevent the water spreading. As it is, the water would flow freely from one end of the tunnel to another; there would be nothing to stop it. You would have the whole place impregnated with water. That is another reason why I think concrete packing would have been superior.
1888. Do you think it is absolutely necessary in the carrying out of a work of this description to cover it over with concrete in preference to the filling we have put in? I do not say it is necessary, but in order to make a thoroughly good sound job I think concrete should have been used. I may say that I have seen a great many culverts made for water and sewerage works, and also for railways, and it has been the invariable custom to put concrete between the brickwork and the solid excavation.
1889. Have you ever had any experience of railway tunnels? I have not been actually in charge of them.
1890. Is it the custom to pack with concrete in the case of railway tunnels? In most of them.
1891. You do not know whether it is the custom to do so in this Colony? I could not say.
1892. I suppose you will admit that there is great expense attaching to the use of concrete in the case of work of this kind? It would have been more expensive; still, I think the expense would have been warranted under the circumstances.
1893. In the case of buildings in the city erected on to the streets, how are the spaces behind the area walls which come on to the footpath filled in? I am not aware.
1894. Do you not know that the space round about those walls is generally filled up with ballast and loose broken material, so that the water will percolate and get away down to the bottom level? I could not speak from any experience in that matter.
1895. *Mr. Robert Jones.*] Have you made any attempt to arrive at an estimate of what the cost of putting in concrete would be per lineal yard? I have not made any estimate. I could not make any satisfactory estimate in the absence of fuller information as to the size of the excavation.
1896. Suppose the excavation was about 8 feet wide? I should not like to commit myself to any statement unless I had access to the plans, and had fuller information on the subject.
1897. What would be the value per cubic yard of the concrete? I suppose you would have to reckon on about 30s. per cubic yard, and I do not suppose it would take less than 2 yards to the yard forward; but I give these figures with a great deal of doubt, because I have not the plans before me. I am alluding simply to the filling in of spaces between the solid excavation and the brickwork.
1898. You think it would take 2 cubic yards of concrete to a lineal yard of the tunnel? I could not bind myself to any figures unless I had the dimensions before me.
1899. You think it would take approximately that quantity to do the filling? Yes.
1900. That would mean £1 a lineal foot for every foot of the tunnel;—do you, as an engineer, think that that would be anything more than a waste of public money? Evidently the work as done is not satisfactory. It would probably have been cheaper to do the work in the way I have described than the way in which it has been done.
1901. You think it would have been cheaper in the long run? Yes.
1902. *Mr. Harris.*] As to the wooden blocks acting as a flat arch, you said that the wooden blocks and the concrete were mixed up together;—what do you mean by that? I meant that they were closely connected, and that the pressure was transmitted from one to the other. There is a certain amount of adherence between them. The wood-blocking would have the effect of spreading the pressure over a wider space than if it came directly on to the concrete.
1903. *Mr. Bavister.*] In reply to some questions previously asked, you called attention to the fact that it would be difficult to pack properly in consequence of the confined space;—are you still under the impression

that

that the arch was turned and completed before any packing of the side walls was commenced? No, I do not suppose that; but I can see that the difficulty would be even greater than I anticipated, because I saw one place where the cap was right down on to the brickwork—was actually bedded in it. In a place of that sort it would be almost impossibie to pack in behind the cap, because, as soon as the arch is turned, the space would be closed. G. Chamier, M.I.C.E. 11 Aug., 1897.

1904. I think you stated that you had seen tunnel work of a similar kind carried out? I have seen tunnel works in sewerage works carried out.

1905. Tunnels smaller than railway tunnels? Yes.

1906. Are you aware that the method of doing the work is to set up centres with loose lagging, as it is termed? I do not quite follow you.

1907. Centres are put in covered with lagging;—are you aware that the method of construction in these cases is that the lagging, at least near the key, should be loose, enabling the men if necessary to stand in between the two sides of the arch up to the point of its being at least two thirds completed? I was not aware of what special method was adopted.

1908. Supposing that method to have been adopted, would it not be a natural expectation that the haunches should be packed in from that position before the arch was keyed? It might be, to some extent; but it could not be done thoroughly; they generally pack from the end.

1909. Would it not tend to more satisfactory work being done if that course were adopted? It would make the packing better than if it were done from the end.

1910. You do not know that that course was not adopted? I do not know what course was adopted. I am simply going upon the facts as disclosed by my examination.

1911. Have you any knowledge whether a shaft has been sunk in some part of the excavation at the junction of Pitt and Park streets, which went down to a depth lower than the foundations of the tunnel? No.

1912. Such a thing might exist without your knowledge? Certainly.

1913. *Mr. Cann.*] Supposing a shaft had existed at this particular point where the subsidence took place in Park and Pitt streets, and if that shaft were not properly packed, would the effect be a settlement on each side of that shaft underneath the concrete? No doubt if the shaft had not been properly attended to the packing might afterwards have fallen towards the shaft and have made hollows.

1914. And that would affect a considerable distance on each side of the shaft? It would.

1915. Do you remember what distance it was from the kerbstone to where the subsidence took place? No; I did not take any measurements. I judged from the general look of the place.

1916. Was the subsidence evenly distributed throughout? It was greater in the centre. It was from 4 to 5 inches at the sides, and increased to 9 or 10 inches in the middle, and there were also hollows at the sides. It was not an even subsidence.

1917. If the shaft were in that condition at the crossing of those two streets, and if the shaft were put in prior to the construction of the telephone tunnel, what would be the effect so far as the subsidence was concerned? If the shaft was put in prior to the construction of the telephone tunnel, and was badly filled in, it would all aid in the general subsidence that took place. That is all I can say.

1918. Would not the effect of the subsidence be as is shown on this plan? Yes; something in that direction.

1919. *Mr. Bavister.*] Was the line of greatest subsidence that you saw, under the concrete, in a line with the centre of the telephone tunnel? Yes; it was. It extended right across from side to side, and was greatest in the middle.

1920. And the middle of the depression, or thereabouts, was parallel with the centre of the tunnel? Yes.

1921. You have stated in one portion of your evidence that where loose earth had been cut down you were able to put in your hands? Yes.

1922. From that, would you form the impression that it had been excavated at some previous period—that it was not virgin soil? It was not virgin soil. A portion had been opened out beyond what the City Council had taken out. The ground had been previously removed.

1923. And the ground would present such a condition if a shaft had been sunk there and not properly filled in, would it not? Yes.

1924. *Chairman.*] You answered a question just now, and referred to a plan that was submitted—the plan referred to was a plan signed by "A. L. and G. McCredie, Architects and Consulting Engineers," and was a plan of the telephone work at Park-street, was it not? Yes; I do not wish to be held to say that I in any way admit the correctness of the plan, or that it represents the whole of what I saw. I merely mentioned that if there had been a shaft at that place it might have caused a portion of the subsidence.

Henry Browne sworn, and examined:—

1925. *Chairman.*] What position do you hold? Superintendent of footways and street cleansing, and foreman of masons. H. Browne. 11 Aug., 1897.

1926. For whom? The City Council.

1927. You understand that this Committee is taking evidence and making inquiries in reference to the telephone tunnel that has lately been constructed? Yes.

1928. Have you made any report to the City Council in connection with that tunnel or the footways over the tunnel? Several reports in connection with the footpath over the tunnel.

1929. Have you the reports with you? No, I have not. Those reports were sent on to the City Surveyor, and, of course, would be dealt with officially through the head of the department.

1930. What was the nature of those reports? In connection with the work generally.

1931. But what did you say in connection with the work? I simply expressed dissatisfaction with certain features of it.

1932. What features? Only relative to the surface works.

1933. Will you describe what you mean by the surface works? The manner in which the surface works were done—either the laying of the flagging, the method of tar-paving, or general surface work.

1934. Do you keep a diary or journal? Important facts I sometimes note down in a diary.

1935. Have you such a diary? Yes, I have. If anything strikes me as being particularly important, I may note the fact.

John

John Moore Smail, sworn, and examined :—

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1936. *Chairman.*] What is your position? Chief Engineer for the Water and Sewerage Board.
1937. Are you a civil engineer? Yes; M. Inst. C.E.
1938. Have you had any matter before you connected with the telephone tunnel and the footpaths? Very little. It only cropped up occasionally in connection with official routine as regards the laying of mains.
1939. Have you made any report to the Water and Sewerage Board? I made an official report, at the request of the Mayor of Sydney, who asked the Water and Sewerage Board that I might be allowed to inspect a certain place connected with the tunnel. That request was made officially to the Board, and was sent on to me. I visited the place and made an official report, which was sent on to the Mayor. That is the commencement and the end of my connection with the tunnel.
1940. You say that you reported on a certain part of the work? Yes.
1941. What part? Opposite the Civil Service Co-operative Society's new store that is going up in Pitt-street.
1942. What was the nature of your report? The report, I think, was somewhat to this effect: that the sides of the tunnel up to the spring of the arch had been filled in with good stuff, which appeared to me to be well rammed, but that between the crown of the arch and the poling-boards the filling was done with large spawls. I gave the opinion that probably this vacuity would lead to the stuff over the poling-boards in time drifting down through the joints and then leaving a vacuity between the timber and the pathway, but when that timber was likely to decay it was impossible to say; it might last for years. I think that was the sum and substance of my report.
1943. Did you make any examination of the lower part of the work outside near the building line? No; the whole of my examination was confined to the one side I could see where it was opened out for the front wall of the Civil Service Co-operative Society's new stores.
1944. Did you find any spaces between the top of the arch and the poling-boards? There were no spaces there. The filling in was done with rough rubble, but there were no spaces.
1945. Is that the only place you examined? In connection with the work of the Water and Sewerage Board, the Chief Inspector informed me that opposite, I think, the bathing establishment, in Pitt-street, there was a hollow, and that it would be necessary to fill that up before we could lay our main; but that was attended to, I believe, by the Telephone Department directly we spoke of it.
1946. Did you see it? I saw a portion of it.
1947. What was that? Just where the timber was. I must confess that it was rather late in the evening when I went down, I having been very busy all the afternoon. Between the timber there was a hollow underneath, as if no filling had been put in. That is as it struck me.
1948. *Mr. Cook.*] No packing at all? Not on the top.
1949. *Chairman.*] That was underneath the poling-boards? Yes.
1950. And between them and the top of the arch? Yes.
1951. Did you make any report in reference to Park-street? No; those are the only two occasions on which I had anything to do with observing the telephone tunnel.
1952. Do you know anything further about the footpaths or this telephone tunnel, or any matters connected with it at all? No. Unless it concerned myself as engineer for the Water and Sewerage Board, I never troubled my head about it. Whatever I wanted to be done they have always done. Beyond that I have never troubled myself.
1953. You did not examine Park-street at all? I examined it occasionally, the same as any other person might; but I never went officially to examine it.
1954. Whatever you know of it I want to ascertain; I do not care whether it is official or not;—you say you examined Park-street? I just looked at it.
1955. Did you look at it in such a way that you could give a professional opinion about it? Yes; long enough to give an opinion on it.
1956. What was your opinion? It appeared to me that what filling had been put in had consolidated to such an extent that it had left an opening between the crown of the arch and the underside of the concrete. It seemed to vary. I did not measure it; but looking at it casually it seemed to vary from 6 inches down to 12 or 13 inches in one place.
1957. Did you form any opinion as to the cause of it? No. I have had nothing to do with the telephone tunnels more than I have said.
1958. Was not this matter before the Water and Sewerage Board? Mr. Davis brought the matter before the Board with reference to the place opposite the bathing establishment in Pitt-street.
1959. What was the space you saw there? It might have taken twelve or thirteen loads of stuff to do the whole thing.
1960. Below the boards? Yes.
1961. *Mr. Bavister.*] Spread over how great a distance? I could not say; I did not measure it.
1962. Well, roughly speaking? I suppose it may have been 15 or 16 feet.
1963. By the total width of the tunnel? Yes; I think about thirteen loads of stuff is what the Inspector said was required. That was opposite the Natatorium. We were laying a 10-inch main on the footpath there.
1964. *Mr. Nelson.*] Speaking about the packing on the crown of the tunnel, you say there is evidence of its not being well packed? I said it was packed with spawls, in the one place I saw opposite the Civil Service Co-operative Society's new store.
1965. What do you think would be the best kind of packing under such circumstances? We generally, if we can get sand, pack with sand, or a mixture of sand and loam—something, at any rate, that will not consolidate or subside too much.
1966. Do you find a difficulty in packing on the crown with sand? Oh, no.
1967. It is customary, when packing with sand, to put it in with water, which would induce it to consolidate? In all our trenches we use water.
1968. You say that the trench opposite the Natatorium needed about thirty loads of stuff to be put in? My Chief Inspector said that it would take about thirteen loads.
1969. Would that be thirteen loads laid upon the surface? Oh, no; distributed in bulk.
1970. Over the whole of the 16 feet? Yes; down the sides and over it.

1971. So there had been really a very heavy subsidence there? I would not say that. It seemed to me like a pocket. The men had forgotten to ram—an oversight—and no packing had been put in. J. M. Smail. 11 Aug., 1897.
1972. *Mr. Cann.*] No subsidence had taken place on the surface? No; no subsidence on the footpath. The timber was intact. There were the poling-boards and the cross-pieces, and everything else.
1973. *Mr. Nelson.*] What I was putting to you was whether it had subsided from the surface, and those thirteen loads of stuff were spread over the ground? I thought you meant, had it gone through?
1974. You have many transactions with the City Council? Yes.
1975. Do you have any difficulty with the officers of the City Council in getting your pipes in? No.
1976. Do they ever do anything for you in laying the pipes? No; they only undertake to restore the footpaths.
1977. But they charge your Department for the labour performed? Yes; they will not do it for nothing. We found that we could not get contractors to restore the footpaths satisfactorily, or in such a way as to satisfy the City Council—one or the other—and therefore we agreed to let the City Council do the work and charge us.
1978. You have had some experience in putting in tunnels for your Department? Yes.
1979. Have you examined this tunnel-work at all? No.
1980. Neither internally nor externally? No; I think that the only time I was inside the telephone tunnel was near Moore-street, when we got permission from the Postmaster-General to utilise the tunnel for the purpose of drawing air into our sewer.
1981. You are not able to express an opinion upon the telephone tunnel? No; the only thing I know is about the want of packing which I saw at one place, and the large packing at the other place.
1982. Presuming that you had not opened the footway at the place where you did, and found this vacancy, from your experience as a practical man, what would you say would have been the result? There is no doubt that at some time or other there would have been a collapse. I think I said in my report that it would be impossible to say how long hereafter that might occur, for I have known timber to last in the ground many years. I once saw an old post that was over 100 years of age. Of course if the timber was soft wood, such as oregon, it would decay in no time.
1983. *Chairman.*] Are you an expert in timbers? No; I do not put myself forward as an expert in timbers, but I know what good timber is.
1984. Have you any idea how long these poling-boards are likely to last where they are situated? I should say that they will last fully fifty years, if they are made of good sound material. Of course I did not examine the material to see if any of it was dozy or half decayed. If it were good hardwood timber, it would last fifty years.
1985. A 1½-inch board? Yes.
1986. *Mr. Bavister.*] You paid a visit, I understand, to the place opposite the Civil Service Co-operative Society's new stores? Yes.
1987. At the time of your visit were the side-walls of the tunnel quite exposed? Yes; they had been exposed to put in the front wall of the building.
1988. Do you know if any of the upright timbers supporting the caps had been removed? No; they were all there when I saw it.
1989. Do you know whether they occupied the same position as they had originally occupied, or had been taken out and replaced? They seemed to be in the same position as the men had originally fixed them in.
1990. You stated that the side-wall of the tunnel at that position was entirely exposed; that being so, what was there to support the packing on the haunch or spandril of the arch? Where it was exposed you could see it at the leading end of the section removed beyond that. That was where I saw the stuff was packed in on the sides, and, of course, on the tunnel. It must have a support or the thing would tumble away.
1991. I suppose, as a matter of fact, you are now referring to where you can see past the boundary line of Hagon's frontage? I suppose that would be the name of the house. The sides had been packed, but from the crown down to underneath the poling-boards the packing had been done with rough rubble.
1992. Did you see anything that would lead you to the knowledge that at that particular position a sewerage drain-pipe passed across the tunnel? There was a sewerage drain-pipe, I think, which came in the way of the building itself, and we had some trouble with it.
1993. Would that have any effect on the packing—as to whether it could be got at, or had been packed in such a manner that when the side supports further on had been removed it would break down? I think you have misunderstood me. I did not say there was no packing, but that it was rough rubble spawls. That would not affect the question of the pipe at all, for I arranged with Mr. McCredie that he should put a pipe down under the bottom of the tunnel, and not inside it at all, and that he should disconnect any pipe coming in the way of the invert of the telephone tunnel, and connect it with the one underneath the telephone tunnel. I, therefore, do not think that pipe would affect the question at all.
1994. All the drainage pipes they came across were diverted from their original course? Yes.
1995. You are assuming that the telephone tunnel and the main sewer are running parallel? They are running parallel with each other.
1996. The telephone tunnel being in the centre, between the kerb and the building line? Yes; and then, of course, the pipes passing from the building line to the main sewer in the middle of the street intersected the telephone tunnel, some of them at such a level that we would have had to raise the tunnel or put the pipes underneath it, and after consultation the engineers who were carrying out the work decided to put a pipe underneath the tunnel, disconnect from the main sewer, and connect with that pipe; and that was connected, I think, at Moore-street with the main Bondi sewer.
1997. The water and the gas pipes were not diverted from their original course? No.
1998. Were there any surface pipes at this position which would account for the packing giving way? No.
1999. *Mr. Robert Jones.*] In the carrying out of this tunnel work, as far as regards the relationship existing between your Department and the workmen employed in making the tunnel and those who supervised it, did you find any difficulty in working harmoniously with them? Oh dear, no; we never had the slightest trouble.
2000. Were they at all times ready and willing to rectify any little error pointed out to them by your Department? Oh, yes, anything we wanted was always done; in fact, I never had to write a letter to the Postmaster-General about not being able to get it done.

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2001. And I presume that they came in contact considerably with your work? Yes; a good deal—with the sewerage, but not so much with the water.
2002. They would naturally come in contact with your drainage pipes and mains? Yes.
2003. And you had no difficulty in getting anything done which you considered it was their duty to do;—on your pointing it out they rectified it? In every case where we wanted a pipe altered or connected with a drain and I have spoken about it, the necessary work has been carried out.
2004. Without complaint or grumbling? Yes.
2005. As to the packing, would you consider it a correct thing to pack round the side walls and the crown of the tunnel with concrete, considering the purpose for which the telephone tunnel was intended? Oh, no.
2006. You would not consider that necessary? Oh dear, no.
2007. Would you consider it too expensive, or what? I think that if I were to do that sort of work I would have trouble about it.
2008. You think the method would be far too expensive to attempt such a thing? I think it would be unnecessary.
2009. *Mr. G. McCredie.*] Do you know whether the work in Pitt-street, where you say there was no packing, had been completed or not—whether it had been passed as completed? I could not say whether it had been passed by the engineers. I am only stating what I actually saw.
2010. It was very close to the surface?. Yes; as our main is only 3 feet below the surface, and that disclosed the whole thing, it could not be very deep.
2011. In carrying out work of that description, where you are close to the surface and do not want to interfere with the traffic, do you think that it would be safe to leave the timber in without the packing until such time as you could take the top surface off and take the timber out and fill up? I would be inclined to finish the work straight off, and leave the timber in if there was any danger. As a matter of fact, we do not leave timber in unless taking it out will jeopardise men's lives, for we cannot get contractors to leave timber in unless we pay them for doing it. There is a schedule of rates for that.
2012. As far as regards the timber being left in, the time this timber was left in it was sufficiently safe to support the footpaths until it was taken out? Oh, yes. It all depends, as I have said, how long it would take the timber to rot. Of course, if the timbers were to rot, down would come the footpath.
2013. If that timber and packing were left in so close to the surface as that, would there not be inconvenience in connecting pipes with buildings;—would not the timber be rather a nuisance? Yes; it would.
2014. And it would be better to take it out? Certainly. Unless it would jeopardise the men's lives, or you might be passing a building with a crack in it, and I would then certainly leave the timber in.
2015. You will admit that this work is a work of expediency, and you have to deal with things as you go along, as in carrying out your sewers? Just so.
2016. In carrying out works of that description, if you took the timber out and lifted the surface you could make a better job than by filling in with the timber underneath? Yes. We have to watch even our own men, and see they do not leave any voids.
2017. In carrying out work for the Water and Sewerage Board, as engineer for the Board, have you at any time while you have been carrying out the work had it taken possession of by the City Council? No.
2018. Do you not think it a very extraordinary proceeding for anyone to take possession of work and take it out of the hands of the engineers who are carrying it out, and whilst it is not complete? I should say it is most original.
2019. Concrete packing over a tunnel would be a great nuisance to anybody connecting pipes, would it not? I do not see the necessity for it.
2020. The packing that we have been using is similar packing, is it not, to what you adopt for similar work? Oh, no. I have explained that in tunnels so near the surface we put in sand or some other stuff that can be easily rammed, but most of our tunnels are in rock.
2021. With regard to the carrying out of this class of work, do you prefer carrying out work of this description by day-labour or by contract? Where a lot of contingencies arise we carry the work out by day-labour. All our mains in the city are laid by day-labour for the simple reason that we can never get the contractors to satisfy the Municipal authorities, and we are constantly coming across old gas-pipes and old sewers, and the contractor would require a pretty good sum in respect of such things. I do not like day-labour work. It gives the office too much to do. There is so much book-keeping. I, therefore, prefer contract work; but there are cases of expediency where it is necessary to have day-labour work.
2022. In carrying out work of this description you prefer day-labour? I speak generally. I say that if you have work with such contingencies arising, day-labour would give the best results.
2023. Seeing that there are many drains and pipes near the tunnel, this would be a work with contingencies? Yes.
2024. In the excavation that was made for putting in the areas for the Civil Service Co-operative Society's new store it was necessary to come up to the side of the tunnel;—in examining that, did you take particular notice as to whether, in the making of that excavation, any of the timber supporting our timber over the tunnel had been shifted? No; as I said before, it struck me that it was as it had been left by the men who carried out the tunnel work; that is the appearance it had to me, but of course I may be mistaken.
2025. In front of the walls of buildings along a street, is it usual to pack open ballast—that is, ordinary spawls—alongside the foundations of the buildings to allow the water to percolate through to the bottom? You mean like a French drain; that is the usual thing put in.
2026. *Mr. Robert Jones.*] You saw the timber of this tunnel? Only at the two places I have mentioned.
2027. You saw it sufficiently to form an idea as to what the timber was like in quality? It seemed to me to be sound.
2028. In your opinion, was there any timber that you saw there the life of which would be from three to five years and not more? No; I could not say. I should certainly say longer than that.
2029. Much longer? Yes; the timber I saw.
2030. From the general appearance of that timber you say it would last much longer than from three to five years? Yes; I am sure of that.
2031. *Mr. Hayes.*] In your sewerage tunnels, carried out by contract, have you anything to do with superintending? Yes; it is all under me.
2032. No matter what the depth of the excavation may be, and whether made in rock formation or clay, do

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do you find it necessary to have the earth between the top of the arch and the tunnel excavation properly packed? If it is in rock we are not very particular, because most of our tunnels generally have a roof of about 50 feet of solid rock above them, and that is packed in with spawls, but not with concrete. If, however, it is in clay or in friable ground which is likely to weather away, of course it is packed tightly.
2033. And in all cases you see that that is thoroughly done by the contractor? The inspector is supposed to do that. One of the inspectors is supposed to be at each heading when the men are ramming. Of course, that is a most important thing. Some time ago we found that the men did not do exactly as they should have done, and the stuff went into the face of the heading, and the road perhaps sunk down 4 or 5 inches. We were fortunately able to deal with the matter before an accident took place, but it taught us a lesson.
2034. You have always been very careful? Yes.
2035. *Mr. Cann.*] I suppose you admit that a tunnel like this telephone tunnel is very different from a sewerage tunnel? Yes.
2036. You would not need to take the same precautions with a tunnel like this, to make it water-tight, as you would with a sewer? No.
2037. It is a different kind of work? Yes; but of course you would want to keep the water out, or it might get damp.
2038. *Mr. Bavister.*] Or provide for the escape of water? Yes; that is always provided for.
2039. But if it were more expensive to keep the water out than to provide adequate means for its escape, you would let the water in and afterwards get rid of it? It depends what you want the tunnel for. If you want a dry tunnel you must keep the water out, but if you do not want that you may let it in and then let it out.
2040. *Chairman.*] Have you the report that you made for the Mayor? Yes.
2041. Will you read it please? Yes. There is a letter which led up to the report.
2042. The Mayor, I suppose, wrote asking for a report? Yes; the letter came in the usual official way.
2043. And in reply to that letter you made a report? Yes; the report is as follows:—

I inspected this place with the Acting City Surveyor, and the following opinion could be forwarded to the Mayor:—
The portion inspected was a length of tunnel opposite the new Civil Service Co-operative Stores, the side of which had been laid bare.

The side and crown bars and top poling-boards had been left in, between which and the extrados of the arch the filling appeared to have been done very loosely, with large spawls. The filling over the haunches of the arch appear to have been better carried out. There is no doubt in my mind, as the soakage from footpath finds its way through the overlying finer material it will in time pass down to the spawls and fill the interstices up. This will naturally leave voids on the top, and as timber decays so will settlement take place. It would be impossible to say when this would take place, but to place the work beyond danger it would be advisable to have the space between extrados of arch and sides and roof of tunnel filled in, and punned with finer material. If this were done, the future rotting of timbers would not affect the footpaths.

William Greenwood, Associate Member of the Institute of Civil Engineers, sworn, and examined:—

W. Greenwood, A.M.I.C.E. 11 Aug., 1897.

2044. *Chairman.*] Have you examined the work known as the telephone tunnel work? I have not been through the tunnel.
2045. Have you examined the outside work? I was engaged by the Corporation to inspect the Park-street work more particularly.
2046. Did you inspect it? Yes.
2047. Did you make any report? Yes, to the Council. I reported that the packing in the tunnels and the side walls had been done in a slovenly, unworkmanlike, and unsatisfactory manner.
2048. Do you refer in that answer to any other than the Park-street opening? Yes; I saw the ground where they have put up a new building in Pitt-street, beyond the corner of King-street. It is the Civil Service Co-operative building, close to Washington Soul's.
2049. Did you report upon that? No; but I was told to look at it.
2050. What did you find there? In that case the heading had been packed with large rubble.
2051. By the heading you mean the space above the arch and underneath the boards? Yes. In erecting that building they came within 2 feet or 2 ft. 6 in. of the back of the wall of the tunnel; consequently that ground fell away. I did not go there officially, but I saw it.
2052. Did you examine the packing at the sides of the tunnel? At Pitt-street you could not. As they took out the ground for the building it fell from the walls. Unless you had been there to watch them you could not have told.
2053. Could you see the end of the packing exposed? Yes, at the top.
2054. Could you see the ends of the packing at each end where it had fallen away? It was running parallel to the building front.
2055. Supposing a certain distance had fallen away, the packing at the ends must have been exposed? Yes, you could see it.
2056. Did you examine that? No, not the side wall.
2057. Are you in a position to give any evidence as to the packing of the side wall? So far as Park-street is concerned.
2058. But with regard to the other? No.
2059. Was the space between the arch and the boards properly packed? It was fairly filled, but it was packed with large rubble-stones—larger than a water-bottle, and irregular in shape.
2060. Was it packing which you approve of? No.
2061. What would be the effect of that packing on the surface? There must be a certain amount of space, and that space in time must get filled as the finer material gradually works its way down.
2062. How would it work down? By gravity or by water getting into it.
2063. But how will it come below the boards? Plenty of the boards had 3-inch spaces between them. They were not tight. The boards across the top of the headings had 2 or 3 inches space between them. Apparently the whole of the boards were of one width. There were no irregular-shaped boards, as far as I could see, on the job.
2064. Did you examine the boards? Not there.
2065. Did you examine the brick or cement work? No.

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2066. Was there any danger to the foundations of the buildings at that particular point? The new foundation goes below the level of the tunnel now with the basement.
2067. Does the tunnel interfere with it in any way? No.
2068. Does it prejudice it in any way? Not if you go below the tunnel.
2069. Supposing you do not go below the tunnel? I may mention that in a street like that, one building supports the other with the cross walls and the ties.
2070. Did you examine the adjoining building? No. The next building towards King-street was very much cracked, but that had nothing whatever to do with the tunnels. The division or party walls must have been built some years ago with an inferior kind of brick. My main reason for going there was to see how the builders got on with the shoring. The building was a most difficult one to get alongside to shore.
2071. You examined the Park-street portion? Yes.
2072. What did you see there? The Corporation, in the first place, cut a piece through about 3 or 4 feet from the northern kerb of Park-street. Then they drilled holes through the concrete 3 feet to 6 feet further to the south in the crossing of Park-street. After they passed through the concrete they came to about 10 inches of cavity before they came to the earth below. The cavity was not parallel with the floor of the concrete—it varied. There was one pot-hole there about 1 ft. 10 in. in depth on the north-western corner. I measured it. It could have been measured at more than what I stated, because it drifted away towards the back of the side wall. If you take the top of a tumbler placed horizontally as the arch of the tunnel, the greatest depth would be down the side of it.
2073. You say there was a space of 10 inches parallel to the bottom of the concrete, except in a pot-hole towards the side of the tunnel? Yes.
2074. On which side? To the north-west side.
2075. Were you there when the Corporation was opening this place? I was there about twenty past 4, I think.
2076. How much was open then? They had taken out the one slab and had drilled holes.
2077. Did you see any earth removed which would add to the spaces? The skin was perfect.
2078. And nothing had been removed? Not a thing. The skin was perfect.
2079. Did you examine this place thoroughly? Yes.
2080. To what distance across Park-street? I do not know whether it was on that or the next day, but they went the whole distance across.
2081. Did they take the whole distance? Yes.
2082. *Mr. Cook.*] Who did? The Corporation. They took the crossing right across Park-street.
2083. You are sure of that? Yes; I am quite sure of it.
2084. *Chairman.*] Do you mean from kerb to kerb? Yes, as near as possible. They did not go quite to the kerbstone.
2085. *Mr. Cook.*] How far off? Sufficient to allow the water to drain on one side.
2086. Is that all? Approximately.
2087. You are quite clear the Corporation opened it all the way across? They did not go to the kerb-stone; that is quite clear.
2088. *Mr. Cann.*] Would you be surprised to hear that they left 14 feet from the kerb-stone? I do not think they left so much as that. Anyhow, I was there fifty times, so that it is only a question of memory if it is not so.
2089. *Chairman.*] Did you find the space you describe continue across the whole opening from north to south? No, it was shallower at the other end.
2090. Did you notice any pipe of any kind? Yes, the hydraulic main comes along there, and I think there is also another pipe.
2091. Did you examine the position of the hydraulic main? Yes, the hydraulic main was on the western side of Park-street.
2092. Did you examine how far, or whether the hydraulic main came over the top of the tunnel? In that length they lifted two lengths of boards that morning. The further board—that is, the most westerly board in that set—next to John Young's building—was resting on the collar of the hydraulic main.
2093. You are speaking of the poling-boards? Yes.
2094. Did the hydraulic main run parallel with the tunnel? Yes.
2095. Did it come over the wall of the tunnel; and if it did, how far? I should think it would be about vertical, over the outside wall. It might not run quite parallel. It was the last board which was resting on the collar.
2096. Did you notice whether the earth round that main was of a different character to the other portions? You could trace where the trench had been cut.
2097. What was the trench cut for? It was cut when the hydraulic main was laid. The material which had been filled back into the trench was the same material as that which had been taken from it. It was the yellow marl stuff which is peculiar to Park-street.
2098. *Mr. Cann.*] Was it a trench or a tunnel? A trench.
2099. *Mr. Cook.*] Are you quite clear about that? If a piece of ground has been disturbed you can tell which is the original material which has not been moved.
2100. But was it opened from the top or tunnelled? That you could tell; but the material was the same.
2101. *Chairman.*] Was it put through as a tunnel? I could not tell.
2102. Did you examine right to the surface to see whether it was a tunnel or a trench which had been opened for the receipt of the hydraulic main? I should say that it was a trench; but I did not see the work done.
2103. *Mr. McGowen.*] Did it appear to have been rammed? You could scarcely detect where the trench had been, because of the similarity in the character of the material.
2104. Did it appear to have been rammed? No; if it had been rammed, it would have been rammed from the top, or it might have been watered, in lieu of ramming.
2105. *Mr. Jones.*] But it was thoroughly set? Yes. Looking at it in the section, nine out of ten men could not have told that the ground had been disturbed unless they had been connected with the work.
2106. *Chairman.*] Did you see any space betweeen the surface and the concrete? As far as I remember, the

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the pipe was really just over the outer edge of the wall, which is really the full width of the tunnel driven for the telephones. As near as I remember it was immediately beneath them. It might have had half its weight on the solid ground and half across the trench.
2107. But what I want to find out, in consequence of other evidence which has been given, is whether you saw any space above that over the hydraulic main and the concrete? Assuming there were six boards across, the last board rested on the collar of the pipe. The heading went no wider than that. The board is 10 inches in width, and one side of it rested on the collar of the pipe.
2108. Am I to infer that you did not see any space above the hydraulic pipe? The space is above the top of the boards, between there and the concrete; and that is the full width of the trench.
2109. *Mr. Cook.*] Was there a subsidence above the hydraulic main? If you ask "immediately above the main," I reply, no.
2110. *Chairman.*] Did you see any space above the hydraulic main above the concrete? I should say no. The muck would not break down vertically, but it would break across.
2111. Then it breaks from outwards inwards towards the tunnel? Yes.
2112. In consequence of that, and of any other pipes you might have seen there, are you of opinion that they had the effect of causing the space between the cement and the top of the ground? No; the hydraulic main goes parallel to Pitt-street.
2113. What other mains did you see? There was one other which was exposed, but that was a cross main, and goes across the opening.
2114. Did you examine the poling-boards at that place? I saw two sets lifted.
2115. Were they close together? There were spaces between.
2116. Did you see the packing under the poling-boards? Yes.
2117. Of what character was it? When they were lifted what you saw mainly was pieces of brick—whole bricks and pieces of stone. I pulled out some whole bricks myself.
2118. Were there any spaces in the packing under the boards? There must have been. The stone had been put in as what you might call "finger muck."
2119. Did you examine the packing down the sides of the tunnel? I put a pick-handle down the back of the wall myself—at the back of the eastern side wall.
2120. What was the nature of the packing there? There was none, because the pick-handle went right down.
2121. *Mr. Cook.*] You say there was no packing there? Not at the back of the side wall.
2122. *Chairman.*] Was there no earth there at all? No, not where I put the pick-handle down.
2123. You say there was no packing there? Not there.
2124. Did you notice it extending at all? I do not know.
2125. Did you examine the packing generally as far as the opening disclosed? Yes; I put the same pick-handle at the back of one of the legs. There had been a notch cut in the side, about 12 inches wide and 9 inches back.
2126. What size was the cavity at the back of the timber prop? Five or 6 inches in width, and it was without filling.
2127. What was the nature of the packing, as far as you examined it, along the whole length which was exposed on the sides of the tunnel? I should think that what had taken place was this: The side wall had been built to its full height, then the drum had been turned and the packing put there. If you put sand in on the top it would run down behind the wall, but if you put stuff the size of potatoes, or of a water-bottle, some of it would jamb on the top of the cavity, and some of the small stuff might run down behind.
2128. Taking the formation of the arch with the side-walls, the packing is placed on the top and allowed to run down the sides? Yes; if it were sand it would have found its way down, but if it were large material some of it would choke in the corners and some fine stuff would run down.
2129. Did you find it was filled with small stuff, or had choked? It had choked, because the cavities were down the eastern side; the western side was fairly full.
2130. Did you notice any signs of an old shaft having been sunk there any time previously? No.
2131. You see the plan marked "Z," showing from Young's Chambers to the "Criterion Hotel"? Yes.
2132. Do you see the space shown presumably as an old shaft? Yes.
2133. With the cavity above it? Yes.
2134. Did you see anything which would lead you to believe that there had been such a shaft? No.
2135. *Mr. Cann.*] Would you have seen it without an excavation? Unless the shaft happened to coincide with the centre of the tunnel. If it had touched on the side wall you would have seen it; but if it were fairly in the centre it would have shown nothing.
2136. You could not see a shaft unless you excavated for it? If the shaft had been in the centre of a trench any marks it might make would be obliterated, but if it had broken through the sides of the excavated ground you could have seen it.
2137. *Chairman.*] If there had been an old shaft there, would the shrinkage or space show? I do not think so.
2138. *Mr. Cann.*] Supposing the shaft had been without the tunnel at all, is not that how it would show on the surface? No; they would come upon it when they put the concrete down for the wood-pavement. You could see right through no matter where it was. In some cases it was less than 10 or 12 inches. In one corner it was only 4 inches deep. You could see right through beneath it.
2139. *Mr. Cook.*] Do you mean to tell us there is a subsidence all across Park-street? Next the "Criterion" they cut out a slab—on the side of the "Criterion." Assuming that they cut the concrete two-thirds of the way from John Young's Chambers, you could then go to John Young's Chambers and see daylight to where the slab was cut out.
2140. And you say that is two-thirds of the way across? Yes.
2141. Did you look through? Yes; there was no trouble about looking through.
2142. Did you examine the concrete? Yes.
2143. Did you consider it was safe or otherwise to traffic in the way in which it was found? The question of safety depends on what load might go across it. That concrete was 9 inches thick, the reason being that it had been originally a stone crossing. In building stone crossings the cubes on the top are 7½ or 8 inches in depth. The bottom of the concrete would probably be 14 or 15 inches from the top of the wood-blocks. There would be 6 inches of concrete there originally. When they changed the stone-cubes and put down wood-blocks they put a fresh layer of 3 inches of concrete, making the concrete from 8 to 9 inches deep in that particular place.

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2144. *Mr. Bavister.*] Did they then raise the street above its original level? No. We will suppose the table is the finished level of the wood-blocks. If you put in wood-blocks 6 inches deep you finish off your concrete to a level of 6 inches. The stone cubes are 7½ inches in depth, and you allow for a sand bed beneath them. You leave a depth of 8½ inches from the top of the wood-blocks to the concrete. Then you put 6 inches of concrete below that; consequently when you remove a stone-cube and put in a 6-inch wood-block you have a depth of 2½ inches to fill in with concrete; and that was filled in with blue-stone shivers.
2145. *Chairman.*] Was this concrete put in the shape of an arch? The convexity of the road forms it.
2146. And on the top of the concrete were wood-blocks? Yes.
2147. You said just now that the safety would depend upon the load? Yes, and the width of the span.
2148. Would it have been safe with a heavy load of 5 or 6 tons? I should not call it safe. It might carry it, but it is very doubtful.
2149. If it did carry such a load what would be the reason of it? Nothing further than this: You frequently make concrete floors for buildings, but there is a limit to the span they will carry with safety.
2150. What I want is your professional opinion as to what load it would safely carry, with the cavity underneath and with the extra thickness of concrete and wood-blocks on top? It might possibly carry a 15-ton roller; but in constructing anything of that kind we should expect to get a factor of safety of 6 as against the breaking load.
2151. Does a factor of 6 mean 9 tons? No, 2½. If it carried 15, divided by 6 it would give 2½ tons. Supposing it would carry a 15-ton roller, that only means 2½ tons for a safe load.
2152. Do you think it was safe for a 2½-ton load? Yes, I think so; but I would not design anything of a thickness like that to carry a 2½-ton load.
2153. What I want is to get your opinion as to whether, as you saw it, it was safe to leave it as a roadway? No, I would not leave it as a roadway. It might not be very dangerous, but I would not leave it so.
2154. I believe you have done a good deal of work in the streets of Sydney yourself;—what class of work have you done? Wood and stone paving. I have done about one-third of it.
2155. Are you a judge of timber? No, not specially.
2156. Are you a judge of the life of timber? No.
2157. Have you ever done any tunnel work? Yes.
2158. In Sydney? No.
2159. Is it customary to leave the timber in tunnel work? You speak of them as tunnels; but I, as an engineer, speak of them as headings. I have done miles of railway tunnels. We generally drive one or two headings in such tunnels.
2160. Do you leave the timber in, if it is standing anywhere near a roadway or under a street? It depends. In some instances I have left every bit in.
2161. Why? Because you could not get it out. The ground, in some instances, is so heavy that you cannot remove it.
2162. If it is safe you take it out? Yes; for the sake of economy, for one reason. In all shale tunnels the whole of the timber is drawn. In this Colony we have a different practice from that which prevails in England. The contractor in England gets so much a yard for his tunnel, whether he leaves the timber in or takes it out. He is either paid by the lineal yard or the cube yard; but he gets nothing for his timber. If the ground is so heavy that he cannot draw his timber, he leaves it there.
2163. I want you to be clear as to whether—putting aside the fact that the contractor loses or does not lose the timber—if the timber can be extracted you would extract it? You always do.
2164. Did you examine this timber? Yes, a lot of it.
2165. What class of timber was it? Fairly good.
2166. Have you any idea of what the life of the poling-boards would be?—
2167. *Mr. Cook.*] Do you know what sort of timber it was? Hardwood.
2168. *Chairman.*] Do you know whether it was spotted gum or red gum? No. I should think they would buy any kind of timber for that work.
2169. You are not an expert in timber? No.
2170. Whatever the life of the timber might be, would it, when it rotted, cause an additional subsidence of the surface? It would cause one; but I do not attach much importance to the rotting of the timber.
2171. Have you any idea or theory as to the cause of the space you saw between the top of the surface of the ground and the concrete? There is only one thing which could have happened. The men in driving the headings drove them larger than was necessary, and let the boards rest on the top of the sills or caps.
2172. And how would the space between the concrete and the surface where you saw the skin was whole be created? If you are working in sand it is necessary to drive your timbers in front of you before excavating the ground. I may say that I have seen scores of the poling-boards taken out, and there is not a mark of a hammer upon any of them, thus showing that they have not been driven.
2173. Do I understand from your answer that there has been an excavation which left a space above the boards when they were laid on the cross-pieces? That is so.
2174. And that the space at the top has been caused by the filling up of the space next to the board? That is so; and this material came down upon the boards.
2175. Do you think any part of that space was caused by the earth coming down between the boards through the spaces? No, I do not think so. When we lifted the boards the stones were there as they had been put in, and there was no fine stuff amongst them.
2176. Therefore, you do not think it was caused by the running of the earth between the boards? Not there.
2177. Was it at any place you saw? Further down the water had got through more. The ground as you come down Pitt-street is far moister than it is there; that is to say, I think rain percolates through the joints of the flagging and down into the work, but I do not think it did on this work.
2178. But have you seen any other place where the rain has percolated through and carried the earth with it through the spaces between the boards? The whole of the work coming down Pitt-street from John Young's is very damp and moist.
2179. Have you made any examinations elsewhere? I have seen this work possibly every second or third day from the time they took up the piece at Park-street.
2180. That is the work going on in Pitt-street? Yes.

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2181. Can you express any opinion as to the work you have seen exposed there? The packing is very indifferent. The ground has been packed on the top of the crown. They have just put in what material came to hand—in some cases fine and in some places rough.
2182. Has that material which has been put in been rammed? I should not think so; it is a difficult thing to ram horizontally.
2183. It has been packed, and not rammed? So I should say.
2184. Have you seen any defects in the footpath in consequence of this? In numbers of instances the flags have gone.
2185. Have you seen them yourself? Yes; but not since the inquiry commenced.
2186. But I am speaking in connection with this tunnel? Yes; in connection with the tunnel the flagging was very irregular.
2187. Was that caused through the bad packing? Yes.
2188. Was that along Pitt-street? Yes.
2189. Any other part? No, I do not know of any.
2190. *Mr. Cann.*] How could it be caused by the packing if the soil did not go through? From the same cause as that which existed at Park-street. If in driving a roof you could drive it exactly true, like a ceiling, and put the boards true against the ceiling and the boards never moved, nothing would come down.
2191. But what has that to do with packing;—you say you have seen the footways put out of order on account of the packing? No.
2192. *Chairman.*] I asked whether the footways had got out of order because of the packing of the tunnel? It depends on what you call packing. If you could take your roof out as true as a ceiling, and you put your timber up to it, all would be well; but the ground would take an arched shape. If the timber is put in horizontally there is a cavity left. There was not a wedge in the whole of that work more than 2 inches thick.
2193. *Mr. Cook.*] If you had charge of men who did the work you described, would you allow it? The men, if they did their work properly, ought to put the wedges beneath the poling-board; but it never has been done in that place. There has never been a wedge there thicker than 2 inches.
2194. You are quite sure the top has been let down all the same? Yes; I can account for it coming down by no other means than that.
2195. Your theory is that it must have come down like that because you cannot account for it in any other way? I have seen a good many headings driven, and you cannot drive a heading and cut out your corners exactly on a true square. Before you could do that in material of that nature it would drop upon you. In the case of sand you drive your boards in front of you, but in the case of shale the ground falls of itself.
2196. Have you seen any of these driven? No.
2197. How do you know the earth has come down? I do not know, but I am quite certain that is what has taken place.
2198. *Chairman.*] There was another reason;—the witness says there were no marks on the ends of the boards to show that they had been driven? None of them have been driven.
2199. *Mr. Nelson.*] You were speaking just now about the concrete;—you were saying you thought it was possible for the concrete, with aperture beneath, to carry about 9 or 10 tons upon it; you were saying that you would allow a factor of safety of 10 tons*? Yes.
2200. Supposing that I tell you that we have had evidence to the effect that that block of concrete, resting, for argument sake, on two piers 8 feet apart, would not carry its own weight, you would not, I suppose, agree with it? I will make as many as you like to carry a good deal more weight than that.
2201. If a witness says that, according to his experience, a block of concrete of those dimensions would scarcely carry its own weight, you would not agree with him? I would not.
2202. You have told us you have had some experience in the construction of tunnels of this character? But never as near the surface as this.
2203. If you were carrying out work of this kind would you attempt to tunnel, or would you feel it your duty to put in an open cut? An open cut.
2204. Presuming you were making an effort to tunnel, as in this instance, what system would you adopt in getting your timbers in—that is, taking the necessary precaution for having so small a heading;—would you take any special precaution? I should take care that the men had wedges there.
2205. I think you will admit that in some parts there is something under 4 feet of heading there? Yes.
2206. And it is of a friable nature? Yes.
2207. Do you not think if an effort were made to drive the poling-boards through the material, it would have a tendency to shake down a great deal of it from the open face? I do not think any of that material is fit for driving. In Park-street you will find the softest material to be met with in the whole of Sydney.
2208. But at Park-street it is quite possible to drive poles crossing the street? Yes; but that ground does not run very far. You do not get much of it in Sydney.
2209. Then would it be wise to attempt to drive your poling-boards? I do not think I should have driven them there.
2210. Then you think it would be unwise to attempt to drive them? In that case.
2211. And in the other case down Pitt-street? You could not drive them there. The ground is worse there.
2212. Therefore, it would be folly to attempt it? Yes. There is only one remedy—to take out your cut and put in your poling-boards. If, when you put in your poling-boards you only put in a wedge-piece between them, sufficient for the next board, instead of wedging them tight against the roof, it makes all the difference.
2213. Do you wish us to understand that instead of the boards being wedged up to the roof, they have been placed up, and a parallel piece put on the top of the set so as to retain the timber in position whilst they were getting the next set in? Yes.
2214. You have not seen the work done? No.
2215. Then that is merely a matter of opinion? Yes.
2216. You say you have had something to do with the construction of brick tunnels? Yes.
2217. Supposing you were carrying up your arches, and you were then going to carry over your springing, what system would you adopt;—I want you to take into consideration the actual work that has been done—

* Note (*on revision*):—I think the word "six" was used.

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done—that is to say, the tunnel being built and rammed, I should like you to tell the Committee what system you would adopt in putting in your brickwork, so that you would have proper provision for the purpose of ramming the space? Possibly when you got 2 feet from the ground it would be necessary to put in sand-filling at the back. You would not ram, because you would break your joint if you did; but that ground is not got out as true and as parallel to the brickwork as a line which you could draw. It may be that, although there is a cavity of 6 inches 2 feet from the ground, the brickwork at springing may be hard against the ground.

2218. If such were the case, would it not be the duty of the man in charge to see that the earthwork was taken down at the springing? Not necessarily. The only thing you can put in there is sand-filling.

2219. Would you say they have not put sand-filling in? That is the only thing you can do, and then you must do it at once.

2220. Presuming you are turning your arch, what way would you make your set so as to get the greatest facilities for completing that work;—you have the timber arch to turn your brickwork on, how would that be constructed for the purpose of completing the arch and the filling? The drum would be about 3 feet in length.

2221. Would the men work from the end of the drum? Yes.

2222. When they got their bricks up—say with the exception of the last four, six, or eight bricks, as the case may be—would you pack on the top of the brickwork? No; I should key before I packed.

2223. And you would pack from the end? Yes. In a length like that, if a man can reach the place to lay four bricks 3 feet in length, he can put in sand-filling and ram it.

2224. Is it not sometimes customary on the top of the drum to have a portion of it to draw out? That is always done for large railway tunnels.

2225. You would not do that in a small tunnel like this? No.

2226. It would not be an advantage for filling? I do not think there would be much in that. If the length in the drum is only 3 feet, a man can easily ram it back. I should use a drum.

2227. You say it is essential to put sand at the back of a brickwork for filling? Yes.

2228. You are aware there is a great deal of soakage through the ground there;—would it not be necessary to drain it off? No; I do not think it is necessary to do so.

2229. Would it be an advantage to drop in rubble? If I did I should put it in the bottom only, not at the back of the walls.

2230. That would be the correct thing to do? I do not call Sydney ground wet. There is no wet ground in Sydney. It is the driest place I ever saw in my life.

2231. You were speaking about the hydraulic pipe on the eastern side; it has been said that that there is a possibility of these pipes creating a subsidence;—do you think the pipes you saw would have any tendency to create that subsidence? No.

2232. Do you think the hydraulic pipes have by any means contributed to it? No.

2233. Did you notice underneath the concrete anything which would lead you to believe there had been a current of water coming over the ground? No.

2234. You do not think there was? No.

2235. You do not think it was possible for the water to have got higher up the street and found its way underneath the concrete? Given a cavity to begin with, the water might get in there; but so long as that concrete was laid on that ground in the first instance no water would get through.

2236. *Mr. Cann.*] Could not it get in from the path? So long as the concrete is resting on the ground the two are watertight.

2237. You have had a good deal of experience with the streets of the city? Yes.

2238. And you are aware that the tramway officials are continually taking up that portion of Elizabeth-street between Park and Liverpool streets;—do you know the reason why they are doing that? No.

2239. Are you aware that there is a soakage from the path, and, if such is the case, would it be possible for the water to continue to drain down Park-street beneath the concrete? There is no such thing as water draining between the concrete and the road.

2240. You will admit that the water does come up through the blocks on the tram-line? I do not want to give my opinion as to the character of the Government work at that place. I may say I did the work on each side of the line for the Corporation, and that does not require repair.

2241. *Mr. McGowen.*] In answer to Mr. Nelson you have stated that, in your opinion, the authorities should not have tunnelled? Yes; it was a mistake to tunnel, for many reasons. It would have been cheaper to open cut.

2242. You mean it was a mistake because there was extra risk of doing the work imperfectly? I think you would have to be careful to get the work done properly so as not to get a settlement of the footpath.

2243. Do you think it was possible to do it without getting a subsidence? In the first place, you would have to put sand-filling at the back of the side wall and concrete-filling on the top. You would have to take care that the men had sufficient wedges and that they wedged the timber tight up to the roof.

2244. If the work were done as you have indicated would it be possible to have any subsidence? I do not say there would be none, but it would reduce it to a small proportion. If the cavity behind the wall is filled with sand it cannot get away, and if that on the top of the arches is filled with concrete it cannot.

2245. Would it be possible to tunnel under any circumstance without the risk? Of the two I would choose to make an open cutting.

2246. I want you to express an opinion whether in doing a work like this there was not an element of danger which could not be provided for under ordinary circumstances or extraordinary circumstances as you have laid down? I should look upon it in this light: If there is a tunnel with 300 feet of crust above it, and you did the work in the way you have done it, the settlement would not matter; but in a case like this, where you are on the footpath alongside buildings, you ought to put in sand-filling at the back of the walls and concrete-filling on the top, and take care that the boards are tight up to your roof.

2247. In tunnelling must you recognise, no matter what precautions you take, there will be a settlement of some kind, greater or less? Yes; but it would be reduced to a very small amount if you did as I have told you.

2248. Then in tunnelling you must reckon on a settlement? Yes; but very small if it is done properly.

2249. The more careful you are the more you provide against settlement? If you leave no honeycomb and cavity there will be no place for the stuff to get away. If the timber is wedged up tight to the tunnel it reduces the subsidence to a very large extent.

2250. You understand the question—that there is always a danger in tunnelling of a slight settlement? Yes.
2251. And the danger is enhanced when you are tunnelling so near the surface, as in this case? Yes. In all probability, if a man had been making a drive of that size with 300 feet crust, he would not have put in any timber at all, but in a place like this it is different.
2252. *Mr. Cook.*] Would you like to work in ground like that in Park-street without any timber? I have worked in worse ground than that without timber.
2253. *Mr. McGowen.*] You say some places you examined had no packing? That is at the back of the eastern side wall.
2254. And the packing that they used was not the right kind of packing? Those two or three lengths had bricks and large lumps of stone in them.
2255. You believe in sand-packing? Yes; but concrete-packing for the headings if you want to make it tight.
2256. You say you put a pick-handle down at one place? Yes, at the back of the side wall.
2257. In more than one place? In two places at Park-street.
2258. *Mr. Cook.*] All along? Not 20 feet along. I put it at the back of one of the lengths. If you put the muck on the top of the haunch, unless you first stop the cavity on the haunch, some of it must run down.
2259. *Mr. McGowen.*] With regard to the tram-line from Market-street to Bathurst-street—you have seen the water coming through the bearings of the rails? Yes.
2260. How do you account for that? That water gets down between the wood-blocking and the side of the rails.
2261. It does not come from underneath? No; not if the concrete is good.
2262. *Mr. Cook.*] You were asked where it came from? From the top.
2263. *Mr. McGowen.*] I understand it comes from the surface? Yes.
2264. *Mr. Bavister.*] Having regard to the large area of the Park at the top of Park-street, and the fact that it is higher than Park-street or any of the streets about there, as well as the telephone tunnel—in the event of rain falling on the Park for any length of time, would it not have a tendency to soak through the upper strata, and get to a strata at a level below the wood-blocks and below the concrete? You have the same class of material right through at Park-street before you get to the marl at that particular place.
2265. Is the earth which you term marl of a nature which moisture would easily penetrate? Yes.
2266. Are we to assume that continuous rain falling on the Park would penetrate the soil to a lower depth than the bottom of the concrete which carries the wood-blocks? If you were to go to any portion of Pitt-street near the Park, and went to the centre of the road and made a bore, you could not tell when you took out the material whether the season was wet or dry.
2267. Would rain be likely to penetrate into the marl to a depth lower than the level of the underside of the concrete in Elizabeth-street? In a wet season the soil at 5 feet deep would be rather moister than it would be in a dry season; but if you were to put a bore down opposite Macintosh's at any time of the year I do not think you could tell from the marl whether it had been taken out in a wet or dry season. You can have a continuous rain there for five years and the concrete roadway will not settle $\frac{1}{8}$ inch.
2268. Can you tell us what is the difference in the levels between the wood-blocks in Elizabeth-street and the paths or general surface of the Park? The Park discharges the rain into the gutters in Elizabeth-street.
2269. That is not an answer to the question. Have you any idea as to what is the difference between the general level of the Park adjoining Elizabeth-street and the wood-blocks in Elizabeth-street itself? Do you mean immediately at the back of the wall?
2270. No. There is an asphalt footpath in the Park running parallel with Elizabeth-street;—can you give us an idea as to the difference in level between that path and the surface of the wood-blocks in Elizabeth-street? I do not think there would be a difference of more than 6 inches.
2271. Do you think the marl to which you referred is an earth through which continuous rain would be likely to penetrate to a depth of 2 feet, so as to set up soakage at that depth? Of course, water will penetrate in time.
2272. If rain had penetrated over the general surface of the Park to a depth of 2 feet, would it not have struck the strata below the cement carrying the wood-blocks? I would be prepared to pave the whole of Elizabeth-street, parallel with the Park, with a wooden pavement and maintain it for a small sum per annum, and if it rains the whole of the time it will not affect it. If the marl came on to sandstone rock probably the line of water would follow the rock when it got there.
2273. Then if rain gets into the marl it is not dependent on veins to spread right through it? No; it is practically the same as sand in a basin. But that water would not affect your roadway. The bottom of your tunnel is based on marl, but if it rains from now till doomsday it will not affect your tunnel.
2274. Some doubt appears to exist in the mind of Mr. McGowen with regard to the water which shows itself at the sides of the rails and in the joints of the wood-blocks next to the tramway in Elizabeth-street. You have stated that water could not get through the concrete. I want you to explain what becomes of the water which penetrates the surface of the Park, over many acres, to a depth lower than the concrete. Cannot it drain through continuously until it reaches some excavation? If the country is sloping in one direction, and is covered with a layer of marl, the water will go through until it comes to a sloping rock; but if it happens to be a basin it will remain in the basin until it reaches its highest point. In a case of that kind you would have a pot-hole.
2275. Do you know what the strata is between Hyde Park and the tunnel in Pitt-street;—is there a basin anywhere between the Synagogue and Bathurst-street? No; I doubt if there would be. If you were to cut a section from east to west along Bathurst-street from the Park towards the Cathedral, you would find that the general lie of the shale beneath the marl would be towards Darling Harbour.
2276. That is to say, that the general trend of the ground is from the highest portion of Hyde Park down towards the tunnel? Yes.
2277. And would rain or water, having penetrated into the marl, sink directly down, or would it have a tendency to follow the general lie of the country? As regards marl, or that yellow stuff like moulders' material, it has no layers whatever.

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2278. Then would rain sink straight down? It would be very much the same as it would be in a sponge.
2279. It is possible, then, that water might get underneath the concrete from its extreme upper edge? It might do so, but it would never affect the concrete.
2280. In answer to Mr. McGowen you stated you had done work for the Corporation on each side of the tramway in Elizabeth-street, and you called attention to the difference in your work and that of the Government? I said that if water from the Park caused trouble with the tram-line it would cause trouble with the Corporation works, and that it had not done so.
2281. I believe the concrete on the portion of the roadway which you blocked is intact? Yes.
2282. I believe the concrete on that portion of the road on which the tramway runs is broken into by the sleepers? Not necessarily. It depends on how much concrete they put beneath the sleepers.
2283. Can you tell us whether the thickness of concrete below the sleepers is equal to the thickness of the remaining portion of the concrete? I am not certain. That road was done by the Government on day-work; had it been let on contract-work I should probably have tendered for it. There would be the same thickness of bed below, but whether it is bedded on ballast or not I could not tell.
2284. It would involve more labour in the excavation for the first formation of the roadway if provision were made for varying the levels of the concrete bottoms to provide for the difference in the sleepers? No, you would cut a trench 6 inches deep in the middle of the road, and put the concrete down to a certain level. You would bed your sleepers upon it and fill the concrete between those sleepers up to the level of the wood-blocks.
2285. Would it not involve the cutting of a separate trench for each sleeper? You first put a layer of concrete 6 inches thick on the floor, and you put your sleepers on the top, then you fill the concrete between the sleepers up to the level of your wood-blocks.
2286. The sleepers average 5 inches in thickness? Yes.
2287. That involves 11 inches of concrete for the whole space between the sleepers? Yes.
2288. Therefore, if it does not involve a greater cost in labour, it would involve an additional cost for materials? Yes.
2289. And that material would be deposited in a position where it would be of least service, I believe, for weight-carrying purposes? You must bring your work to the same level.
2290. It must involve a large expenditure for labour or material to put the same thickness of concrete underneath the sleepers as is between the sleepers. You will at once see that, having admitted that it will require 11 inches between the sleepers and only 6 inches under, you at once establish what I wanted to know;—is the depth the same? There is no groove cut for concrete to go below the sleepers. The bottom of the ground must be of a uniform surface to start with.
2291. I was trying to get at the difference between the wood-blocks on the side of the tramway and those on the tramway itself;—is not the vibration and concussion to which the wood-blocks of the tramway are subjected more severe than those on the other portion of the roadway? Yes.
2292. So that the conditions for the purpose of comparison are not fair? So far as water effecting the concrete is concerned they are the same.
2293. If water were to penetrate to a depth below the concrete at its upper edge, is there anything to prevent it working its way through to the telephone tunnel? No.
2294. You referred to some moisture at a position next to John Young's buildings at the corner of Park-street;—do you know how that moisture gets there—is it due to leakage from pipes or to general soakage? Which moisture was that? I think the moisture was in Pitt-street.
2295. In reply to a question you said that there was moisture at the corner known as John Young's Corner? I do not follow what you referred to.
2296. I gathered from your answer that the ground showed indications of being continuously wet to a greater or lesser degree and that water was travelling through it? No.
2297. *Mr. McGowen.*] It was when you were talking about the hydraulic pipe? I said nothing about moisture at Park-street—not that I remember.
2298. *Mr. Bavister.*] Can you tell us the date on which you were requested to make this inspection? Not from memory.
2299. Have you any record of it? No; but I was there when Park-street was broken through.
2300. Have you any objection to say how it was you made the inspection and by whose instructions? The Corporation.
2301. Was the letter you received from the Corporation the instruction upon which you acted? Not quite; long before then—without being engaged specially for it—I was asked whether I would notice the way the work was being done.
2302. By whom? By the Acting City Surveyor—Mr. Gordon.
2303. Did you receive written instructions to make an inspection? I do not think so; I got a telegram. However, I got instructions from the Mayor.
2304. Did you get instructions that were other than verbal? I am not positive about that. I have been instructed by the Mayor to inspect, and I have reported.
2305. The original instruction you got from him was supplemented by verbal directions? I saw the Mayor and the Acting City Surveyor.
2306. You state that you saw this work broken through, you believe, on a Monday? Yes.
2307. But some time before then your attention had been called to it;—you were asked whether you had noticed the way the work was being carried out? That was in regard to the work near the Civil Service store, Pitt-street. That I had seen before.
2308. Did you take part in the inspection by the Mayor and some of his officials? Yes; he was there on the Monday.
2309. That I believe is the Monday which has been referred to as May 13th? I do not think it is as long ago as that. I am speaking of the day Park-street was broken through.
2310. Have you any idea how long before breaking through at Park-street the visit of inspection by the Mayor and officials was made to the Co-operative store? I was not present at the inspection of the Co-operative store, but I was at Park-street.
2311. To what portion of this work was your attention first called? My attention was first called to it in regard to the building near to Washington Soul's. I had been there several times, because I knew the builders had a ticklish job to shore the building. It was then I saw the side of the telephone tunnel.

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2312. Did you see that particular portion on the day on which the Mayor, with Alderman Waine and various City officials, paid a visit of inspection? It may have been the same day, but I do not know. I have no knowledge of their going there.
2313. Were you called upon to furnish any report as to that portion of the work? No.
2314. Your instructions dealt with Park-street? Yes.
2315. For how long before and after the breaking through of the concrete were you there? I was there that night from a quarter to 4 to 6 o'clock.
2316. Did you see anything which, in your opinion, rendered it necessary to have a force of police there to preserve order? Of course I knew that the Corporation anticipated that the workmen of the Government would come there forcibly to fill in the work the Corporation had opened up.
2317. On the assumption that if one person interferes with the business of another it would be resented—was that the basis of your opinion? I think the Corporation anticipated that the Government would try to close up the work as soon as they could, and not allow it to remain exposed. The Mayor was determined that it should remain exposed. He thought there would be a conflict between the two sets of workmen—that the workmen of the Government would be told to fill in, and he intended that they should not fill in.
2318. Are you aware that for some time previous to that the Postal authorities had been taking out the timber through the whole of the works—commencing somewhere near the railway station—and had on this particular date worked up to the Criterion Theatre? Somewhere about there. I know they had been working for a long time.
2319. And the indications were that the Postal authorities were taking this work in hand as a whole, and were going through with it? Of course I know nothing about the work of the Corporation.
2320. I am only asking you the opinion you held at that time in regard to the matter;—I do not think there is any reason for you to hesitate to answer questions? I am not in the service of the Council, and I know nothing but what I hear.
2321. Did you see any indications of a row? No. I advised the Mayor and Mr. Gordon to keep the work open. Apparently the Government say there is no bad work. In my opinion it was very bad work.
2322. *Mr. Cook.*] What was that? I say it was bad work. I advised the Council to keep it open and let the public and the authorities see whether it was bad or not.
2323. *Mr. Bavister.*] May we take it that having paid due regard to the losses which might be inflicted on the business men of that neighbourhood, and for the purpose of creating some kind of public feeling, you advised the Mayor to keep the street open, thus blocking the traffic and causing loss and inconvenience to the surrounding business people? Not for an indefinite time.
2324. For what time then? On that very day it was anticipated that the Chairman of this Committee would have been selected. The Committee, as a matter of fact, did not exist then, for the want of a Chairman.
2325. How did that come to your knowledge? Through the Press.
2326. That the Chairman was to be elected on that Monday? Not necessarily on that Monday. They had met, I think, before that time, and had disagreed as to who was to be the Chairman.
2327. The first meeting of the Committee was on Tuesday, July 6th? The names of the Committee had been published in the Press before the street was broken through, but the Chairman was not elected, I believe.
2328. *Chairman.*] Are you sure the Committee was appointed before the street was broken through? Yes.
2329. Can you say on what date the street was opened? On a Monday.
2330. What day of the month? I am not positive.
2331. I want to set at rest the question whether or not the Committee was appointed before or afterwards? Mr. McCredie says the road was opened on the 12th July. On that day the Committee had not, I believe, agreed as to who was to be their Chairman.
2332. *Mr. Cook.*] Was the idea of opening Park-street to get the Committee to see it? That I do not know, but it was opened when I saw it.
2333. You stated that you and those with whom you were acting had some reason to believe that the Chairman of this Committee would order a visit of inspection to that place, and that was one of your reasons for keeping it open? I have not stated it, but that is so.
2334. Before a Chairman was selected certain persons, including yourself, thought that a Chairman who was not known would order a visit of inspection to the place;—on what grounds was that opinion formed? If you refer to the *Herald* about that date I think you will find it stated that there was still a difference of opinion in regard to the appointment of a Chairman.
2335. I am asking you on what grounds you base the opinion that a Chairman who had not been appointed would arrange a visit of inspection;—who gave you that information? No one.
2336. How did you arrive at it? From commonsense reasons. If a Committee is appointed to carry out a certain work, and the members of the Committee see the work themselves, there is no getting away from it.
2337. Can you now inform the Committee why the ground was kept open for so long a time, and private interests in that district suffered by the keeping of it open for so long a time, after the Committee had inspected it? No.
2338. That was not done on your recommendation? No.
2339. If you had been called upon for advice, would you have advised that, in the interests of the people about there and the traffic generally, it should be closed as early as possible? That question would never have been put to me. It is not an engineering question; it is purely a question for the Mayor or Transit authorities.
2340. I think you said you advised that it should be kept open;—was it an engineering question then? Yes. Had the ground been closed the Committee would have had to depend on the opinions of the various people who saw it.
2341. But it was kept open for a considerable period after the visit of the Committee? I do not know anything about it being kept open afterwards.
2342. If you had been asked to recommend that it be still kept open, would you have recommended it? I do not know what I should have done. It is purely a business question. If they had a motive, and they told me of it, I might agree with it, or I might not.
2343. *Mr. Cook.*] Whatever it was? No; I say I might or I might not agree with it.

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2344. *Mr. Bavister.*] I understand you to say that the Chairman of the Committee anticipated a visit to this place? No; you suggested that; I did not say it.
2345. Do you say that unless there is a motive for you to give advice you would not give it? No; that is not true. You asked me—in the event of this work being kept open for the Committee to see it, and the Committee having visited it,—what I would have done if I had been asked whether it was advisable to fill in or not. I replied that the question would never have been put to me. It is a question for the Corporation or the Transit officers.
2346. If the Mayor, or any other person, had asked for your advice as to whether it should or should not have been kept open longer, what opinion would you have expressed? That would depend entirely on whether the Mayor gave any reason. If he gave a reason, I might agree with him, or I might not.
2347. Could you see any reason for its being kept open after the Committee had inspected it? Personally?
2348. Yes? But I do not know the workings of the Corporation.
2349. I can only ask you what you know? I do not know their reasons for keeping it open.
2350. Was it, in your opinion, necessary to keep Park-street blocked and the tunnel opened for so long a time after the visit of inspection by the Committee? I know no reason why it was kept open. I have stated that when I saw it on Monday, the 12th, I advised the Mayor to keep it open until the Committee had seen it.
2351. What was it you saw on the 12th? Park-street was cut through on the 12th.
2352. But you said something just now to the effect that you had seen a notice stating that the Committee were going to inspect? I said I gathered from the Press that the Chairman was going to be elected on that day. In that case the Committee would have been in existence. If the work had been filled in, and the Committee had not seen it, they could only have listened to what people told them. I advised them to keep it open until the Committee had seen it.

WEDNESDAY, 18 *AUGUST*, 1897.

Present:—

Mr. BAVISTER,	Mr. HARRIS,
Mr. CANN,	Mr. ROBERT JONES,
Mr. COOK,	Mr. McGOWEN.

W. J. LYNE, Esq., in the Chair.

G. McCredie, Esq., and A. L. McCredie, Esq., appeared in person on their own behalf.

William Greenwood, A.M.I.C.E., recalled, and further examined:—

W. Greenwood, A.M.I.C.E. 18 Aug., 1897.

2353. *Chairman.*] I understand that you desire to make some corrections in the evidence that has been sent to you for revision? If Mr. Bavister's question in reference to the instructions from the Mayor meant, "Did I receive them from the Mayor through the officials?" then my reply is "Yes"; but if it meant "Did I receive them direct from the mouth of the Mayor?" then my reply is "No." Mr. Bavister, in putting the question to me, used the words, "In addition to the letter you received, did you also receive verbal instructions?" To that I replied, "Yes." The answer "Yes" is perfectly correct as regards the latter part of the question, but I never received a letter. That is only a misstatement of Mr. Bavister's. I never said I received a letter.
2354. If you could substitute some other word for "misstatement" perhaps it would be better? Well, I would say "mistake" made by Mr. Bavister.

Henry Browne, Inspector of Footpaths, recalled and further examined:—

H. Browne. 18 Aug., 1897.

2355. *Chairman.*] The last question put to you at the last meeting of the Committee was as to certain reports and memoranda that you had made;—have you now with you the reports to which you referred the other day? I have the whole of the reports relating to my association with the telephone tunnel and all the correspondence through the City Surveyor.
2356. You probably have some reports that you submitted to the Mayor? No; all the reports that I made in connection with this work were made direct to the head of the department—the City Surveyor.
2356½. You have those reports with you? Yes.
2357. Are they lengthy? Not very lengthy.
2358. Will you then read them? Yes. They are as follows:—

In re Electric Telegraph Tunnelling Operations, Pitt-street.

Sir, 7 December, 1895.

I have the honor to report that during the past week three (3) new openings (shafts) have been made on the footway fronting No. 126, City Bank and Civil Service Stores respectively; also along Pitt-street frontage of Post Office.

The brickwork in Barrack-street is now completed, and portion of the flagging has been restored.

I have, &c.,
H. BROWNE.

R. W. Richards, Esq., City Surveyor.

Sir, 20 December, 1895.

I have the honor to report that two (2) new openings have been made during the week in connection with th subway in Pitt-street, opposite Nos. 206 and 218.

The brickwork is now in progress between King and Market streets; also between King and Moore streets.

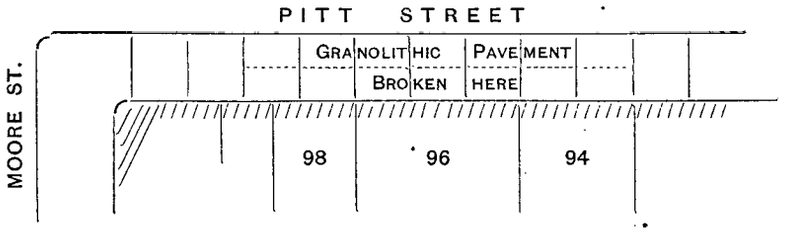
I have, &c.,
H. BROWNE.

R. W. Richards, Esq., City Surveyor.

Sir,

Sir, 6 January, 1896. H. Browne.

I beg to report that the granolithic pavement in Pitt-street, fronting Nos. 94 and 98, on Messrs. Chambers and Grocock's section of telegraph tunnel, is broken in the middle :— 18 Aug., 1897.



I pointed this out to Chambers & Co. this morning, and explained that the damage had been occasioned through insecure "packing." They seemed to think it was not likely to become any worse, but in my opinion the pavement will continue to subside until the " packing " is quite consolidated.

I have, &c.,
H. BROWNE.

R. W. Richards, Esq., City Surveyor.

Sir, 6 January, 1896.

I beg to report that three new openings have been made in Pitt-street, fronting Nos. 230, 240, and 248, in connection with the Electric Telegraph Department subway. The brickwork is now approaching completion from Moore-street to Market-street.

The granolithic pavement fronting the Imperial Arcade has slightly subsided, and is cracked in the middle almost from one end to the other. I pointed this out to Mr. Donald, and informed him that a new pavement would have to be laid.

I have, &c.,
H. BROWNE.

R. W. Richards, Esq., City Surveyor.

EXTRACT from Annual Report upon Paving Works for year ending 31st December, 1896.

This year has been marked by considerable activity on the part of the Telegraph Department in connection with the construction of subway in Barrack-street, Pitt-street, and a portion of Castlereagh-street. Subways.

In each of these streets the footway has been disturbed to a very considerable extent.

That portion of the subway in Pitt-street, between Moore and Bridge Streets, executed by contract, necessitated the relaying the whole of the flagging along the line of tunnel. Reinstatement of footways.

In this connection a difficulty has arisen as to the liability of those responsible for disturbance to a footway whereon flags are broken. Broken flagging.

In many cases the flags, although badly fractured, present a durable and even wearing surface; but once disturbed it is practically impossible to replace the irregular pieces to give an even surface.

As the contractors complain that it is unfair to ask them to substitute sound for broken flags, it would be well if some fixed rule were laid down for guidance in such cases, as, failing the contractor, the expense of such substitution ultimately falls upon the City Council, such outlay being really consequent upon the action of the contractor in disturbing the footway."

Sir, 21 February, 1896.

In re attached memo. relative to subsidence of footway fronting Imperial Arcade, Pitt-street, I beg to report that footway as referred to is paved with granolithic, and subsidence has occurred in connection with tunnelling works, which has resulted in a fracture along the middle of the granolithic pavement. As this has subsided unequally, there are several trips which might cause accident.

I understand that the brickwork of this section of the tunnel is completed, and there is no reason why the work of restoring this footway should not be put in progress forthwith. I may state that the work of restoring footway along Pitt-street, where the Electric Telegraph Department pay a portion of the cost, is now in progress.

I have, &c.,
H. BROWNE.

R. W. Richards, Esq., City Surveyor.

Sir,

In re letter from Mr. Heydon, dated 24/2/96, attached, I beg to report that the area kerb fronting Messrs. Lister & Co.'s premises, Barrack-street, was laid under my supervision in so far as the surface levels of the grates and kerb (only) were concerned. *In re* Mr. Heydon's complaint about water service, I may state that the City Council gave no instructions to have water turned off at premises above referred to, neither did any employee of the Council damage such water service. The only men employed on footway adjacent to Messrs. Lister's premises were those employed by the Electric Telegraph Department at tunnelling works, and the men who laid area kerb under Mr. Graham, architect, at the order of Mr. Heydon.

I have, &c.,
H. BROWNE.

R. W. Richards, Esq., City Surveyor.

The water was cut off, and it was a doubtful question whether it was affected by the tunnelling operations or by some area kerbing that was being laid.

2359. That only means that in carrying out the tunnel work the men may have cut a pipe that might have been repaired afterwards;—it is not a permanent matter? No; it is not a permanent matter.

Sir, 24 June, 1896.

I beg to report that in Pitt-street, east side, between Bridge and Moore streets, along Electric Telegraph Department tunnel, the manhole covers are set slightly above the pavement. In some cases the movable cover in the middle of the iron frame fits very imperfectly, and projects from ½ in. to ¾ in. above the frames, thus forming an awkward trip. About such there has already been several complaints.

I have, &c.,
H. BROWNE.

R. W. Richards, Esq., City Surveyor.

Sir, 2 July, 1896.

In re attached memo. relative to footways in Pitt-street along line of Electric Telegraph Department tunnel, I beg to report that area paved with tiles is 164 square yards; cost of Nepeonic pavement, £50. Mr. Donald has agreed to allow the cost of laying tiles, 1s. 3d. per yard—£10 5s.

Tar paved area disturbed by tunnel operations is 178 square yards; cost of Nepeonic pavement, £53 8s. Mr. Donald will allow the cost of tar-paving this area, £15 17s.

If Nepeonic pavement is laid, it would be advisable to remove the old sandstone kerb, which is badly worn, and substitute 2nd Bowral kerb; cost, £36.

I have, &c.,
H. BROWNE.

R. W. Richards, Esq., City Surveyor.

That letter refers to an arrangement entered into between Mr. Donald and myself, that where tar-paved and tiled areas were disturbed, Nepeonic pavement should be substituted. That was probably on my recommendation,

H. Browne. 18 Aug., 1897.

recommendation, inasmuch as Nepeonic pavement being monolithic in character and extending to the solid formation on either side would not be so likely to be affected by any subsidence that might occur through consolidation of filling.

Sir, 26 February, 1897.

I beg to report that the Electric Telegraph Department are now reinstating the tar-paved footways in Clarence and Kent streets where disturbed during tunnelling operations. As they are only reinstating from the kerb to the inside of the tunnel at building line, a strip of old pavement is left of a varying width of from 18 in. to 30 in. along the building line.

This method is very unsatisfactory, and will inevitably result in trouble and expense in the future, consequent upon the consolidation of the filling over tunnel and subsidence resultant therefrom.

As this pavement extended from the kerb to the building line in one solid piece prior to the tunnelling operations, it is now very much more necessary that it should be restored to the same condition.

Top dressing laid upon the Clarence-street portion is too thin, and seems to lack the necessary adhesive qualities to give a good wearing surface.

I have, &c.,
H. BROWNE.

W. M. Gordon, Esq., City Surveyor, *pro tem.*

Sir, 8 July, 1897.

In re subsidence over Electric Telegraph Department tunnels, Pitt-street, between Goulburn and Liverpool streets,—

Since the completion of the tunnel several subsidences have taken place about this locality, more particularly along the tar-paved footway (adjoining) northerly from the portion now opened.

The filling subsided almost the whole length from there to Liverpool-street during progress of paving works.

If it was intended to remove the timbers from the section now open, it is strange that the footway pavement was first reinstated and on several occasions relaid after subsidence consequent upon rain. At the haunches or sides of the tunnel the earth has been very loosely filled. Where timber has been removed in many places the uprights have been left, and as the earth where these are fixed has not been removed to exactly fit the timber, interstices could not possibly be filled excepting with fine sand; even with this, water would be required to properly run the sand into it.

I do not remember to ever have seen sand used during progress of the tunnel for filling down the sides of arch, but have frequently noticed chippings and fine earth used for such work.

Several times I called the attention of Mr. Donald to the necessity for using sand for this purpose.

I have, &c.,
H. BROWNE.

W. M. Gordon, Esq., City Surveyor, *pro tem.*

The previous letter not by us.—H.B.

The following letter refers to the place where the first opening was made by us, on the other side of Liverpool-street:—

Sir, 28 July, 1897.

I beg to report that in Pitt-street along line of tunnel, where pavement has been recently disturbed, the removal of same has weakened the resistance of the kerb to pressure of wood blocks, and as a consequence same is slightly displaced.

It would, perhaps, be advisable to straighten the kerb where necessary before the pavement is relaid.

Further, I understand that crushed boulders are to be used for the wearing surface of pavement proposed to be laid by the Electric Telegraph Department, fronting the Criterion Theatre and the Lyceum.

For wearing purposes this is not equal to the granolithic pavement destroyed.

It would be also advisable to learn whether cement to be used in this work has been tested. If so, by whom?

I have, &c.,
H. BROWNE.

W. M. Gordon, Esq., City Surveyor, *pro tem.*

Sir, 5 August, 1897.

I beg to report that the reinstatement of granolithic pavement over Electric Telegraph Department tunnel at Park and Pitt streets is now approaching completion.

The concrete of most of this work has been laid the day before the finishing coat is added.

This cannot give such good results as if the pavement was completed the same day.

The concrete of the Park-street section, inspected by me this morning, seems very poor in quality.

From my observation of the material used, and the manner in which this work is done, my opinion is that in quality or durability it is in no way equal to the pavement disturbed.

I have, &c.,
H. BROWNE.

W. M. Gordon, Esq., City Surveyor, *pro tem.*

Telephone Tunnel Construction Office,
Martin-place, Sydney, 29 January, 1896.

Sir,

In carrying on the work in connection with the construction of the telephone tunnel in Clarence-street, at the top of Barrack-street, and in Castlereagh-street, at the end of Moore-street, I have disturbed some tar pavement. Will you kindly instruct your men to repair the same, and charge the cost to the Telegraph Department and oblige.

I have, &c.,
GEORGE DONALD,
Clerk of Works, P.P.W.T.

To the City Surveyor, Town Hall, Sydney.

Dear Sir, 41 Wentworth Court, Elizabeth-street, 26 February, 1896.

As trustee of the Pitt-street portion of the Imperial Arcade, I desire to draw your attention to the subsidence of the footway in Pitt-street fronting it, caused by the tunnel which has lately been in progress in the street.

I have, &c.,
WALTER J. UTHER.

The City Surveyor, Sydney.

Consequent on that letter an arrangement was made by Mr. Donald with myself to have the matter pushed forward as soon as possible. Some difficulty arose as to the extent of the reinstatement. Mr. Donald contended that it was only necessary to do that portion immediately over the width of the tunnel, but I insisted that it should be extended right to the kerb, and, after consultation with the City Surveyor, who inspected the work, that was done. Some slight friction also arose in Park-street over several flags that were reinstated some time ago as to the extent of the renewal. Mr. Donald contended that it was only those flags in which the cracks were immediately visible that should be reinstated. I insisted that the reinstatement should extend further, and that the other flags likely to be immediately affected should be done. So it was opened up, and the City Surveyor inspected the work, and he also insisted that the reinstatement should be further extended, and state that, in his opinion, further extensions would subsequently

subsequently be necessary. But, in connection with these paving works, we only dealt with the parts immediately affected. I will now read a copy of reports in my letter-book relative to instructions received from the City Surveyor:— H. Browne. 18 Aug., 1897.

29 July, 1895.

I interviewed Mr. Grocock, and pointed out the necessity of restoring Pitt-street footways without delay. He informs me that they have to reopen in front of Exchange, and the work of reinstating the footway will be put in progress on Monday, 5th August.—H.B., 29/7/95.

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30 January, 1896.

Telephone Tunnel Construction Office, 29 January, 1896.—To restore footways, Castlereagh-street, at the end of Moore-street; Clarence-street, at the top of Barrack-street.

This refers to small tar-paved areas not referred to in arrangement with Mr. Donald, excepting Clarence-street, at the Coffee Palace, where the extent is considerable.

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20 February, 1896.

W. J. Uther, 20/2/96.—Subsidence, Pitt-street, Imperial Arcade.

This refers to a subsidence of granolithic pavement fronting Imperial Arcade, Pitt-street, caused by tunnelling works, about 6/1/96. Report furnished to C.S., 21/2/96.—H.B.

The following are extracts from my diary, the special instructions mentioned being instructions received by me from the City Surveyor:—

11 June, 1895.

Inspected with C.S. subsidence, Chambers & Co.'s tunnel, Pitt-street. Specially instructed to watch Pitt-street tunnel pavement.

7 March, 1896.

Arranged with Mr. Donald, Clerk of Works, Pitt-street subway, that new sandstone flagging be laid footway, Belmore Markets, throughout Pitt-street frontage, half cost of which will be charged this Department. Through telephone, Mr. Donald not having time for personal interview.

12 March, 1896.

I met Mr. Donald at Sacred Heart, E.T.D. tunnel just opened, and he agreed to pay half cost of new sandstone flagging along Sacred Heart frontage, 41 yards long. The old stone to be taken by the E.T.D. for use patching the other footway.

30 June, 1896.

At 10·30 called at tunnel works in Liverpool-street and Pitt-street, where E.T.D. were removing timber. Saw timber removed which was sound. The space between brickwork and timber was fairly well packed with ballast and fine earth and a few brick-bats. There were spaces between timber and packing, *i.e.*, interstices between ballast. Exactly similar conditions existed at openings fronting Criterion—timber sound and packing somewhat loose. All these openings are being filled with the same material as was removed, with a few additional loads of stone chippings and a little sand at sides where uprights are removed.

2360. Have you anything else you wish to read and put in? Yes; some certified copies of correspondence—certified by the chief clerk of the City Surveyor, in reference to various excavations, subsidences, and reinstatements.

City Surveyor's Office, Sydney, 26 July, 1895.

I, the undersigned, duly appointed City Surveyor, do hereby give you notice that, as a consequence of your operations in constructing a subway Pitt-street, the footway pavement has in various and several places subsided or otherwise displaced, and further that you will be held liable for any damage or accident that may occur by reason of the aforesaid conditions, also for all costs and charges incurred in the restoration of the footway pavement to my satisfaction.

For the City Council,
R. W. RICHARDS,
City Surveyor.

Messrs. Chambers and Grocock,
Contractors, Pitt-street Subway.

Chief Surveyor's Office, Sydney, 7 January, 1896.

Sirs,

Following my notice of 26th July, 1895, *re* condition of footway pavements of Pitt-street, I have the honor to request that you will be in attendance at Martin-place and Pitt-street to-morrow, Wednesday afternoon, 8th January instant, at 3 o'clock, in order that you may have pointed out to you works necessary for compliance with said notice, and that it will be necessary in the event of further damage for action to be taken in terms of said notice.

I have, &c.,
R. W. RICHARDS,
City Surveyor.

Messrs. Chambers and Grocock,
Builders' Exchange, Pitt-street.

MEMORANDUM.

From the City Surveyor, Sydney, to Messrs. Chambers and Grocock, Palmer-street North.

Town Hall, George-street, 10 September, 1896.

Sirs,

Following my notice of 26th July, 1895, and *memorandum of 7th †February, 1896, *re* subsidence over subway (telephone tunnel), Pitt-street, I have to inform you that further subsidences having occurred, you are hereby required to make same good within fourteen days from the date hereof to my satisfaction, failing which works necessary to restore footway will be carried out by this Department at your risk and expense.

*Letter. †January.

Yours, &c.,
R. W. RICHARDS,
City Surveyor.

MEMORANDUM.

From the City Surveyor, Sydney, to Messrs. Chambers and Grocock, Builders' Exchange, Pitt-street.

Town Hall, George-street, 9 February, 1897.

Sirs,

I have to request that you will proceed with reinstatement of granolithic pavement in Pitt-street, fronting Messrs. Richardson and Wrench's premises, subsidence having followed excavations made by your firm under contract with Telephone Department.

Yours, &c.,
W. M. GORDON,
City Surveyor, *pro tem.*

MEMORANDUM.

From the City Surveyor, Sydney, to Messrs. Chambers and Grocock, Builders' Exchange, Pitt-street.

Town Hall, George-street, 28 May, 1897.

Sirs,

I beg to inform you that gateway entrance to premises in Pitt-street, Nos. 72, 74, 76, and 78, known as Vickery's Buildings, having subsided consequent upon works carried out by you in the construction of telephone tunnel, that unless necessary repairs are effected to my satisfaction forthwith, same will be carried out by the City Council at your risk and expense.

Yours, &c.,
W. M. GORDON,
City Surveyor, *pro. tem.*

MEMORANDUM.

H. Browne.

18 Aug., 1897.

MEMORANDUM.

From the City Surveyor, Sydney, to Messrs. Chambers and Grocock, Builders' Exchange, Pitt-street.

Sirs, Town Hall, George-street, 11 June, 1897.

Consequent upon your failure to acknowledge receipt of, or to comply with the requirements of my letter of 28th May, ultimo, *re* gateway entrance to premises Nos. 72, 74, 76, and 78, Pitt-street, I beg to inform you that the necessary work will now be proceeded with at your risk and expense.

Yours, &c.,
W. M. GORDON,
City Surveyor, *pro. tem.*

I have here a *précis* of the arrangement entered into by Mr. Donald and myself in connection with the reinstatement of pavements throughout the line of tunnel:—

My first association with the section of tunnel under notice occurred through an appointment made through the City Surveyor (Mr. R. W. Richards) to meet Mr. Donald and inspect the length of pavement to be disturbed by operations of the Electric Telegraph Department.

This we did, taking the first section from Moore-street to Bathurst-street, noting the broken and cracked flags, also material and general condition of pavements throughout where sandstone paved areas were too badly worn to relay, and the Caithness and bluestone were cracked to any extent.

I at first proposed that new pavement be substituted, two-thirds ($\frac{2}{3}$) of the cost of respective material be charged to the Electric Telegraph Department.

After some discussion, and a consultation with the City Surveyor, this was reduced to half ($\frac{1}{2}$), and the arrangement then stood—where existing pavement was sandstone, Caithness flagging be substituted, and half cost of sandstone be charged to the Electric Telegraph Department; and where Caithness or bluestone was cracked, half cost of renewal be borne by the City Council.

Throughout the discussion upon this matter, Mr. Donald evinced a decided keenness in conserving the interests of his Department, whilst I, of course, was bound to see that the City Council was under no disadvantage. However, the arrangement might be regarded as a fairly equitable one for both sides.

Our inspection was subsequently extended to Gipps-street, existing arrangements in *re* flags to continue.

Excepting over tar paved areas, which were to be renewed throughout, the whole cost to be charged against the Electric Telegraph Department.

This was done after allowing to stand as long as possible to consolidate. During progress of this work heavy rain set in and caused a subsidence of considerable extent over pavement then in progress. This was made good partly by contractor and partly by employees of the Electric Telegraph Department, they filling in places and restoring the tarred metal, the contractor rectifying same when he came to lay top-dressing.

Some friction arose as to the ownership of old flags, Mr. Donald contending that as the Department paid half cost of new flags they were entitled to some of the old flags to replace others that were broken in course of removal.

After some discussion this point was conceded with regard to the Caithness, they being allowed possession of a portion.

South of Hay-street, glazed tiles were met with; and as the City Council then had a contract for laying Nepeonic pavement, I pointed out to Mr. Donald that this being "monolithic" in character, extending to the solid foundation on either side of the tunnel, it would be less liable to be seriously affected by the subsidence following the ultimate consolidation of the filling. This Mr. Donald agreed to, and where glazed tiles formerly existed Nepeonic pavement was substituted, the Electric Telegraph Department paying proportionate cost of relaying tiles—one shilling and three pence (1s. 3d.) per yard—that being the ascertained cost of this work. Fronting Belmore Park footway was tar-paved, and fronting the Convent paved with sandstone.

Nepeonic pavement was laid in both these sections, the Electric Telegraph Department being charged the proportionate cost of tar paving fronting Belmore Park frontage, and half cost of sandstone in front of the Convent. A special condition was here made by Mr. Donald that they be allowed the old flags to repair other places.

All old flags were relaid by the Electric Telegraph Department at the beginning of the work of relaying sandstone flags. I took exception to the uneven and unsightly condition of the surface. The inequalities of the flags were then roughly chiselled over. I again pointed out that this work was still very unsatisfactory. This then resulted in the surface of all flags over sandstone paved areas being thereafter re-dressed, it being my contention that this should be done.

Shortly after the tunnel was completed at the Imperial Arcade and Criterion Theatre the condition of granolithic pavement indicated a subsidence over tunnel. Here again some friction arose as to the extent of renewal, I insisting that same be extended the full width of the footway. This was done. At the Criterion Theatre Mr. Donald was only willing to renew two or three flags then cracked. I pointed out to him that other portions were affected, and when the flags were removed he consented to the extension of renewal as requested.

In each of these cases Mr. R. W. Richards, the City Surveyor, inspected the pavement, supported my contention, and stated that later it would be necessary to further extend said renewals. Earth under these flags had only subsided a couple of inches—not nearly so much as under those recently removed. At the gate-way leading to the Civil Service Co-operative Stores, Pitt-street, Messrs. Phillips, Rhodes, & Co. connected a ventilating-shaft across line of tunnel—and after the crossing was relaid heavy rain came on, and it subsided. The bottom was then ballasted, cubes relaid, and one-third cost charged to Phillips, Rhodes, & Co., and two-thirds to the Electric Telegraph Department.

Some friction again arose as to the pavement fronting Mr. Mitchell's premises in Clarence-street, the gateway entrances being paved with bluestone cubes and large bluestone runners. These were removed by the Telegraph Department to their own yard. I inquired why they had been removed, and Mr. Donald informed me that as the Department undertook the responsibility of repaving the footway, he was entitled to what came out of it. I pointed out that the material removed was the property of the City Council, and of greater value than the pavement proposed to be laid, and must be returned to the Council. Mr. Donald then stated that if this was done he would not do anything towards paving this area. I stated that it would be cheaper for the Council to take the material and pave it themselves than sacrifice same to the Government. The greater portion of the material was returned to the Corporation Depôt, and the City Council took the Caithness flags that were left and laid sandstone flags.

All paving works on sections other than Pitt-street were executed by the Electric Telegraph Department without reference to the City Council. The old tar-paved material being removed, broken, and re-tarred at Martin-place, I understood from Mr. Donald that the screened portion was to be used in the top-dressing. I informed him that such could not be accepted. He stated that as it came out it was fair that it should be returned. I insisted that such could not be used, only in the bottom course. He then informed me that I need not trouble as the best material would be used. The first portion of the top dressing of this pavement was laid too thin, and the material was laid too soon after mixing. This was inspected by Mr. W. M. Gordon (Acting City Surveyor) at my request, and pointed out to Mr. Donald. No addition was ever made to the thickness of top dressing complained of. I had again to report to the Acting City Surveyor that the reinstatement of tar paving in Kent-street was not satisfactory, a strip being left alongside the buildings. I also pointed out to Mr. Donald that the strip as left could not be accepted, as it would dam back the water behind the joint to the inconvenience of pedestrians, and cause unnecessary percolation of water into the filling. Some correspondence ensued in *re* this matter, but it remains as at first laid, and subsequent reinstatements were continued upon the same lines. In all business relations with Mr. Donald upon these matters he was particularly careful to economise the expenditure of his Department even at the sacrifice of satisfactory reinstatements, and when any reference was made to the unsatisfactory methods adopted in reinstatement, and further contingencies consequent thereupon, he always stated that the Government were there to make good when required.

At the request of the Postal Department, the usual 10 per cent. charged for supervision was eliminated from all accounts.

These are a few additional letters—communications between Mr. Donald and myself:— H. Browne. 18 Aug., 1897.

Dear Sir, Telephone Tunnel Construction Office, Martin-place, 30 December, 1895.

I will be much obliged if you can make it convenient, at an early date, to go over the pavement with me, as agreed upon by us a few weeks ago, so that we may come to some arrangement about the broken and worn flags which will be disturbed by the excavations for the telephone tunnel.

I am, &c.,
GEORGE DONALD.

Mr. Browne, Inspector of Pavements, Town Hall, City.

The following is my memorandum written on the back of that letter:—

Attended to.—H.B. Inspected various areas in Pitt-street with Mr. Donald, and arranged what should be removed. Met Mr. Donald with the City Surveyor, and he arranged that the Government would pay half cost of sandstone where pavement was sandstone, and half cost of Caithness where pavement was bluestone or Caithness.—H.B., 31/1/96.

MEMORANDUM.

From the City Surveyor, Sydney, to Mr. Browne.

20/4/96.

STATE of footway, Pitt-street—gateway entrance to premises 78, E. Vickery and Son; gone down about 6 inches; instruct and see that Chambers and Grocock restore to satisfaction.—R.W.R., C.S., *per* P.H.M., C.C. Attended to by Chambers and Grocock.—H.B., 21/4/96.

Dear Sir, Martin-place, 7 January, 1897.

A letter has been sent to Mr. Walker, the Engineer-in-Chief of the Department, by Curtis and Barry, of 167, King-street, wanting to know how it is that that the pavement in front of their place is not finished, &c., &c.

When do you think you will get it done? Please let me know, so that a reply can be sent to Curtis and Barry. It is the piece just below Elizabeth-street.

Yours faithfully,
Mr. Browne. GEORGE DONALD.

That letter refers to a portion in King-street. There was some delay. We entered into an arrangement with a contractor, and he was not prepared to proceed with the work at once, and a delay occurred through his not being able go on with the work immediately; but I think it was put in progress and completed within three days of the receipt of Mr. Donald's letter.

21/6/97.

FOOTWAY, Pitt-street, where opened, was filled in by the tunnel employés, contrary to the instructions of the Mayor.

Filled with clay and stone chippings, several loads of which were brought to make good deficiency in the material excavated, *i.e.*, where cavities formerly existed.

23/6/97.

FOOTWAY in Pitt-street, fronting "Criterion Hotel," opened at 9 a.m. Cavity 6 inches deep under surface of granolithic pavement. Opened in the presence of W. M. Gordon.

That was the first movable granolithic flag we took up. It had subsided about 2 or 3 inches, removed 10 inches, and in the presence of Mr. Gordon it was reopened prior to the excavation being made there.

Sir, Telephone Tunnel Construction Office, Martin-place, 6 May, 1897.

Will you be good enough to allow the bearer to select lengths of bluestone kerbing for the purpose of relaying those pieces cut away where the telegraph posts were standing, and oblige.

Yours, &c.,
Mr. H. Browne, Inspector of Pavements. GEORGE DONALD,
Managing Clerk of Works.

I had arranged with Mr. Donald verbally that the price should be 3s. per foot. A man first brought a verbal order, and I said that he would have to bring a written order. He did so, and I minuted that the price should be 3s. per foot, and Mr. Donald wrote the following upon the order minuted by me. The material was supplied upon that:—

Price, 3s. per foot. Will Mr. Donald please add that he agrees to this price? Greatly oblige, &c.,
H. BROWNE.

As you have asked 3s. per foot I have not cavilled at it, and would not dispute it when your account is sent in. I have not been asked for this sort of thing since I have been sending orders for anything to any person from whom I wished to purchase materials. Are you asking too much, or is it a fair price? Have you any reason to think I would dispute a fair price, whether it had been named or not?

If I had not been willing to pay 3s. per foot I should not have sent this order.

GEORGE DONALD.

2361. Have you anything else? Only some reports as to the quantity of filling used in one of the Pitt-street sections.

2362. What do you mean by the quantity of filling used in one of the Pitt-street sections? The number of loads between Bathurst-street and Market-street—the amount of filling used up to the completion of that section. These are the reports furnished to us, but the measurements, &c., are only approximate. They were made by a Council employee named Wadsworth; but he does not vouch for the absolute accuracy of the measurements, but he will vouch for the absolute accuracy of the number of loads stated. He was looking after the work for the Council. This filling was done recently, after the removal of the timber:—

(1.)—6th July, 1897; Pitt-street, at Congregational Church.

Opened hole 10 x 8 x 5½; took out two lengths of timber; packing bad; hollow under roads; four loads extra filling required.

7th July, between 290 and 280½.

Opened hole 60 x 7 x 3 to top of boards; joints of timber about 1½ inch wide; packing very bad under; hollow spaces; packing consisting mostly of lumps of ballast and clay.

Filled in and completed on 8th July; took fourteen loads of extra filling; not well rammed, and no ramming down sides of tunnel.

(2.)

H. Browne.

18 Aug., 1897.

(2.) 8th July, opposite 280½ and 278.

Opened hole 38½ x 7 x 2 ft. 9 in.—Joints of timber 1½ inch apart. Inspected by Mr. Donald, Messrs. Hennessey, Gummow, Cardew, H. H. Browne (Inspector of Pavements and Acting City Surveyor), also Alderman J. C. Waine. Packing fairly good, consisting of small ballast and clay fillings alongside of bearers; there were hollows all along length thereof.

This section was finished on 9th July, and took fifteen loads of extra filling and two loads of sand; seventeen loads.

(3.) Pitt-street, opposite 276 and 274.

Opened hole 20 x 7 x 2 ft. 9 in.; joints of timber about 1½ inch apart; inspected by Messrs. Donald, Hennessey, Cardew, H. H. Browne, Alderman Waine, and Acting City Surveyor. It was found on lifting the timbers that there was scarcely any packing, about half-a-dozen small pieces of ballast being between two of the bearers. Looking southerly underneath gateway entrance to M'Intosh there appeared to be hollow places.

About 6 o'clock in the evening the gateway entrance was opened; the joints of timber were about 1½ inch apart. Size of opening made, 12 x 7 x 3; under the timbers, vacant spaces varying from 3 inches to 14 inches were found; Mr. Hennessey was present and measured depths of some; it was twenty minutes to 8 in the evening when this opening was finished.

To complete section opposite 276 and 274, another hole, 5 x 7 x 3 was opened. It took sixteen loads of extra filling to complete the above trenches.

(4.) 9th July, 1897.

Opened hole opposite 266 Pitt-street—30 x 7 x 2 ft. 9 in.; took out six lengths of timber and seven pieces of 9 x 3; packing under longitudinal timbers was fairly good, only hollow alongside bearers being found.

This hole took eight loads of extra filling to bring up to level of flagging.

In the hole opened between Washington Soul's premises, 268 Pitt-street, hollows of 4 to 5 inches existed below timber near bearers. The timbering was removed and running parallel with the kerb other timbers were found which when removed, exposed a hole 9 inches wide, 4 feet long, and 2 ft. 3 in. deep. This being at the gateway entrance was quickly filled.

Eight loads of extra filling were required to complete this section.

252 and 254 Pitt-street. 15th July, 1897.

Eleven lengths of boards; joints varied from ½-inch to 3 inches; packing hollow alongside 9 x 3 bearers; length about 50 ft. x 7 ft. x 3 ft. 6 in.; excavated down side of tunnel 18 inches deep, and put down bar in several places; took one load of gravel and twenty loads of extra muck; twenty-one loads.

South side of gateway at No. 252 to north side of gateway National Buildings.

16th July, 1897.

About 48 ft. x 7 ft. x 3 ft. 6 in.; removed ten lengths of timber; spaces between ½ inch to 2 inches; packing fai , excepting at cross bearers, hollows 3 inches to 4 inches thereat.

Mr. Greenwood present; twenty loads of extra filling required.

South side doorway No. 248 to south side of Inglis' Sale-yards.

30 x 7 x 2 ft. 6 in.; seven lengths of timber moved; spaces of ½ inch to 3 inches; packing fairly good; also excavated down sides to spring of arch and rammed it well; thirteen extra loads and one load of gravel required to omplete; fourteen loads.

Opened from north side of Inglis' gateway to 240 Pitt-street. 19th June, 1897.

67 ft. x 7 ft. x 2 ft. 6 in.; spaces of timbers ½ inch to 2 inches; packing hollow in places alongside 9 x 3; service pipe disconnected; leakage had removed in solution packing to depth of 6 inches below boards equal to about one load of muck; excavated alongside of tunnel and drove down bar and filling appeared solid.

Required two loads of gravel and thirty-one loads of muck; thirty-three loads.

189 cubic yards excavated.

68 cubic yards required to fill up.

About 33 per cent. additional.

(5.)

The hole at Criterion Theatre took fifteen loads of extra filling up to 10th July, 1897.

12th July, 1897.

Five more loads were put in to complete level of footway; fifteen loads.

At the opening in front of 270 and 272 the hole was about 36 x 7 x 4 ft., out of which seven lengths of boards were taken and eight pieces of 9 x 3; the hollow spaces varied from 3 to 5 inches, and thirteen loads of extra filling were required.

12th July, 1897.

Opened hole at north-east corner of Bathurst and Pitt streets, and took out five lengths of timber; packing below timber was good; size of hole, 18 x 6 x 4 ft 6 in..

13th July, 1897.

Seven loads extra were required to complete.

20th July, 1897. Opened 66 x 7 x 2 ft. 6 in.

From No. 238 to 234.—Took out fourteen lengths of timber. Half-inch to 2-inch joints.—Packing in places being very hollow, being 6 to 9 inches deep. Select Committee viewed. Excavation only 12 inches from face of building-line Nos. 238 to 234; fifteen bearers; thirty uprights. Two loads of gravel and twenty-six loads of muck; twenty-eight loads.

21st July, 1897. Opened 50 x 7 x 2 ft. 6 in.

Thirteen feet northerly of Kiss' to No. 234. Eleven lengths of timber; joints, ½ inch to 3 inches. Five lengths of packing fairly good; six lengths 4 to 6 inches hollow; eleven bearers and seventeen uprights taken out. Two loads of gravel and twenty loads of muck; twenty-two loads.

22nd July, 1897. Opened hole 39 x 7 x 2 ft. 6 in.

From No. 222 northerly, ten lengths of timber; eleven bearers and twenty-two uprights; packing fairly good. Eleven loads of muck and two loads of gravel; thirteen loads.

Opened opposite No. 216, 15 x 7 x 2 ft. 6 in.

Four lengths of boards, joints ½ inch to 3 inches; very hollow in one place; 9 inches in places; four cross-bearers and eight uprights. Eight loads of muck required.

23rd July, 1897. Opened opposite Lyceum Theatre, 59 x 7 x 2 ft. 6 in.

Eleven lengths of boards; joints 2 inches; packing for five lengths the worst I have seen; from 9 to 12 inches hollow; rest fairly good. Mr. McCredie and Mr. Donald saw two lengths removed; eleven bearers and twenty-two uprights. Four loads ballast; thirteen loads muck, and two loads sand; nineteen loads.

27th July, 1897. South-side of Lyceum Theatre, gateway entrance, 13 x 7 x 2 ft. 3 in.

Three lengths of timber; four bearers; seven uprights; section fairly good except at bearers. Four loads extra.

28th

H. Browne.
18 Aug., 1897.

28th July, 1897.

Continued this section from the centre of No. 204 to the south side of Fenelly's Bazaar.
No. 198—60 ft. x 7 ft. x 2 ft. 6 in.
Twelve lengths of timber; twelve cross-bearers; twenty-four uprights from the sides; the packing in this section opposite Shepherd's seed-shop was from 3 to 4 inches hollow, also alongside of 9 x 3; Mr. Chamier present; packing composed of bricks, ballast, &c.; rammed sides to hand of arch. Two loads of gravel, four of ballast, ten of muck; sixteen loads.

29th July, 1897.

Opened from 8 feet on the north side of Fenelly's Bazaar, 38 ft. 6 in. x 7 ft. x 2 ft. 6 in. to No. 194; nine lengths of timber; nine cross-bearers; eighteen uprights; packing hollow in places; consisted of ballast, half-bricks, &c. Filled in with one load of gravel, four of ballast, and six extra of muck; eleven loads.

30th July, 1897.

Opened hole north side of Fenelly's Bazaar, 8 ft. x 7 ft. x 2 ft. 6 in.; removed two lengths of timber, two cross-bearers, and four uprights; packing fairly good. Two loads.
Lengthened hole, Pitt and Market streets, to 20 ft. x 7 ft. x 4 ft.; five lengths of timber; five cross-bearers; ten uprights; packing fairly good. One load ballast.

31st July, 1897.

Opened hole in Market-street at Bank; took out one length of timber, two cross-bearers, four uprights; this section a little hollow.
Opened crossing at National Buildings and laid concrete under tubes; did not extend concrete to solid formation on each side, but sloped edge of existing concrete a little at the top.
Opened at Inglis's and Kiss's; removed four lengths of timber, five cross-bearers, ten uprights from each packing a little hollow in places. Filled in with five loads of ballast and two loads of muck; seven loads.
From Bathurst-street to Market-street—total filling, 321 loads.

2363. *Mr. Bavister.*] As ballast is first mentioned on the 28th July, do you know whether that was the first time it was used? I do not know.
2364. Why did you take particular notice from the 1st July? I instructed Wadsworth, who was appointed by the Council, or directly by the City Surveyor, to remain on the works to note the character of the work done, and what the packing was like beneath, and that sort of thing; and he furnished a report to me of the general condition, as exposed, and of the nature of the work done in connection with the filling.
2365. Whose reports are those which you quoted? Those are extracts from Wadsworth's reports to me.
2366. *Chairman.*] What date was Wadsworth put on? I have a note in my diary—on the 1st July. "Wadsworth appointed to inspect tunnel, opening and filling works; divides his time between Goulburn-street and opposite the Criterion Theatre." Here is another note made by me on the 2nd July: "I called at the Criterion Theatre, where timber is being removed; saw Wadsworth, and requested him to particularly observe the condition of timber removed, spaces between timber and packing, and also between the boards; also quantity of material required to complete filling when timber is removed."
2367. *Mr. Bavister.*] In giving particulars on the 9th July, you said that the filling was to the level of the flagging;—with regard to filling up the excavation to the level of the flagging, I should like the Committee to know whether the flagging was not done at that time, and whether the space that is now or will ultimately be occupied by flagging was then occupied by earth? It was filled up to the level of the flagging, as stated in his report.
2368. Are we to understand the top or the bottom side of the flagging? It was filled up to the surface-line of the flagging. When the flagging was made in that particular section, the material was removed to openings further on, and was characterised in his report as a "remove," and is not embraced in the number of loads supplied. He was particularly instructed to note the difference between what we call a "remove" and a "load." If they had, say, seven loads of earth to remove from Soul's, they would not remove that off the works altogether, but would probably carry it lower down, and put into some other opening, and that in his report is called a "remove," and is not counted in the number of loads mentioned; these are only the extra loads brought there.
2369. *Chairman.*] You count the loads when they are brought there to be put in, and do not count again any that are removed to another place? No, we do not. If seven loads were removed from Soul's to Kiss's and put in, and if sixteen extra loads were required there, the return, as stated here, would be only sixteen loads. These loads are only approximate. Wadsworth does not vouch for the absolute accuracy of the quantity.
2370. I suppose they are box-dray loads? Yes. There might be a discrepancy of eight or ten loads, more or less. Wadsworth simply reports what he sees, and the same with regard to the measurements. He does not measure absolutely accurate, but the discrepancy in measurements would be trifling.
2371. The first papers that you read referred to what took place in 1895? Yes.
2372. Had Mr. McCredie charge of the tunnel works at that time? This is the only time I came in contact with Mr. McCredie in connection with the tunnel. This is a note in my diary of the 10th June, 1895: "Telephone report that subsidence had occurred at 'Exchange Hotel,' Pitt street, tunnel. Saw Mr. McCredie and Mr. Chambers. Inspected footway with them. Pointed out that although flags were broken they were in good order for traffic, and informed both McCredie and Chambers that where broken flags were disturbed sound flags must be substituted." They acquiesced.
2373. Do you know whether Mr. Donald at that time had charge of the work? I did not meet Mr. Donald then.
2374. You have generally to do with the flagging of the footpaths? Yes; subject to direction from the City Surveyor.
2375. Can you call to mind if any other tunnels have been put down in the city which interfered with the footpaths? Not in my time.
2376. None of the Water and Sewerage Board tunnels? Yes.
2377. Well, that is in your time? Yes; they have tunnelled. Invariably they open the footways, and if they tunnel at all it is when they come to granolithic pavement, or something of that kind, which is very expensive to reinstate, and they then tunnel under that section.
2378. Have you had any similar work done by the Water and Sewerage Board to the work done in connection with this telephone tunnel? No.

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2379. Do they, as a rule, carry out their work with open cutting when they come so close to the surface? In all cases. If they tunnel at all, it would be under the woodblocks, or something of that kind.
2380. Where they have tunnelled, have you had any trouble with the footpaths? There have been slight subsidences on the footway over their cutting sometimes, consequent on the consolidation of the filling, and it has been necessary occasionally to call their attention to the necessity for more care being exercised in ramming.
2381. Have those subsidences to which you referred been extensive? No; an occasional flag. They are dealt with by telephone. We invariably telephone to the Department, informing them that a subsidence has occurred, and they have it dealt with. In cases where reinstatement of footway is necessary over their works, they send a requisition to the Council, and we execute the work by contract, except in small repairs which only require a little stuff round a hydrant case. Those they execute themselves; also relaying of flags.
2382. You referred to Mr. Donald and to your relations with him;—I suppose you always found him willing to do any work you wanted done? Generally he was, but there have been exceptional cases when he was not so willing. As an illustration, I may say that he was not willing to do what I requested in Clarence-street. He also declined to do what was requested in Kent-street. A top-dressing was made in Clarence-street. Our specification states that it shall be an inch. Mr. Gordon and I tested it in places, and in some places did not find half-an-inch. The foundation course was not laid to an even surface, and consequently the thickness of the top dressing would be variable. Unless the thickness is uniform for wearing purposes it is not satisfactory, because when the top-dressing wears off half-an-inch in one place it would leave the metal protruding, and that would give an irregular surface.
2383. All the work that you have described in your papers to-day as filling has been done by the Telegraph Department? Yes; the whole of it has been done by them.
2384. At your instance? I never in any way directed them at all in connection with filling.
2385. It has been done by the Telegraph Department itself? Yes, entirely.
2386. Do you of your own knowledge know anything of the opening made in Park-street? Yes; I was present when it was opened.
2387. You are not a civil engineer? No.
2388. You can only describe what you saw? Yes; exactly what I saw.
2389. Will you describe shortly what you saw in Park-street? When the opening was made I had charge of the men, who were making it, and I directed them to drill holes in places to ascertain what cavity there was between the filling and the concrete. By "filling" I mean natural earth below. It was evident, from the vibration caused by the traffic, that there had been a very extensive subsidence. The holes were drilled, and they exposed a cavity of considerable extent. Each of the holes showed a cavity, and in some it was deeper than in others. On the north-western corner of the opening it was the deepest. When the holes had been broken through, I sent for the City Surveyor to come and determine what should be done further. The opening had been made under instructions from him. He inspected it, and I think that he asked the Mayor to look at it.
2390. I want to know what depth of opening you saw, and what was the appearance when you opened it? It appeared as if the whole thing had subsided over the line of tunnel—that there had been a fissure in the earth on the east side—on the Woolloomooloo side of the opening.
2391. That would be the left side looking up towards Hyde Park? Yes. The fissure there extended right into the inside of the cutting, and the whole of the earth there had apparently subsided.
2392. Did you measure the depth of the space? I did not.
2393. Have you any idea what it was? It extended from 5 inches in some places down to 18 inches.
2394. *Mr. Robert Jones.*] How were those holes made? With a pick and hammer—simply broken through.
2395. *Chairman.*] They were gad holes, I suppose? Yes.
2396. *Mr. McGowen.*] At the time you made those holes in Park-street, were the Electric Telegraph men working in front of the "Criterion Hotel" pulling out the boards and filling in? Not at that time. That had been done, and the work was suspended at the time those holes were made, if my memory serves me rightly. It had been opened and filled in, and the men were working in a southerly direction from there, I think, although I am not quite clear on the point.
2397. You are not quite sure whether the men were working immediately in front of the "Criterion Hotel" at the time you started the work in Park-street? I am not sure, but I think not.
2398. *Chairman.*] Now describe what took place after you made the opening? We made the opening, and then sunk down on to the haunches of the arch and down to the sides of the tunnel.
2399. What do you mean by sunk down? We removed the whole of the earth from the opening down to below the springer of the arch, and we found there that the sides were filled in with clay and soil generally—a sort of regular mixture—fairly solid, excepting in one place which was hollow. We drove the bar down there, and at the uprights the earth had not been cut out exactly to fit the uprights, and there were slight hollows down the side of the uprights.
2400. Were you present when the Committee examined that place at Park-street? Yes.
2401. Except where the actual opening had taken place, had there been any serious change from the time the street was opened until the time when the Committee went there? No change.
2402. Then, excepting where the opening took place and you excavated to get down to see what the packing was at the sides of the tunnel, the Committee saw it in its natural state? Excepting that down the sides of the tunnel, a little earth had run down and been trampled upon by the men working there, practically it was in its natural state, excepting that the cross bearers may have been depressed perhaps an extra half-inch—the cross bearers that support the laths on the top.
2403. How would they be depressed—from the weight on the top? Yes. The fact of cutting the hole in the earth would throw all the weight on the upper bearers at each end of the opening.
2404. Were you present when the trouble took place between the telephone labourers and the Mayor? No, I was not.
2405. Do you know why the Mayor went for the police? I do not.
2406. Are the men from the Telegraph Department at work now opening the top and taking out the timbers? Yes; on the contract section now.
2407. Have you anyone there examining the work? I have.

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2408. The same man? Yes; the same man. His section extends to Spring-street. They started at Bridge-street and worked southerly. They started two gangs recently—I think on Monday—and I sent an extra man to the lower side—that is to say, there will be two men there this week.
2409. Are they taking out all the timber? Most of it.
2410. Have you had any reports as to inferior quality of the timber? Reports generally say the timber is fairly sound.
2411. Have you much subsidence in the footpaths and other parts of the city where there is no tunnelling of this kind, but where there is laying down of pipes and that sort of thing? Very little.
2412. Have you anything like you have had in this case? No.
2413. Have you ever had anything like you have had in this case? Not within my experience.
2414. How long have you been there? Since 1892.
2415. *Mr. McGowen.*] Of course, you are a practical man? Yes.
2416. You are foreman of stonemasons? Yes.
2417. Are you a stonemason yourself? Yes.
2418. And a builder? I have been.
2419. In what way did this tunnelling that was being done by the Post Office authorities come within the scope of your duties? In so far as the reinstatement of footways was concerned.
2420. You had to see that if there was any subsidence affecting the flagging of the pavement, they made it good? I was to see that the same was put in good order, and that the Council was put to no expense in connection with it. I had special instructions from the City Surveyor to be particular on that point.
2421. With regard to any interference with the footpaths, it was your duty to see that they were made good by the persons who were making the excavations under the footpaths? Yes; or the gully shafts. In this case some of the gully-shaft connections were disturbed or altered, and it was necessary for me to go down the tunnel to see how the connections were dealt with.
2422. Therefore, your special duty in regard to the footpaths was to see if there were any subsidences affecting them, that the persons who were making the excavation made the footpaths good? My special duty, as I understood it, was in connection with the reinstatement of the footways, and in connection with all the surface works consequent thereupon. Below the surface I did not consider I had anything to do with. I considered that the responsibility of that rested entirely with and upon the Department who were executing the work.
2423. Below the surface you thought you were not asked to express an opinion? I was not asked.
2424. All this work had to be done subject to your approval? Subject to the approval of the City Surveyor. I acted under his instructions.
2425. But if you had sent in a report to the City Surveyor that the pavements had been made just as good as it was in its original state the City Surveyor would have approved of it? Very likely. He might decide to inspect it himself; he frequently has done so.
2426. An invariable custom with you, I suppose, in cases of this kind, is only to ask the persons who have been the cause of the depression to make the work just as good as you would do with your own officers? Precisely so.
2427. You never ask them to do any more than you would ask your own officers to do? Certainly not.
2428. In answer to Mr. Lyne you stated that you never had much difficulty in regard to any interference with your footways so far as the Water and Sewerage Board were concerned—in your experience of the Water and Sewerage Board and the Hydraulic Power Company and any other Company that have been making any excavations under the pavements you have always asked them to make the pavement good? Certainly. There has been some friction between our department and the Hydraulic Power Company, consequent upon my demands in that respect, and they have been invariably acquiesced in.
2429. Did the Hydraulic Power Company ever contend that you were asking them to put in a better pavement than the original pavement was when there was a depression? They did on one occasion contend that my request was somewhat unreasonable. A consultation with the City Surveyor ensued, with the result that my request was withdrawn, or perhaps not actually withdrawn—it was not carried out by the Hydraulic Power Company.
2430. You referred in some of your papers to the depression of the pavement in that portion of the tunnelling done by contract, and said that the contractor had made it good; in how many cases have either the contractors, the Hydraulic Power Company, or the Water and Sewerage Board complained that you have asked them to do too much? I think the contractor complained once, and his complaint had reference to the broken and cracked flags. It frequently happens that a flag may be cracked or broken into ten or twelve pieces—a large flag may be broken into more—but it still presents a perfectly smooth and even surface, because the bottom of it is sound and solid, and it may remain in the condition and be equally good as if it were a sound one, but once you disturb the bottom you cannot possibly put those pieces back. It is the same with sandstone; where the surface of the stone is worn uneven you cannot get that to go back into precisely the same position.
2431. Did you not say, in answer to Mr. Lyne, when you referred to, I think, a case in Spring-street, that you asked the contractor to make the broken flag good? The whole of them.
2432. The whole of the broken flags good? I requested that they should make good all that would not lay solid. That had reference to the small pieces. Of course, if you had a flag 6 feet square, and if it were broken into two pieces, those two pieces could be put back satisfactorily, and it would be unreasonable to ask for that to be made good by substituting a new flag.
2433. You would not ask the contractor to make that good? No.
2434. In dealing with Mr. Donald, did you take up exactly the same position? Precisely.
2435. Does it not appear from some of the reports you have submitted that a question arose between Mr. Donald and you that you were asking him to put in new flags where flags had not been broken? No; not in my papers. The arrangement with Mr. Donald was that where the flags were badly broken same be renewed, and it would probably have cost his Department more than a moiety of the cost of the renewal to put them in order. It was an advantageous arrangement for them, and a satisfactory arrangement for the Council—an equitable one for both sides—the arrangement with me being precise and distinct. Where existing pavement was worn or broken, new pavements should be substituted, and they should pay half the cost.

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2436. You mentioned that Mr. Donald was "keen" in looking after the interests of his Department;—did you ever say to any of the officers above you that you had got considerably the better of the Government with regard to making the pavements good? I do not think so. I have no recollection of having ever made such a remark. I have said, in connection with the reinstatement, that the sandstone paved areas were very satisfactory. I told Mr. Donald that I thought that they were, if anything, somewhat better than they were before they were disturbed.

2437. Did you ever mention to any of the Council employees, either subordinate or superior to yourself, that you were enabled to save to the Council some thousands of pounds, or a thousand pounds, or any amount of money, by getting the better of Mr. Donald? I have no recollection of ever making any such assertion. I think it very improbable that I would.

2438. You do not think that you made it? I do not. If I said anything of the kind I may have remarked that the reinstatement of these footways, if they had been executed by the Council, would have cost £1,000.

2439. *Mr. Cann.*] I suppose you would save that amount if you got the chance? I do not know that I would. My instructions always have been to deal fairly, not only with the Government, but also with the public, and to see that the Council labour under no disadvantage, but not to take any undue advantage of anyone. That is distinctly understood in the Department. In fact, where anything can be economised for the public, in a matter of reinstatement, we are instructed to do so; and a similar rule would hold good in regard to the Government.

2440. *Mr. McGowen.*] You grasp the meaning of my question? Quite. I never said I got the better of Mr. Donald to the extent of 1s.; I am positive as to that; in fact I do not consider I have. The arrangement has been a fairly just and equitable one for both sides. Mr. Donald throughout has evinced a desire to save for his Department whatever he could wherever he could, and directly it became a matter of outlay he has refused to acquiesce in our request made to him.

2441. When you used the expression that Mr. Donald was very "keen," that implied you thought that he was getting the better of the Council in the interests of his Department? What I meant by that was, that he did not want his Department to do more than he could possibly help. In other words, if I had not insisted on a specific arrangement being entered into, he would have been quite willing to allow the Council to go to the expense of reinstating the whole of the footway.

2442. In other words he would have been perfectly willing to allow the Council to suffer a monetary loss through the work of the Government Department? That is what I think.

2443. That is your opinion of Mr. Donald? My view of him is that he would save wherever he could; and in every discussion we have had, whilst being comparatively fair, he has always tried to get the better of the bargain.

2444. And, on the other hand, you yourself never desired to get anything more than what was fair? I do not think so.

2445. You know where the day-labour started in regard to this tunnelling? Yes.

2446. It was in Pitt-street? Yes; it started from near the General Post Office.

2447. Are you a member of the Builders' and Contractors' Association? I am a member of the Association, but I have not taken any part in their proceedings for nearly the last ten years. I am still a member of the Association, but have never taken any part in any way in connection with their proceedings as an association for ten years past.

2448. Have you ever expressed, either publicly or privately, an opinion with regard to day-labour on Government works? I do not think I ever expressed any opinion upon it.

2449. Neither favourably nor as opposed to the system? I cannot recall ever having done so.

2450. In one of your reports you stated that you were specially instructed to watch the work in Pitt-street? Yes.

2451. That was day-labour work? I think that before the day-labour work began I had distinct instructions from the City Surveyor as to the work in connection with the restoration of the footways there.

2452. I am now referring to your notes, "specially instructed to watch the work in Pitt-street"—mentioned in one of your papers? I think that was in June, 1895—that is before the day-labour work began—"specially instructed to watch Pitt-street tunnel."

2453. Why were you especially instructed to watch this work? Because, in consequence of subsidences during the progress of the work, the flags became irregular. In driving the timbers they sometimes forced one flag a couple of inches above another.

2454. That was during the contract works? Yes; and also during the day-labour works. The special instruction I noted was the first I received.

2455. In how many cases of the contractors' work did you ask them to make the flagging good? On several occasions. This was done by the Council at their cost, probably because they did not deal with the matter as soon as requested. At 92, Pitt-street we relaid 23 yards.

2456. You did not ask the contractors to do that? I believe they had been asked.

2457. But they did not do it? Apparently not.

2458. And the Council did it? Yes; they laid and relaid as necessary.

2459. In how many cases? At 92 Pitt-street; Pitt-street at Spring-street; Pitt-street at Exchange; Pitt-street 76, 78, 80, and 82.

2460. You can give us a list of the cases? That is a list of those we did. I cannot give you a list of the particular instances in which they have been requested to do so except in large matters. In going down Pitt-street, I might observe that a flag was disturbed and I might go to the other section and ask Messrs. Grocock and Chambers to send a man to attend to it, and they might do so at once.

2461. In all those cases you have mentioned the Council made them good? Yes, and the Council rendered an account to the contractors and they paid it.

2462. In one of your reports you reported with regard to the wisdom of using sand for filling in the sides of the tunnel? Yes.

2463. Did you make a report of that kind? I did not make a report. That was a matter between Mr. Donald and myself. I stated that cursorily to him.

2464. Is that in one of the reports you sent to your chief? Yes. In that paper I state that I had mentioned to Mr. Donald the advisability of so doing.

2465. You reported on the wisdom of using sand for filling in the sides of the tunnel? No. I reported that

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that I had mentioned to Mr. Donald the advisability of using sand for packing down behind on the perpendicular brickwork. I had merely mentioned that to him.
2466. Casually? Yes, stating that I thought it would be very much better—just in conversation with him; in fact, I think I have gone so far as to say it ought to bedone.
2467. How comes it that a casual conversation between you and Mr. Donald is reported by you to the City Surveyor? In that report, if you will allow me to read it again, you will see that I state that I had mentioned to Mr. Donald that this should be done.
2468. But this was not within your duties, was it? I do not think so.
2469. Were you asked to give that opinion by Mr. Donald? No.
2470. *Mr. Gordon.*] Having given that opinion to Mr. Donald, I considered it my duty to let the City Surveyor know that such had been the case.
2471. *Chairman.*] You desire to put in a plan? Yes; showing approximately the sections and areas of the footways disturbed by the recent operations in Pitt-street in connection with the removal of timber and the filling in over the line of tunnel, extending from Bathurst-street to Market-street. [*Appendix C.*]
2472. *Mr. Bavister.*] You were appointed to your position in 1892? Yes.
2473. What length of footway is under your charge? Approximately, 200 miles.
2474. Within what boundaries? Within the city boundaries.
2475. You have a number of men under your control? Yes. I should say that I have to control about 300 approximately. The number varies; sometimes it would be more, sometimes less. Of course there are gangers and sub-gangers.
2476. Is it customary for you to appoint a man specially to watch excavation work? I do not appoint a man specially.
2477. Is it customary for the City Surveyor, or any other authority under the City Council, to appoint a man to watch excavation work, or is it done only under exceptional circumstances? The whole of the circumstances in this case were exceptional. We have not had any similar experience.
2478. Has any person been so employed before? There has been no reason to do so before.
2479. Has there been any person so employed? To my knowledge—no.
2480. It has probably come under your notice that at the present time a water-main is being laid in College-street? Yes; in the roadway.
2481. In the case of any tunnelling work under the streets and footpaths, do the City Council take any special precautions? I cannot speak as to the roadways; they are under a separate department, with a separate head.
2482. Then it would be only excavations under footways that would come under your immediate notice? Yes.
2483. Then any subsidence taking place in a roadway, although due to a similar cause as one which might have taken place in a footway, would not come under your notice? If I observed it, I should report it to the City Surveyor, and it would be dealt with by the clerk of works who is in charge of roadways.
2484. But the matter would not be attended to under your direction or control? Not unless it were a specially urgent case, and were likely to be a source of danger.
2485. Ordinarily you would have no knowledge of the work? I should have no knowledge of it.
2486. You referred this morning in one of your reports to the desirableness of having all the cement tested, and a record made setting forth the persons by whom the test had been made, and the result, &c.? Yes; I said that, in connection with the work of reinstatement then being executed, I thought it would be advisable to ascertain the brand of cement used, whether it had been tested; if so, by whom, and what test it had undergone.
2487. Can you say what difference the testing of the cement used in the construction of the tunnel would make as regards subsidence or any other effect on your footpaths? My observation was made, not in connection with the tunnel work, but in connection with the reinstatement of the pavement. I did not refer in any way to the tunnel.
2488. Were you occupying the position you now hold when the portion of the tunnel between the Post Office and the Exchange was commenced? Yes.
2489. Do you know if any representations were made to the City Council, that, in the interests of the safety and the convenience of the public, the work ought to be done by tunnel;—do you remember any efforts being made to prevent the work being done by open cutting? I am not aware of any such representations being made.
2490. You have not yet given in any report as to what took place as regards the necessity for taking more material for filling in as regards that portion of the tunnel which was done by contract? The reports are sent in daily, but the section not being complete the returns have not been made up.
2491. Your latest report in that connection is dated the 31st July? The plan was prepared from Bathurst-street to Market-street, and the reports have been summarised up to that date.
2492. We may expect to have reports as to the remainder right down to the Exchange? If you require them.
2493. You informed the Committee that the Council had removed some Caithness flagging, and had laid in its place some sandstone flagging;—would the Council have allowed any contractor or other person to do that? It was a third-class street, and sandstone was the accepted material for that particular street. If a Caithness pavement had been disturbed by any other person it would have had to be replaced as a Caithness pavement. In this case, as far as I can recollect, there were two gateways, the entrances had fallen into desuetude, and the kerb was completed across the gateways by the Electric Telegraph Department. We supplied the kerb and they laid it.
2494. Then it is correct to state that in this particular instance the Council themselves put down an inferior grade of flagging to that taken up? No, that is not so, because most of the area of the footway to that frontage was occupied by gateways. That would be bluestone cubing and large bluestone runners. The value of the bluestone runners and cubing would be considerably in excess of the sandstone flagging. That material was taken up by the Council, however, and sandstone flagging was substituted. If the Electric Telegraph Department had had to replace that particular footway they would have had to replace it in the condition in which they found it. The Council might have been called upon to remove the gateways, and in that case the footway would have been paved with sandstone flagging.
2495. Is not Caithness flagging a more expensive material than sandstone flagging? It is about 33 per cent. dearer.

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2496. Then it is a fact that the Council did replace with sandstone flagging a footway which had been laid with Caithness flagging? Only a portion was laid with Caithness flagging.
2497. But where Caithness flagging was used sandstone flagging was substituted? Yes; the grade of material was adopted by the Council by resolution.
2498. Would a contractor be permitted to do the same thing? Certainly not; because the material the contractor removed would have been of greater value than that substituted.
2499. Will you tell the Committee on what date the first difficulty arose between yourself and Mr. Donald as to his compliance with any request you made? The first matter of importance that arose was in connection with the footway in Kent-street; but our first serious difficulty arose as regards Clarence-street. I should mention, however, that Mr. Donald, throughout, was always willing, in small matters, to fall in with our views. A request was made in connection with the redressing of the sandstone pavement. Mr. Donald acquiesced, and redressed the balance. Mr. Donald, throughout, always said that the Department were quite willing to do anything that was necessary in the way of reinstatement. There was simply a difference of opinion in some cases as to what was necessary. He and I differed as to what was really required. For instance, he might say, with reference to a certain piece of work, that it would do, whereas I might not think so. The correspondence began in connection with the Clarence-street and Kent-street footway.
2500. You say that Mr. Donald did redress the greater part of the sandstone flagging which was relaid? Yes.
2501. Have you known of a contractor engaged upon extensive relaying of flagging having it understood that he should redress the flags? We have never had contractors doing work requiring such extensive redressing.
2502. Have you known of contractors being compelled to redress a certain amount of flagging, large or small, when they have had to relay sandstone? If a contractor has left an area disturbed or in an unsatisfactory state, it is customary to write to him asking him to do what is required to the satisfaction of the City Surveyor. Failing his attention to the matter, the Council employ a man to do the work, and furnish the account to the contractor.
2503. In no case is a contractor compelled to redress sandstone flagging which has been otherwise laid to the satisfaction of the Council's officers? If he has not replaced the sandstone to the satisfaction of the City Surveyor, he is obliged to do so. If redressing is necessary, that also has to be done.
2504. Did you not say that you had never known a contractor to be compelled to redress sandstone flagging which he relaid? Contractors have not only been obliged to redress the portion disturbed by themselves, but they have been obliged to make good the flagging which has been cracked, failing which the Council do the work and charge the contractor.
2505. If a contractor after having disturbed the sandstone flagging has relaid it, and no person made any complaint, would he be compelled to redress it? The flagging must be relaid with a perfectly even surface.
2506. Have you known of any cases where the contractor has been compelled to redress the stone? We have had frequent cases where they have not done so, and have been called upon to do so. On their failing to do it the Council have done the work and have charged the contractor.
2507. But you have not found it necessary to take such a step as to send your men to redress the stone in connection with any work done by the Electric Telegraph Department? No; only in the case of subsidence.
2508. It would only be in exceptional cases? Yes.
2509. As a rule the Department has done what it has been requested to do? Yes.
2510. You spoke of a broken flag at the "Criterion Hotel," or near it? Yes.
2511. Was there a movable portion of granolithic pavement inserted for access by the hydraulic main? It was inserted for access to any main which might be laid there. The flag would be put in at the time the pavement was originally laid.
2512. Proper provision would be made for it at the time of the laying of the footpath originally? Yes.
2513. Are you aware that this particular flag was broken by a cask which was being delivered at the hotel? No; I was not aware of that.
2514. In speaking of the quantity of material used for the filling-in of the work since the Council had taken action, I should like to know how you got your quantities of the material? The quantity which I furnished here to-day was from the report of a man who is constantly on the work, and who notes the arrival of the material.
2515. How can he distinguish as to where it comes from? He can watch it coming out of one section and being put on to another.
2516. How could he arrive at a decision? From being on the spot all the time. My instructions were very precise. I said to him, "I do not want you to give me an approximate idea, in which later on a discrepancy may be found; I want a return of what you actually receive. If you are not absolutely clear about anything, do not put it in your report."
2517. Do you think the man could see where the material was loaded into the carts? No; he could only see that it came on to the work; he could not tell where the material came from.
2518. Were the carters Corporation employees? I do not know any of the carters.
2519. Your only means of arriving at the amount of additional material used in the refilling is from the opinion formed by this man as the loads were brought on to the works? From observation by him of material delivered at the site referred to in his report.
2520. Can you say whether the material was so different in appearance as to enable the man to say without doubt whether a given load was fresh material or not? I would take his opinion as being a reliable one.
2521. You acknowledge that there was so great a difference in the material as to render it easy for anyone to say whether it was removed stuff or fresh material? I should say that in most instances it was so; in some cases it might be doubtful. The length of a section referred to in a report for a particular day would only be about 60 feet.
2522. Can you say what interval of time occurred between the commencement of any particular portion and the completion of the filling over it? I could not say positively. In some cases it stood for a week, ten days, or a fortnight.

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2523. For how great a distance in advance of the flagging would the filling be completed? It might be 100 yards, perhaps.
2524. Could you give the Committee an estimate of the quantity of material that would be used in that 100 yards, having regard to the position which would be occupied by the flagging? No.
2525. What is the average thickness of the flagging? Three inches in some cases; in others, 2 inches.
2526. What is the thinnest of your hardstone flagging? It would go down to 1½ inch; the average would be 2 inches.
2527. What would be the average in the case of sandstone? From 4 to 5 inches.
2528. In what proportion would they exist;—how much of the thinner grade of the flagging would there be as compared with the thicker? I do not think I could state the proportion.
2529. Would the proportions be anything like equal? I should say not. In some cases certainly not. I should say there would not be more than 30 per cent. of the thicker stone.
2530. What do you think would be the average throughout the whole 100 yards? You might take it at 3 inches. I could furnish you, if you required it, with the number of loads taken from one section and put on to the other.
2531. Can you form an opinion as to what amount of material would be taken in place of the flags over the 100 yards of length? It would probably be excessive.
2532. Can you supply us with information as to what would be the contents of 50 yards of length? There might be ten loads approximately. There would be from ten to twelve loads, allowing for a depth of 3 inches.
2533. Is it not customary, in filling temporarily the position which the flags will afterwards have to take, to fill in the earth higher than the kerbstone to prevent tripping? In this case it would be on the same level.
2534. Have you made any calculation as to the quantity of timber taken out from these works? No.
2535. Mr. Wadsworth has devoted all his time to the progress of this work and has made daily reports since he has been there? Yes.
2536. Mr. McGowen asked you this morning some questions as to some statement supposed to have been made by you as to the saving effected by the Council;—are you positive that no such statement as that alleged has ever been made by you to anyone? I did not understand the nature of the question. What I understood him to say was: Did I ever say that I got the best of Mr. Donald to the extent of £1,000—that is, in the Council's favour?
2537. Have you ever stated to any person that you had by your conduct saved for the City Council considerable expense in having the footpaths reinstated? I am quite certain that I never stated that. I never said that by my conduct I saved the Council any such sum of money. If I referred to the matter at all, and I am not clear whether I did or not, I may have said that if the Council had had to reinstate the footways, it would cost them £1,000. I may have said that the reinstatement or renewal of footways by the Department would be worth £1,000 to the Council.
2538. You think that is a fair estimate of the advantage which the City Council gained? Assuming the City Council require to make no further outlay—assuming that they would not have to interfere with the footways or to bear any expense in connection with them—I should say that the value to the Council of the work done would perhaps be £1,000, or something like it.
2539. But you may have stated that the footpaths were in a better state, and that the Council had made a saving by means of the way in which the footpaths had been improved? I may have done so. I certainly stated, and I do now state, that the footways over the sandstone-paved area are in a better condition than before, assuming that there will be no future expense in connection with subsidences.
2540. Have you ever known contractors to leave sandstone flag footways in so good a condition as that in which these footways were left by the Postal authorities over the tunnel? In some cases, yes; in other cases, no.
2541. As a rule, would they be better or worse? As a rule, they would probably be slightly worse. If they were very much worse they would not be tolerated.
2542. Do you know when the Acting City Surveyor gave his evidence here? Yes.
2543. Did you have occasion to hurriedly bring in a note of some urgency while he was here? Yes.
2544. Had the note any reference to this work? It had.
2545. What was its purport? The Acting City Surveyor would remember; it was in connection with some opening which had been made. It was something which came under my notice, I think, after I left him that morning, and with which I thought he should be made acquainted. I now remember all the facts. It was in connection with an opening in front of new premises in Pitt-street, which were the subject of an action at law. I saw that the space below the boards was not solid; in fact, it was hollow. They were proceeding to fill up the opening and I asked them not to fill it up until they had instructions from the Acting City Surveyor. The Acting City Surveyor was informed that an opening had been made, and that there were hollows beneath the boards. I asked him whether I should allow the plumbers to fill up the opening or whether it should remain open until he had inspected it.
2546. Was that on July 25th? It was on the day on which the Acting City Surveyor was examined here.
2547. You say that the opening was made in front of premises in connection with which there was a law suit? Yes.
2548. Do you know how long previously the law suit took place? No.
2549. Were the hollows you saw of a serious nature? The flagging had been taken up in front of the premises by a plumber in connection with, I think, a gas-pipe. I did not know that a hole had been made until I happened to pass there.
2550. Is there not a by-law under which plumbers get a license, and are they not compelled to give notice to your officers of the opening of a footpath, and, indeed, obtain their permission to open it? There is such a by-law.
2551. Is that by-law in force? Yes; the requisite notice had been given in this case, but it did not come on to me.
2552. Did you see the opening made? No.
2553. It was made before you arrived? Yes; and it was being filled in.
2554. Do you think that what you saw was brought about by the plumbers in the carrying out of their work? I do not know what they did before I arrived. I can only state that under the boards there were hollow spaces.

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2555. Did they comply with your request that the filling might be delayed pending instructions from the Acting City Surveyor? Yes; it was left open until 1 o'clock.
2556. The men were quite willing to leave it open? Yes. I said that I would let them have an answer in a quarter of an hour, and at 1 o'clock they filled in the opening.
2557. Do you have any trouble with the plumbers and others in regard to the filling in and reinstatement of footpaths? There is continual trouble; letters are being written continually.
2558. The material which is used to complete this kind of work often forms the subject of a complaint on the part of your department, does it not? Yes.
2559. Plumbers and licensed drainers are the men with whom you have most trouble, I believe? Yes.
2560. Do the Water and Sewerage Board always give you notice of the openings they propose to make in the footways? Invariably, but there are exceptional cases of emergency, such as the breaking a pipe, where the Board attend to the matter themselves without giving any notice.
2561. Their permissions to open are very numerous? Yes.
2562. The Board apply to the Council if they are going to open any footway, I suppose? Yes. Sometimes it is done by communication on the telephone; sometimes it is done by one of their officers meeting me and making a verbal communication in that way. The man will say, "We are going to open so-and-so," and I would say, "Very well."
2563. In a case where they communicate with you by telephone, letting you know that they are going to make an opening at such-and-such a place, if the person who replies to them at your end of the line states that an objection exists, they must delay operations? Certainly. The rule is for them to write informing the Council of their intention to make an opening at such-and-such a place.
2564. The openings, consequent upon connections made by the Water and Sewerage Board, will, I suppose, with our increasing population, become more numerous each year? I think not. Most of their mains are laid. All the openings in connection with service pipes are done by plumbers.
2565. I see that there was a considerable increase in 1896? No; I think there was quite as much done in 1895, but I am not quite sure. The Board's openings were made principally for the renewal of mains or the substitution of larger mains.
2566. Do you think it likely that the openings made by the Water and Sewerage Board in 1895 were 570? I could not say, but I should not think there would be that number.
2567. Do you know that there were were as many as 660 made in 1896? Do you mean in connection with the Board's operations only?
2568. Here is the paragraph in the yearly report from the City Surveyor's Office:—"Again the Water and Sewerage Board have increased in the number of openings made, the total for the year ending 1896 being 660, as against 570 for 1895";—I suppose we may take that as being correct? Yes, undoubtedly; but that would probably refer to roadways, and that is a matter of which I have no cognisance. All the openings in connection with footways where notices are given are entered in a book connected with the footways department, and all the openings in roads are entered in the roadways department. There are, naturally, more frequent openings in the roadways, because most of the mains are laid there. On the other hand, the openings in the footpaths are extensive, because where it is necessary to attend to a break in a pipe, for instance, or to renew a main service, they probably go from one end of the street to the other.
2569. I think you said that no work ever done in the city, whether by contract or otherwise, had interfered with footpaths to so large an extent as had these Post Office tunnel works? Not within my experience.
2570. If the charges in connection with reinstatement amounted to £240 in the case of the Electric Telegraph Department, and to £349 in the case of the Water and Sewerage Board, would you consider that the Electric Telegraph Department charged by you with an amount greater in proportion to the work done than was charged to the Water and Sewerage Board? Undoubtedly; because the roadway reinstatement would be more expensive. For instance, there is the concrete to be laid, and then the wooden blocks, and it is necessary to wait until the concrete is set before the blocks can be laid. Most of the reinstatements in the case of the footpaths were attended to by the employees of the Electric Telegraph Department.
2571. If one of these amounts applied to the roadway, would not the other also apply to the roadway? I could not say.
2572. You said you thought the operations of the Water and Sewerage Board were not increasing;—do you think the openings made in footpaths by licensed plumbers are increasing? Certainly.
2573. Would you estimate that they now amount to nearly 1,000 a year? I could not say. I know that the number of letters which we have to write, directing attention to the necessity of more satisfactory reinstatement, are increasing in number.
2574. One paragraph in the Council's report for 1896 says:—"Insufficient ramming still maintains, following works prosecuted by licensed plumbers; consequently extensive subsidences take place after rainfall, rendering accidents probable";—I suppose that is correct; would that apply to footpaths? No; because in footpaths they do not go to the same depth—they rarely go more than 15 or 18 inches.
2575. Do they cut through the kerb or go under it? They go under it.
2576. What is the depth of your kerbing? From 12 to 18 inches. In exceptional cases it may run to 2 feet. In none of the first-class streets have we any kerbing of a greater depth than 18 or 19 inches.
2577. Where the kerbstone reaches a depth of 2 feet do the plumbers in connecting with water or gas mains beyond the kerb go under it or cut through it? They go under it.
2578. So that in some cases the pipe may be as much as 2 ft. 3 in. below the surface? In many cases the kerb is only 15 or 18 inches in depth. I do not think there are more than three or four places in the city where the kerb would be 2 feet.
2579. During the laying of the hydraulic main did the work come under your notice? Yes.
2580. The mains are usually laid under the footpath? Yes.
2581. If you had to follow the work of the hydraulic main where the work left the footpath across a street, would your supervision end at the kerbing? Yes.
2582. And another man would have to take the responsibility in the street? Yes. If the Hydraulic Power Company, in making an extension along a line of footway, desired to cross a roadway, it would be so stated in the several notices delivered to those concerned.
2583. Do you remember the hydraulic main being laid along Pitt-street next the Criterion Theatre, between Market-street and Bathurst-street? That was laid before I held a position under the Council.
2584. Previous to 1892? I think so.

2585. Do you know in what year the wood-blocking in Park-street was done? I believe in 1886, and it was renewed some time afterwards. H. Browne.
2586. Bluestone cubes were put in at the crossings; were they removed and wooden blocks substituted since you have held your position under the Council? The work not being in my department I could not say. 18 Aug., 1897.
2587. On what date did Mr. Richards go to England, do you know? I think on 12th December last. His final instructions to me were to pay special attention as usual to reinstatement, and to be sure that the Council suffered no expense.
2588. You carried out your instructions and experienced no difficulty with anyone in connection with the Electric Telegraph Department until the trouble arose in Clarence-street? Yes; that would be in January or February.
2589. Shortly after the departure of Mr. Richards? Yes.
2590. Who took Mr. Richards' place? Mr. Gordon.
2591. Under Mr. Richards the Electric Telegraph Department carried on the work to the satisfaction of the Council and without any friction? No.
2592. Did any friction arise prior to Mr. Richards' departure? No similar occasion presented itself. No work of the kind had been done by the Electric Telegraph Department. All tar-paving works had previously been executed by the City Council for the Electric Telegraph Department.
2593. Did any friction arise in the carrying out of the work, or was it carried out to the satisfaction of your department, before the departure of Mr. Richards? Some friction did arise in connection with the extension of the renewal at the Imperial Arcade, and also at the Criterion Theatre. In both cases it was necessary for Mr. Richards to personally visit the works. I believe he interviewed Mr. Donald, or, at all events, he gave me such instructions as were conveyed to Mr. Donald.
2594. In regard to there not being such serious trouble in connection with water-mains and gas-mains, did you not state that it was not necessary to go to so great a depth under the footpath? It is not usual; they do not go deeper than they can help.
2595. May I call your attention to what is now taking place on the premises of the City Bank, in Pitt-street;—is there not an excavation under the footpath there fully 16 ft. deep? I thought you were referring exclusively to the connections of the water and gas services.
2596. I desire my question to have reference to all work done underneath the footpaths;—in connection with such work, have any subsidences taken place? In connection with drainage work—yes.
2597. Of a serious character? I do not remember any of a serious character.
2598. I presume that all work of the kind affecting the stability of buildings would necessarily affect the footpaths, and would therefore come under your notice? I do not think so necessarily.
2599. Do you remember some years ago a house collapsing just off Abercrombie-street, in connection with some sewerage work? I do not remember the occurrence.
2600. If such a thing occurred would it come under the notice of your department? It might not come under my immediate notice. It might be dealt with by the City Surveyor without reference to me, he being the head of my department.
2601. If four houses in a terrace collapsed, blocking not only the footway but the roadway, would not such a matter come under your notice? Perhaps not; the City Surveyor might deal with the whole matter himself. It might not come under my notice until the debris had been removed and the houses rebuilt, when a necessity might arise for reinstating the footpath.
2602. Do hoardings on footpaths come under your notice? No; there is a special officer to deal with those.
2603. *Mr. Robert Jones.*] I understood you to say that there was a consultation between Mr. Chambers, Mr. McCredie, and yourself as to some broken flags? I think I said that Mr. McCredie was present. So far as I can remember he took no part in the discussion.
2604. You have seen the timber taken out of these places? Yes.
2605. What in your opinion would be the life of that timber? I could not tell you. I do not think I should be justified in expressing an opinion on that point, because I am not an expert in timber. The life of timber varies very much according to the district from which it is obtained. Then there is the class of wood to be considered.
2606. What would be the life of timber such as you saw in this instance in its present position? I should say that in ten years a considerable portion of it would show signs of decay.
2607. Do you mean that it will be so decayed as to be unsafe? Some portions might be, other portions might last for twenty years; but, as I have already explained, I am not an expert in timber.
2608. What would be the result if the timber all gave way? In cases where the packing was imperfect there would be a serious subsidence. If the packing were perfect I should say there would be a slight depression. Certain sections of this tunnel are well packed; other sections are imperfectly packed, and others are not packed at all. The packing is patchy, according to the men upon the work, I should say.
2609. You read some notices which were sent to Mr. Donald in reference to some alterations you wished to have done? That would be official correspondence from the head of the department. The Town Clerk might be able to furnish you with copies.
2610. Did you read no official correspondence in connection with Mr. Donald? No; what I read was correspondence between Mr. Donald and myself.
2611. Are you not a Council official, and is not Mr. Donald an official of the Electric Telegraph Department? That is so; but all important communications would be conducted through the heads of the departments.
2612. Did you not treat the correspondence to which you have referred as official correspondence? Yes.
2613. That is the correspondence I am referring to; I mean the letters which passed from you to Mr. Donald in regard to rectifying some portions of the work;—were the alterations made? All. Most of the requests which I personally made to Mr. Donald were complied with.
2614. I am referring to written requests? There were no written requests from me to Mr. Donald—at least I can think of only one, and that was in connection with some material he required, for which, in his order, he did not state the price.
2615. There have been some communications from the City Council to the Electric Telegraph Department, complaining of the manner in which some of the work has been carried out;—were those complaints attended

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attended to? If I understand you to refer to the work in Clarence and Kent streets footways, certainly not. I reported the matter to the City Surveyor, and the report was sent on to the head of the Department. I reported that the material used in Clarence-street was inferior, that the thickness was insufficient, and also that the method adopted in Kent-street was unsatisfactory. It still remains in the condition of which I complained, and subsequent reinstatements further along Kent-street and down Liverpool-street were carried out in a similar way.

2616. In what way was the material in Clarence-street inferior? It was laid too soon after mixing.

2617. What was it? Tarred screenings.

2618. Is the objection you raise a serious one, supposing the tar to have been boiled? It does not set so quickly if it is laid too soon after mixing—it should not be laid within three days.

2619. Supposing the tar to have been boiled, do you think the stability of the pavement likely to have been effected if the screening were laid within three hours instead of within three days? If it was exposed to heavy traffic the stability of the work would be affected. The pavement would be cut up by the traffic, and it would then set irregularly, as occurred in this case.

2620. You think that if the tar were boiled the stability of the work would be affected if the pavement were laid even an hour after mixing? Yes. In this case I should think it was laid on the next day.

2621. And you think that circumstances affected the stability of the work? It did, inasmuch as it took the pavement longer to set. It was affected by the traffic, and the surface was made uneven and irregular.

2622. Is it uneven now? Not at present.

2623. Do you think, then, that the stability of the work has been affected? I do not know what may have been done since. Several things occurred afterwards. In one case in Kent-street there was a convexity of 3 inches. When I next saw the pavement it was perfectly level; the surface was fairly even. Whether that was caused by subsidence, or whether it had been done over again, I could not say.

2624. Do I understand you to say that the footpath in Clarence-street is now even? It is not perfectly even, but it is fairly so. My men have since tar-painted Clarence-street. I think that section was included in what they did, but am not sure.

2625. Would you now say that the work was good? No; there is not sufficient thickness in some places. It has not the same wearing quality which pavements will have when laid with an even thickness throughout.

2626. Do you say that the work is inferior because the paving was laid the day after it was mixed? Yes; the foot traffic passing over the pavement during the process of setting wears it unevenly. If it is allowed to stand three or four days after being mixed the tar becomes more adhesive. If it is then put down and rammed it requires more to disturb it than would be required if it were laid when first mixed.

2627. Do you not think that if the tar has been boiled, and is allowed to get thoroughly cold, it cannot be as well mixed with the screenings than as it could be a week afterwards? It should not be used until at least three days after mixing.

2628. Do you know who is carrying out the work which is being done in Macquarie-street? I could not say; I think it would be done under the Roads Department.

2629. Are you aware that in that case the tar is being put down straight out of the boiler? That is for an entirely different purpose. We do not allow any sand to be used in the top-dressing work on our footpaths. If sand or any foreign substance is found in the top-dressing it is condemned.

2630. What do you use? Fine screenings and the dust of the screenings.

2631. For top-dressing? Yes. Considerable areas have been condemned for having sand in it. If in the reinstatement of a footpath a plumber used sand and tar instead of the proper material, the Council would put down the proper material and charge the plumber accordingly. As regards the pavement in Clarence-street, our objection is that there is not enough thickness in one place, and more than sufficient in another. In one place there may be half-an-inch, and in another place there may be an inch or an inch and a half. The rough material protrudes through the surface where it is only half-an-inch thick, and the pavement wears unevenly. It is of great advantage to have a uniform thickness—1 inch, or whatever it may be.

2632. You say that you met Mr. Donald by arrangement to fix up matters which were in dispute between you in regard to the flagging? We inspected the areas to be disturbed, with the object of coming to an arrangement.

2633. You arrived at an equitable understanding? So I considered.

2634. In that case, did you ask for more than you got? I said I thought two-thirds should be allowed by the Department; but the City Surveyor, after some consultation, thought one-half would he sufficient.

2635. It would appear then that you asked for what was unreasonable? It might appear so.

2636. Your superior officer afterwards accepted much less than you asked for? Yes.

2637. You said something about Mr. Donald being keen in his dealings with your department on behalf of the Electric Telegraph authorities? He always tried to make the best business arrangement he could in his own favour.

2638. Would you not consider from that that he was a good officer of the Department for which he was acting? He certainly conserved the interests of the Department for which he was acting.

2639. He made the bargains as though he were making them for himself? Yes.

2640. You said that considerable friction existed between the Department and your officers;—what did you mean by that? I mean that there was considerable discussion before we arrived at an arrangement.

2641. But that does not surely involve friction? If it were necessary to bring the City Surveyor to inspect the particular section which required reinstatement, and if it were necessary for him to inform Mr. Donald that such and such a thing was required, I should consider that that would be friction.

2642. You had to bring the City Surveyor to settle matters between yourself and Mr. Donald in a case where you were at fault, judging from the City Surveyor's method of dealing with the matter? Yes.

2643. Do you consider, then, that you yourself caused friction in that instance? It was a preliminary arrangement before the beginning of the work.

2644. But you said that if you had to bring in the City Surveyor you would deem that there was friction; in this case you had to bring him in, and he decided against you;—would you hold, under those circumstances, that you yourself were the cause of friction? Certainly, in that case; but I think, if my memory serves me aright, that Mr. Donald offered less than the City Surveyor thought necessary.

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2645. Would you consider that because the two of you could not agree amicably, and your superior officer came in and arrived at a much better understanding with Mr. Donald than you were agreeable to, that there was friction? I was not empowered to make any arrangement. I was only empowered to deal with Mr. Donald, subject to ratification of the arrangement by the City Surveyor. In this case I had to submit to the City Surveyor my opinion as to what should be done, and he would deal with the matter himself. That was exactly what occurred.
2646. You thought that two-thirds was a fair thing? Yes.
2647. But the City Surveyor thought otherwise, and accepted one-half? Yes. On looking over the matter I am bound to submit that the City Surveyor was right.
2648. In that instance was there any altercation between yourself and Mr. Donald? No.
2649. There were no high words? No.
2650. You were perfectly amicable right through? Well, he might be of opinion that the renewal should be extended only to a certain point, and I might think otherwise.
2651. But would you call that friction? I should.
2652. A portion was filled in at Goulburn-street by the Electric Telegraph Department, in opposition to instructions from the Mayor? That is one of my diary notes.
2653. What was the effect of that? I could not tell you; I simply noted the fact.
2654. Was it a serious matter? I really could not tell you. I understood your application to refer to all notes in connection with and references to the work, and I included that note among the others.
2655. A considerable number of loads were used at various places to fill up the alleged subsidences;—would it not have taken the material to fill up the spaces from which the timber was taken out? Certainly not the whole of the material.
2656. Could you give us any idea of what quantity it would take to fill up the space from which the timber was removed? I should say that out of the 320 odd loads it might have taken at the extreme forty loads. That is only an approximate estimate. I have not made any calculation.
2657. What would the thickness of the boards be? 1½ inch.
2658. And the cross-pieces? 9 x 3.
2659. And the uprights? 9 x 3.
2660. What would the removal of that quantity of timber for a chain involve in the way of filling;—you say that forty loads would be equivalent to the bulk of the timber taken out? Yes; between Bathurst and Market streets, the section referred to in plan. I could not say what the quantity would be for a chain; it would depend upon the timber which had been used.
2661. Did you see the position of the hydraulic main in Park-street? Yes.
2662. Did you think that the earth round about that main was properly rammed? I should say it was well rammed. The ground had consolidated.
2663. It was firm? It was not as firm as virgin earth, but it was firm.
2664. Did it seem to you that it had been rammed? I should say that it had been.
2665. Did you test it? We only noticed how it was done.
2666. Did it seem soft? Not so hard as the contiguous earth which had not been disturbed.
2667. Do you know whether that main was put in by open cut or by tunnel? I could not say. It was certainly opened to the surface.
2668. You have had cause for complaint in connection with other pipes and mains in the city? Yes.
2669. Is it your opinion that more trouble has been caused in connection with this work, having regard to the proportion of work done, than was caused in connection with the hydraulic main? I should say so; because the whole of this work has had to be re-opened. In the other case it was only occasionally that the work had to be re-opened.
2670. Were the openings made by the action of the Electric Telegraph Department or through the instrumentality of your department? That is a question which I think the City Surveyor could answer. I only know that the openings were in progress. How they were occasioned I could not say. The whole of the work which was unsatisfactorily done has not yet been dealt with by the department.
2671. It may be intended to deal with it? Yes. I may mention that the whole of the work of which I have complained has not yet been rectified.
2672. They are proceeding with the work now? Yes; portion of Pitt-street is completed. The opening up and re-filling is now in progress.
2673. You do not know whether it is being done at the request of your department or not? I could not say. The Acting City Surveyor would know that.
2674. If it is being done at the request of your department, would you consider it a proper thing to do? That is also a question which I would rather leave to the Acting City Surveyor.
2675. You would think it correct to take the earth out from the surface and to re-ram it as is now being done? I do not. I think that in some cases the material which has been placed there will ultimately subside again, not to any extent, but it will subside sufficiently to necessitate the relaying of portion of the pavement.
2676. Do you think it possible to so ram a trench that when the weather comes on to it there will not be some slight subsidence? I do not, unless it were filled in with sand.

WEDNESDAY,

WEDNESDAY, 25 AUGUST, 1897.

Present:—

Mr. BAVISTER,	Mr. HARRIS,
Mr. F. CLARKE,	Mr. ROBERT JONES,
Mr. COOK,	Mr. McGOWEN,

Mr. NELSON.

W. J. LYNE, Esq., in the Chair.

A. L. McCredie, Esq., and G. McCredie, Esq., appeared in person on their own behalf.

Henry Browne, Inspector of Pavements, recalled and further examined:—

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2677. *Mr. Harris.*] You have stated that you are in charge of the pavements;—you are also in charge of the kerbs and gutters, are you not? Yes.

2678. Can you inform us when the kerb opposite the Criterion Theatre was renewed? Portion of it was renewed at the time the granolithic pavement was reinstated, and some of it was raised during the progress of the tunnel work, but prior to the commencement of the reinstatement of the granolithic pavement.

2679. Was your attention called then to any subsidence in Park-street? No; there was no subsidence then visible there.

2680. Did you ever, previous to that, notice a subsidence in Park-street? No; I never noticed any subsidence except over the line of pavement which was disturbed and reinstated in front of the "Criterion Hotel" only. The subsidence in Park-street at that time was not noticeable.

2681. Did you ever go down this tunnel to see what effect the tunnel works had on the pavement? I had occasion to go down the tunnel at the corner of Market-street in consequence of some alteration of the gully connections, and on several other occasions I went down the tunnel to see how the packing was being done. I had no instructions to go beneath the surface, but I did so for my own satisfaction. I did not consider such visits official, or particularly so.

2682. Did you ever call attention to the packing then as being bad or likely to injure your pavements? No; but whilst below I have stated to the men there that it would be necessary to be very particular with the packing, particularly under the granolithic-paved areas where subsidence might lead to considerable expense in the reinstatement of the footway.

2683. You never made the statement, as alleged, that the City Council would save so much by the works done by the Government in regard to the footways? With regard to that statement I got somewhat mixed during my last examination. I understood that the question was: Did I personally state that I had ever got the better of the Government or the better of Mr. Donald? I had not so stated. I may have stated that the reinstatement of those works, as I said before, might have cost the City Council £1,000, or that it might have been worth £1,000 to the City Council.

2684. *Mr. Cook.*] What do you mean by "worth £1,000 to the City Council"? If you noticed the language in which the question was couched it seemed as though I had been taking credit to myself for having got the better of the Government. That is how I understood the question.

2685. *Mr. Harris.*] Did you not think it was your duty to go down these tunnels often, you being in charge of the footway? No. I considered that, as all the underground work was being done by the Government, all the responsibility in connection therewith would be borne by the Government, and the City Council had nothing to do with the underground work. Cursorily, I mentioned to Mr. Donald something in connection with the buildings likely to be affected by the underground work, and I also mentioned similar things to the City Surveyor, and, consequent upon that, Mr. Richards sent a report to the Town Clerk calling his attention to the necessity of pointing out to the Government the extreme care required in prosecuting their tunnelling works for fear of a collapse or damage to any of the buildings along the line of the tunnel. Mr. Critchett Walker, the Principal Under Secretary, answered that letter, I understand, stating that special care would be taken, and that the wish of the City Council in the matter would be attended to. The correspondence is on record.

2686. Was the opening that was made in Park-street from kerb to kerb? Not from kerb to kerb. There was a space, I think, for a waterway left on each side of the kerb to the extent of about 3 feet.

2687. When you went down into the tunnel was all the timber there? The timber was there, but there were slight spaces beneath it. The whole of the earth above had settled, and the cross-bearers had subsided in the middle—that is to say, they were bent about 1¼ to 1½ inch.

2688. Did you ever draw the attention of the City Council to the fact that the Hydraulic Power Company had caused some subsidences in your works? I reported to the City Surveyor that a pipe had been laid by tunnel by the Hydraulic Power Company from the south-west corner of Park-street to connect with their main on the south-east corner, and that the same had not been filled and properly rammed. I have the letter here if you would like to have it read.

2689. Was your attention ever called to the rumbling noise caused by 'buses and other vehicles passing over the intersection of Pitt and Park streets? Several times, and I myself have distinctly observed a decided and distinct vibration there. The ground shook most unmistakably. You could notice it if you stood on the line of tunnel in Park-street, or even on the footway adjoining.

2690. Was that before or after the tunnel was done? Long after the tunnel was completed. It was not so noticeable immediately after the completion of the tunnel; it became particularly noticeable, I suppose, several months after the tunnel was completed.

2691. Had you any doubt, then, that it was the tunnel which caused it? Neither then nor since.

2692. When you noticed that vibration or rumbling noise did you report it to any of your officers? I reported it to the Acting City Surveyor, and he came with me and we stood there while several vehicles passed over the line of tunnel.

2693. How long ago was that? Some weeks before the opening was made, and then, again, immediately prior to the opening being made.

2694. And then you took no steps by opening the street to see what was the cause of it? Personally, I took no steps at any time in the matter. The steps were taken and the matter was dealt with by the Acting City Surveyor. I acted upon his instructions when I brought the men there and had the opening made. The Acting City Surveyor was present during a portion of the time the opening was being made.

2695.

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2695. What time of day was it when the opening of the street took place—early in the morning or late in the day? We had a number of men there, and they started work about 12 o'clock at night. The concrete was broken through or cut through almost to the bottom by morning, and in the morning—I suppose beginning about half-past 6—the concrete was removed. But the search-holes were drilled or cut through on the previous afternoon.

2696. You got orders, then, to work all night? The men remained there by instructions from the Acting City Surveyor during the night, and in order to keep them warm and employed I suggested that they should groove the concrete down almost to the bottom during the night. That was done, ready for removal the first thing in the morning.

2697. Then when you got to the tunnel, was it you who removed the timbers? Yes; we removed the timbers on the section opened by us down to the crown of the arch. We did not remove any of the uprights.

2698. There was no packing there then? There was some packing beneath, but it was imperfect packing. Since my last examination it has been necessary for me to make reports to the Acting City Surveyor on the reinstatement of the footways. Those reports are as follows:—

W. M. Gordon, Esq., City Surveyor *pro tem.*,—

Sir, 13 August, 1897.

I beg to report that the granite used for finishing wearing surface of granolithic pavement, two (2) flags at the Imperial Arcade, has not been put through the sieve. Two (2) flags were laid with this material. I pointed out to Mr. Guest that such work could not be accepted, and he then put the material used for the other flags through the sieve. I forward herewith sample showing size of some of the pieces used in the two flags referred to.

Yours, &c.,
H. BROWNE,
Superintendent of Footways.

W. M. Gordon, Esq., City Surveyor *pro tem.*,—

Sir, 21 August, 1897.

In re reinstatement of granolithic pavement in Pitt-street, fronting Richardson and Wrench's, &c., I beg to report that the concrete has been laid for the last two (2) days, and the finishing coat or wearing surface is not yet laid. This work should not be accepted by the City Council, as when the pavement was originally laid the concrete and finishing coat were completed the same day, and the present method of reinstatement cannot give satisfactory results.

Yours, &c.,
H. BROWNE,
Superintendent of Footways.

Mr. Guest,—

Sir, 23 August, 1897 (9·10 a.m.)

Will you be good enough to see Mr. Gordon, City Surveyor *pro tem.*, before you proceed further with the work of laying granolithic pavement in Pitt-street at Richardson and Wrench's, &c., as the present method of carrying out this work is not satisfactory to the City Council.

Yours, &c.,
H. BROWNE,
Superintendent of Footways.

W. M. Gordon, Esq., City Surveyor *pro tem.*,—

Sir, 25 August, 1897.

In re reinstatement of granolithic pavement over E. T. D. tunnel in Pitt-street fronting Richardson and Wrench's, I beg to report that large pieces of metal are still being used in the wearing surface. In my report under date 13/8/97, I objected to this and pointed out to the contractor the necessity for removing the large pieces from the material used for wearing surface. I met Mr. McCredie and Mr. Donald upon the work yesterday, and informed them that such work could not be accepted by the City Council. They both stated that the action of the Council was very like persecution—in fact, Mr. Donald distinctly stated that in his opinion the objection to accept the pavement was a decided persecution.

I may state that the pavement objected to was not removed.

Yours, &c.,
H. BROWNE,
Superintendent of Footways.

I forward herewith sample removed from the pavement then in course of completion.

2699. *Chairman.*] You put those reports in? Yes. I have also some samples here. Some of them are ¾ inch to 1 inch. These were removed from the flags then in course of completion—from a portion intended to remain as a completed surface.

2700. Is that made up into a concrete of any kind? It is made up into a matrix. I produce a sample of the original material removed. There are no such pieces in the wearing surface of this.

2701. What is this? This is granolithic pavement. There are no pieces anything like that size.

2702. This shows the wearing-surface of work done by the City Council? Yes.

2703. And what you maintain now is that the work being done by the Government is too coarse? Certainly. It is in no way equal to the other.

2704. And the pieces that you have taken from the work going on now are very much larger than anything put in by the City Council? Considerably—I should say seven or eight times as large as the largest pieces in the wearing-surface of that pavement.

2705. *Mr. Cook.*] You picked that out haphazard? Yes; I did not select it specially. I should say it would be all the same.

2706. *Mr. Robert Jones.*] Did you select these pieces? I picked them from a flag in course of completion, and I pointed out to the contractor that these pieces were altogether too large for that class of work.

2707. *Chairman.*] You produce another sample? Yes. That was washed by the contractor, who, before the washing, persisted that it had gone through the sieve.

2708. *Mr. Robert Jones.*] These pieces were actually picked out of mixed, made-up material, ready for laying? Picked out of material that had been laid.

2709. *Chairman.*] How do you mean laid? It had been laid, and the men were trowelling off the surface.

2710. It was not set, then? It was not set. My contention was that the material had not been put through the sieve. The contractors' contention was that it had been put through the sieve, and I picked this out to show you that the whole of it had not gone through the sieve; and, if only one or two of these pieces were left in the wearing-surface, such could not be accepted by the City Council, as it was not in any way similar to the class of work that was down previously.

2711. Have you any other sample? I have. Objection was taken by the City Council to the wearing-surface being laid on the top of the concrete after the concrete had been laid three days. In one of my reports, I have stated distinctly that when the original pavement was laid the concrete and the wearing-surface were laid the same day, and the whole thing had set as a solid piece—as you will observe from the sample. In some cases I objected to the way in which the work was done; and I now produce a portion of a condemned granolithic flag—condemned by the City Council—because the concrete had been laid about thirty-six hours before the wearing-surface was completed. 2712.

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2712. By whom was it laid? Mr. Stuart, a contractor for the City Council. After the concrete had been laid about thirty-six hours, the wearing surface was laid. The pavement which Mr. Guest is now laying might be in use one or two years before it would show it really was bad; but, in this case, you can see the effect of the sun has been to lift the wearing-surface right off the concrete beneath. If you compare that with the other sample, you will see that it is not set in one solid piece, consequently it was condemned by the City Council, and was removed; and that sample was retained. I contend that similar conditions would have existed if the City Council had allowed Mr. Guest to complete the wearing-surface on the concrete laid by him three days previously.

2713. *Mr. Robert Jones.*] Will you measure this piece of metal in the sample of granolithic pavement, which was laid to the satisfaction of the City Council? Three-quarters of an inch from the top of the wearing surface, I find a piece which forms part of the concrete three-quarters of an inch in size, and another piece immediately below it is from three-quarters to seven-eighths of an inch. The objection that I take to the examples is not in regard to the concrete beneath, but in regard to the wearing-surface.

2714. *Chairman.*] Are those pieces you have just measured in the wearing-surface? In my opinion, they are not in the wearing-surfaee.

2715. *Mr. Cook.*] Were the other pieces which you have produced taken from the wearing-surface? They were removed from what was intended to be the wearing-surface.

2716. How do you know? They were completing it.

2717. *Mr. Robert Jones.*] How did you obtain these pieces? I picked them out simply with my fingers from what was intended to be the wearing-surface.

2718. Did you use anything else but your fingers to take them out? I did not.

2719. You simply dug your fingers down and took the pieces out? That is so. I understood from Mr. McCredie's expression that his objection to the removal of the piece of work under discussion was on the ground of delay. I pointed out that it would only mean at the most a loss probably of half a cask of cement used in the completion of the piece complained of, and probably an hour or two hours' work to renew with satisfactory material. However, that was not done at the time I left.

2720. *Mr. Harris.*] All work done by a contractor has to be done to the satisfaction of the City Council in every case? This is not done to the satisfaction of the City Council.

2721. Did you call Mr. Guest's attention to the fact that it was not done in the way required by the City Council? At the Imperial Arcade I called his attention to the necessity of sieving the material, which was subsequently done. Later, I found him using material which it was palpable had not been put through the sieve, and consequently the work was not satisfactory. I simply informed Mr. McCredie and Mr. Guest that it was not satisfactory, and there the matter remained, and the work remained too.

2722. He did not refuse to do it? He did not do it.

2723. But last week, when you visited the place, was not the weather wet? During the time he laid the concrete the weather was wet, and it was not possible for him to complete the wearing-surface in consequence of the rain; but I do not consider that in consequence of rain the City Council should be at a loss by accepting unsatisfactory material.

2724. But when the weather was wet, how did you know what material he was going to use when he had not had an opportunity to finish the work? I know that he had laid the concrete, and had not completed the wearing-surface on the day the concrete was laid, in accordance with the rule in connection with such work done for the City Council.

2725. But he would require yesterday to be a dry day before he could finish the work? Certainly. But my objection to the completion of the work with this material is on the ground that the pieces are altogether too large. My objection to his finishing the wearing-surface on the concrete laid three days previously was that the wearing-surface would have risen like the piece I produce, and have formed a hollow. I have had several examples in the city of work laid under the supervision of the same Mr. Guest, when such has occurred.

2726. *Chairman.*] You mean, by that, to say that there has been no adhesion? Yes; there has been no adhesion. I mean that the hot sun ultimately affects the adhesion of the tops where the joints are cut through—if you tap it, it sounds hollow—and if there were a succession of hot days during the summer, the sun would lift the wearing-surface from the concrete—very slightly perhaps, but sufficient to cause cracks on the surface.

2727. *Mr. Harris.*] Have they refused to do what you require? They did not positively refuse; but the work remains now in the condition that it was in when I objected to it. Mr. Guest continued the completion of that flag last night, after I had informed him that the material used could not be accepted.

2728. He has refused, then, to do what you required him to do? Up to last night he continued on precisely the same lines as before. He had been informed previously that this material could not be accepted at the Imperial Arcade, and I believe he had to remove two flags there, because similar material had been used, and he afterwards put the same material down again.

2729. He has put the ones right to which you called attention first? I believe so; but I am not sure. I have not since inspected it.

2730. Have you inspected any of the work this morning? I have not.

2731. You do not know whether he is still going on with the work you have rejected? At the present time I do not know, but I have sent a man to remain on the work and to report to me how it is done. If they replaced those two flags I have mentioned, that would have been according to the City Surveyor's instructions. I act directly under the City Surveyor, and all these matters are reported to him, and upon such reports he communicates his instructions to me.

2732. What is your last report to the Acting City Surveyor—that they are not complying with your request? I have already stated that in my report of the 25th August.

2733. *Mr. Robert Jones.*] At what time was that report written? It was actually written this morning before I came here. The reason for that was that the Acting City Surveyor was not in his office at ten minutes past 4 when I returned yesterday afternoon, which I did directly after my interview with Mr. Donald and Mr. McCredie; and as the Acting City Surveyor had left his office I had no opportunity of dealing with the matter then.

2734. *Mr. Harris.*] Then he has not seen that report? I interviewed him and explained the whole matter to him at half-past 9 o'clock this morning.

2735. *Mr. Robert Jones.*] Although you wrote that report this morning you are not aware whether they have altered what you spoke to them about yesterday? Neither Mr. McCredie nor Mr. Donald gave the men any such instructions in my presence.

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2736. Although you wrote that report this morning, are you aware whether they have or have not altered the work? I certainly am not aware. I have not been there this morning.
2737. *Mr. Cook.*] Do you know that Mr. Guest has made an agreement with the Post Office Department to satisfy you in the matter of these pavements? I was informed by Mr. Guest that his instructions were to do the work according to the City Council's instructions. But how are the City Council going to compel him to do it? The City Council had already objected to similar material being used, and they repeated their objection.
2738. Has Mr. Guest given the City Council a ten years' guarantee in regard to all this work? I am not aware of it. I am aware that he verbally offered to do so.
2739. You are not aware that he has already done so in writing? I am not.
2740. And that the City Council have drawn up the form of the bond itself? Does that bond refer to the Government guarantee, or to Mr. Guest's guarantee to the City Council?
2741. Mr. Guest's guarantee in regard to the pavement? I am not aware of it. When the matter was referred to by the City Surveyor I suggested to him the advisability of having a guarantee direct from the Government in connection with it.
2742. You do not know if that has been done? I know nothing further beyond the fact that when the City Surveyor and I interviewed Mr. Guest at the Criterion previously about the work and the material, Mr. Guest said that he would give us a ten-years' guarantee, and subsequent to that I advised the City Surveyor that it would be to the advantage of the City Council to have a guarantee direct from the Government, and not from Mr. Guest.
2743. You went and condemned this work yesterday;—do you know if it has or has not been altered since? I do not; I have not been there this morning.
2744. Do you not think that it would have been at least fair for you to go there this morning and see if your instructions had been carried out? In my report I stated simply what had occurred last night.
2745. Which was unfavourable? Yes; I say nothing about what has occurred this morning. I simply state in my report exactly what had occurred last night. When an officer in the execution of his duty, with samples such as I have here to substantiate his objections, is informed by a Government officer that he is persecuting a contractor, I consider that such conduct is very unfair and discourteous on the part of that officer. Throughout all this work I have done my best to facilitate the operations of the Government in every way.
2746. *Mr. Robert Jones.*] At Question 2661 I asked you, "Did you see the position of the hydraulic main in Park-street?" and you answered "Yes;"—now I ask you, did you consider that the hydraulic main in Park-street was properly rammed when you saw it on that occasion? Yes; so far as I could judge then, I considered it had been rammed.
2747. What was your answer to a similar question this morning? That does not refer to the same main. My answer this morning referred to a connection of the Hydraulic Power Company's from the south-west to the south-east corner—not in the line of tunnel, nor in any way connected with it.
2748. I am referring to the hydraulic main? The question this morning did not refer to the same main.
2749. I ask you now about the hydraulic main in Park-street? The main referred to by me in my reply to Mr. Harris this morning extends from the south-west to the south-east corner—that is to say, it goes across Pitt-street in Park-street at right angles to the line of tunnel, and is in no way connected with it, except in so far as the junction is effected at the corner of the Criterion.
2750. I did not ask you whether it came at right angles, or in any other way, but I referred to the hydraulic main; I now ask you, did you consider that the earthwork of the hydraulic main in Park-street, which was stripped bare by your Department opening the top of the tunnel, was properly rammed and consolidated round the hydraulic main? I considered it was well rammed.
2751. Did you in any way say this morning that it was not? Not that that particular main was not. There are two hydraulic mains—one running across Park-street, and the other running across Pitt-street. The hydraulic main along the line of Pitt-street extends over the top of the tunnel. The hydraulic main referred to in my reply to Mr. Harris this morning runs from one side of Pitt-street to the other—not from one side of Park-street to the other. One runs north and south, and the other runs east and west. The main running north and south is over the tunnel, the main running east and west is that referred to by Mr. Harris's question.
2752. *Mr. Harris.*] When you opened the road in Park-street could you see alright up Pitt-street underneath the concrete? From the hole you could distinctly see—from the north-east corner of Park-street, looking southerly—from one opening to the other. It was quite hollow.
2753. *Mr. F. Clarke.*] How far would that be? I suppose about 12 feet, more or less. The opening was made near the centre of the roadway, and another opening also was broken through at the side of the roadway, and from one opening to the other you could see clearly.
2754. *Mr. Cook.*] Is the Mr. Guest who is laying this granolithic pavement an old contractor in the city? He is.
2755. Has he done work for the City Council before? He did some work for the City Council, as manager for Mr. Coskerie.
2756. Have you had occasion to condemn his work before? In regard to some of the work laid under him, I have objected to certify for the payment of the retention moneys, and they still remain unpaid.
2757. How long ago was that? Over twelve months ago. Some portion of that work is over the line of tunnel at the Haymarket. I was obliged to stop the work then being conducted by Mr. Guest, because I objected to the material used in the concrete, and also to the brand of cement used. The work was suspended for some time.
2758. It was eventually finished? Yes; upon altered conditions—that is to say, the material I required was used.
2759. Then, naturally, you have not a very high opinion of Mr. Guest as a contractor? I have not formed any opinion of him as a contractor. I have not a very high opinion of him as a manager.
2760. Therefore you would not be likely, I suppose, to approve very much of any work he might do? I should be inclined to look more closely after his work than after another's.
2761. And, of course, you have done so in this case? No; I do not think that I have. We do not keep an officer continually on the work. We judge it by results. We always secure ourselves by a clause in the specification, obliging the contractor to maintain the pavement in repair during the currency of his contract.

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contract. Most defects exhibit themselves within a year, and, when such occur, we do not certify for the payment of the retention money then held—in some cases 10 per cent., and in other cases 20 per cent. on the value of the work. That is considered sufficient protection.

2762. Did you tell the Committee that you would be inclined to look more closely after Mr. Guest than after some others? I certainly would be inclined to pay more attention to his work.

2763. What was being said when Mr. Donald and Mr. McCredie told you that they were being persecuted? I understood that remark to mean that I was persecuting the contractor. I stated that the work would not do; that the City Council would not accept it. They objected, and said the work should do, and that the objections taken by me were unreasonable.

2764. Did they say that you should have accepted this work? In effect, they stated that.

2765. Tell us what they said precisely? Mr. McCredie's statement was that Mr. Guest had tried every means to please me—meaning, I suppose, the City Council—and was unable to do so, and that the action of the City Council looked very like persecution, and that it seemed impossible to please them. Mr. Donald said that the material objected to was good; that the granite would wear the same as the cement. I said it would not do so, but that the cement would wear from it, and that the granite would either stick up in little cones or would come out pitted on the surface. Mr. Donald said that the cement and granite would wear uniformly.

2766. You stated, in reply to Mr. Harris, in regard to the vibration at Park-street, that you called the attention of the City Surveyor to it the first time a little before the opening was made in that street? No; some time previously the City Surveyor and I had discussed the matter.

2767. How long before? Several months, I should say, as near as I can remember.

2768. You have also told the Committee that you noticed a hollow sound immediately after the construction of the tunnel;—why did you not report to the City Surveyor then? That I noticed a hollow sound immediately after the construction of the tunnel?

2769. Yes; you told Mr. Harris so? Then I was mistaken. I did not notice the hollow sound immediately after the construction of the tunnel. It was some little time after the construction of the tunnel. I must have been confused by the questions.

2770. How long after. Several months.

2771. Then nearly twelve months have elapsed since you first noticed it and called the City Surveyor's attention to it? No; I should not say so.

2772. Why did you not report when you first noticed it? I did not know whether the Government intended to take it up or not. Probably one reason would be that, being on the roadway, it is not within my jurisdiction. It is not customary for one Department to interfere with the affairs of another.

2773. As a matter of fact, you did not report it until trouble first began about the tunnels? As a matter of fact, I do not think I officially reported it then. I may have verbally said that in Park-street the road was very hollow and the packing must have subsided.

2774. From those reports that you have read, may we generally take it that up to the time of the making of those reports things had gone on statisfactorily as between the City Council and the Postal Department? Up to that time there were many verbal objections taken by the City Surveyor and myself which had been attended to by Mr. Donald. The works had practically proceeded satisfactorily so far as the surface-works were concerned on the day-labour section up to the Railway Station.

2775. The first friction—to use your own word—with Mr. Donald occurred in Clarence-street over the tar-paving? No. The first friction occurred in connection with the extension of renewal at the Imperial Arcade and at the Criterion. That was amicably adjusted.

2776. When was that? It would be about twelve months ago. I reported the matter to the City Surveyor, and I forget whether he interviewed Mr. Donald or communicated instructions to me, which I conveyed to Mr. Donald, but our contention was adopted. The first friction subsequent to that occurred in Clarence-street. In connection with the Pitt-street reinstatements below those referred to, Mr. Donald met me in nearly every way.

2777. What was the cause of the trouble in Clarence-street to which I have referred? Mr. Donald removed the material from in front of Mitchell's premises; he removed it to the Government depôt.

2778. That is to say, the tar-paving? No; the material was bluestone cubes, and large bluestone runners.

2779. But I am speaking in respect of the tar-paving;—there was some tar-paving put down there, was there not? Yes.

2780. What was the objection to that? The objection to it was that the top-dressing was laid too thin, and the material was used too soon after mixing, and that complaints had been received by the Acting City Surveyor from the occupants of some of the premises calling attention to the disgraceful manner in which the work had been done.

2781. Have you got those complaints? The letter is on record.

2782. From whom? I think from a Mr. Hervey—the premises being three or four doors from King-street on the west side of Clarence-street. At the time this complaint came in I was not aware that the top-dressing had been completed. I inspected it and reported it to the Acting City Surveyor, who also inspected it, and tested the thickness of the material, and informed Mr. Donald that it was too thin.

2783. Was it as thick as your own in the immediate vicinity—you laid some down yourself close to it? I do not remember laying any. If it were laid by contract it would be laid probably an inch in thickness.

2784. Is ours as thick as yours? In our day-work we frequently, as a matter of expediency, lay a very thin coat of top-dressing, such as would not be accepted from a contractor.

2785. You have two standards in the City Council—is that it? Precisely.

2786. One standard for a contractor and one for yourselves? Not necessarily. It may, as I have stated, be a matter of expediency. The bottom might not be very good, and to top-dress it with a very thin coat might probably give it an extra couple of years' life, and then the whole thing would be renewed.

2787. Then you objected to a strip being left in? Not in Clarence-street but in Kent-street.

2788. Why did you object to that strip being left in? Because, in the first place, when completed it was unsightly. The completed portions showed greater convexity than usual in the case of footways, and being left along the line of joint where the connections between the new and the old had been made, there was, in wet weather, an accumulation of water which could not get away in some places.

2789. Did you ever allow any other contractors to patch the pavement in that way? Other contractors have patched the pavement in that way, where the disturbance would not be so great in extent. A

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contractor might put in a trench 12 inches wide, distant 12 inches from the kerb. In such a case we would probably allow him to extend the renewal to 6 inches on the solid formation on the inner side of the trench. That is the rule.
2790. Is that being done in all cases now? So far as I am aware it is.
2791–2. What is the width of the trench which the Water and Sewerage Board are making now—the one in Elizabeth-street I refer to particularly? I think the width of the trench there would be about 15 inches.
2793. What is the width of the tar-paving put in? Something over a yard. It varies from 2 ft. 9 in. to 4 feet. We always measure 6 inches on the solid formation on the inner side of the trench.
2794. Is that being done there now? That has been done there.
2795. Is it being done there now? Yes; from 4 to 6 inches. It is being executed by contract.
2796. From 3 to 4 feet, you say, is the width of the tar-pavement they are putting down? In some places, where the trench only is being renewed. In other places where the pavement is very bad the whole width is being renewed, the Water and Sewerage Board paying their proportion of the cost.
2797. Would you be surprised to know that in many places the width is no more than 18 inches? I should be very much surprised to know that. The width would vary according to the position of the pipe relatively to the kerb. In some cases, it might be 2 feet from the inner side of the kerb, and in other places only 18 inches. In the latter case the width of reinstatement would not be so great. The whole of the work was measured by the City Council, in the presence of an officer of the Water and Sewerage Board, and the amount to be charged to the Board was computed upon a calculation extending 6 inches on the solid formation wherever their line of trench existed. In places where the footway was narrow, they were charged the full width.
2798. I am not asking what arrangements were made, but whether you know that in Elizabeth-street there is tar-pavement being put down which is not more than 18 inches wide? I am quite sure that there is none being put down by the City Council which is only 18 inches wide.
2799. Nor by anybody else? Not so far as I am aware.
2800. You said, I think, on the last day of your examination that you had charge only of pavements, and not of streets? Yes.
2801. How came it, then, that you opened Park-street? It was an emergency case—in other words, I received the instructions at 10 o'clock in the morning, and had to have the matter dealt with at once.
2802. Why were you instructed, and not the man who has control of the streets? That is a question that only the Acting City Surveyor can answer.
2803. You do not know? I do not know.
2804. It was an unusual thing to do? It was an unusual thing. I had not in any way been connected with road-opening before.
2805. You have no idea why the selection of yourself was made? I think it was an oversight on the part of the City Surveyor. I think that, for the moment, he did not distinguish between the two departments, and I having the more men available he suggested that I should bring them and proceed with the opening.
2806. You told us at the last meeting that you were a member of the Builders' and Contractors' Association? Yes.
2807. Are you aware of any proceedings of that association lately? Not beyond what I have noted in the public Press.
2808. Are you aware that the Builders' and Contractors' Association, the National League—until recently known as the National Association—and the Chamber of Manufactures have banded themselves together in a supreme attempt to break down this day-labour system? I have no knowledge of any such intention. I have merely noted the fact in the Press, the same as anybody else might. I take no part in the proceedings of the Builders' and Contractors' Association.
2809. I take it that your sympathies are with the Builders' and Contractors' Association, you being a member of it? I have not considered their objects, I have not taken part in their business or proceedings of any kind, for some years past. I am simply a member of their association, because I have not withdrawn from it.
2810. You go frequently to the association's chambers? Not during any discussion of business matters.
2811. During the day at any time? I may go in during the day to obtain letters.
2812. Is it not a fact that you have been frequently there since the trouble about the telephone tunnels began? I call there for my letters every day. Most of my letters are addressed there.
2813. Will you say that you have no knowledge of what goes on there? I never spend any time in conversation with the members. The knowledge I have is principally derived from Press reports—the same as anybody else.
2814. And I take it that you subscribe to an association, in which you have not the slightest practical interest—is that it? That is precisely the case. I never know when I may desire to resume my occupation as a builder, and consequently I remain a member of the association.
2815. You admit that you have been there every day whilst this dispute has been going on? Certainly.
2816. *Mr. McGowen.*] Your active interest in the Builders' and Contractors' Association has ceased since you obtained the position you now hold under the City Council? It had practically ceased considerably earlier. I had retired from business.
2817. To obtain the position that you now hold were you recommended by the Builders' and Contractors' Association? Certainly not.
2818. By any officers of the association? I think that the only recommendation I received in connection with the matter was from Mr. Alderman Waine, and I do not know whether he was a member of the association then or not.
2819. Alderman Waine was a member of the City Council? He was, and is, a member of the City Council.
2820. He is still? Yes.
2821. And he is still a member of the Builders' and Contractors' Association, so far as you know? I believe so; but I do not know.
2822. He has taken an active interest as an alderman—in the interest, I suppose of the City Council—in connection with the telephone tunnels? Yes; he has frequently been there, inspecting the progress of the works.

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2823. Were any of your actions in regard to any of this work—in condemning it, or reporting unfavourably upon it—taken at the suggestion of Alderman Waine? Certainly not.
2824. Or any other member of the Builders' and Contractors' Association? No member of the association ever influenced me in the slightest, or attempted to do so.
2825. *Mr. Cook.*] Have you ever said to anybody that the pavement was £1,000 better than it was before the tunnels were constructed? I may have said so in effect.
2826. *Mr. G. McCredie.*] What was your occupation before you entered the City Council's service? I had retired from business, and had no occupation.
2827. But previous to retiring from business? A builder.
2828. Will you tell the Committee some of the works you have been connected with? Principally foundation works, and building myself. I did not do the finishing trades; but otherwise I built a terrace of five or seven houses for Mrs. Merriman in Argyle-street. I put in the foundations of Soul's premises in Pitt-street; I also did the basement of J. R. Love's premises in Bathurst-street; I also did the stores for Mr. Eadie in Sussex-street, and a shop for the late Mr. Field in George-street, near Hordern's, and a terrace in Palace-street, Petersham, and other buildings.
2829. Are you a bricklayer or a stonemason? A stonemason; but all the brickwork that I had done was done by day-labour under my direct supervisisn.
2830. You said your duty was the supervision of all work connected with the footways? Yes.
2831. Whose duty is it to supervise the work in connection with roadways and crossings? It is the duty of Mr. G. L. Lee, clerk of works in the City Surveyor's department.
2832. I understand, from the answer you gave Mr. Cook, that you could not explain to the Committee how it was that you were so active in connection with the opening up of Park-street? I received certain instructions from the City Surveyor, and I carried them out.
2833. Have you had any consultations or conversations with contractors in reference to the telephone tunnels? I cannot recall any at present.
2834. Have you not heard the contractors for laying pavements for the City Council make complaints against Mr. Donald for doing by day-labour what they considered they were entitled to do by contract? I cannot recall any such complaint.
2835. You have not heard such a complaint? I cannot recall any such complaint, and I think I should be able to do so if any had been made.
2836. You have an office at the Town Hall? Yes.
2837. What hours are you supposed to be at that office? From 9 to 4 are the office hours.
2838. Are you generally there at that time? No. It is is my custom to go round the works in the morning before going to the office, and I sometimes call at the Builders' Exchange on my way to the office.
2839. How long does it take you to get your letters at the association's rooms? About two minutes; I am rarely there more.
2840. Will you distinctly state that you have not been there more than two minutes recently? I may have written a letter there. Certainly I have not been there in consultation with any builders or contractors more than five minutes.
2841. Were you there last Saturday morning—since you have given evidence here? I cannot recollect having been there, but I can positively state that I did not refer to my evidence—to anyone or anything in connection with the tunnel—there.
2842. Will you state that you did not spend half an hour there last Saturday morning—since you gave evidence here? I think I should be perfectly safe in so doing. That is within the limit. I think, if my memory serves me, I wrote two letters there—about ten lines in each. I may have been there only two minutes. I cannot recall the time exactly.
2843. Are applications to open the footways submitted to you for report? No.
2844. Do you inspect the pavements before openings are made? Sometimes, but not in all cases; I would not have time.
2845. Do you make special notes of cracked flags, or other defects? Sometimes; but not in all cases.
2846. Then it would be a difficult matter for you to know whether the pavement was reinstated as good after it was disturbed as it was previously—almost impossible for you to do that? No, because if the pavement were not suitable for traffic, it would be put in a suitable condition by the City Council. It would not be left in a dangerous, unsafe, or unsightly condition. If it were in that condition after the openings, it is quite evident that that state had been caused by the openings.
2847. Will you say that there are no cracked pavements in the city, or any pavement in an improper condition, at the present time? There are many cracked flags, but they are satisfactory for traffic, because they present an even surface.
2848. Is there a book kept by the City Council, with notes in it, as to the state of the pavements? No.
2849. Are the parties who make the openings expected by the City Council to reinstate the footpaths and leave them in as good a condition as they were previous to the openings being made? They have to leave them to the satisfaction of the City Surveyor, or, practically, the Inspector of Pavements.
2850. I take it, from that answer, that if a pavement is bad where an opening is made, the City Council can compel the man who makes the opening to put in new pavement? Precisely, if he does not call the City Surveyor's attention to it prior to the opening. But we have no such pavements. We have no very bad pavements. The best evidence of that fact is that we have no public complaints of them.
2851. In the case of an opening in a footpath, do you require the persons making that opening to reinstate the whole of the footpath, or only to make it good where the opening is made? It depends upon whether the whole of the pathway is affected. If the opening extended over, perhaps, two-thirds of the footway, we would expect them to make good the whole of the footway, or if it were of any great extent, and if the contiguous pavement were badly worn, an arrangement would probably be made by which the whole of the pavement would be reinstated by the City Council, who would charge their proportion to them. That is being done now in connection with the Water and Sewerage Board.
2852. Do you, when excavations have been made in the footpaths, allow those excavations to be filled in with the material taken out in making the excavations, or do you compel the parties making the excavations to cart that material away, and bring in sand or other material with which to fill in the excavations? They invariably fill in with the material taken out, unless it is absolutely unsuitable.
2853. Can you tell the Committee the nature of the ground forming the footpaths in Pitt-street? It varies. In some places it is rock, in other places clay, and in other places it is filling. 2854.

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2854. Take it from Park-street to Market-street? It would be all clay there, excepting where former excavations had occurred, and then it would be filling. There might be a little rock mixed with it.
2855. What do you mean by filling? It may be old building material along the side of the areas, or it may be clay, or soil, or almost anything.
2856. When the City Council themselves made excavations in the footways, do they remove all that material and refill the excavations with sand? No; the City Council take the responsibility of further subsidences.
2857. During the construction of the telephone tunnel you have on several occasions been down the excavation and inspected the work? I have on several occasions.
2858. When doing so, did you ever make any complaints as to the manner in which the work was being carried out, or as to the nature of the filling round and over the brickwork? No; I never made any complaint beyond my remark to Mr. Donald, which you will find in my former evidence. I may have said to the men engaged on the work, "I hope you will pack that solidly."
2859. Have you not stated, after such inspection, that you were thoroughly satisfied with everything? I have no recollection of ever having made such a statement; in fact, I am quite positive I did not.
2860. You are positive that you never stated, after such inspection, that you were thoroughly satisfied with everything? I have no recollection of ever having made such a statement. If I did so it would be opposed to my opinions.
2861. You will not say that you did not make such a statement? I think I am perfectly safe in saying that I did not.
2862. If you had had any complaints to make, would they not have been included in the City Surveyor's report of 1896, similar to the complaints made about plumbers and licensed drainers? Not necessarily. That report was hurriedly compiled, in consequence of the City Surveyor's projected departure for Europe.
2863. I suppose that, it having been hurriedly written, it is not a correct report? Everything therein stated would be correct, otherwise it would not find a place there.
2864. Well, in the report of the City Surveyor for 1896, it is stated, "603 openings were made by licensed plumbers and 181 openings by drainers"; and it is also stated, "grievous complaints were made concerning the manner in which the footpaths were reinstated";—now, can you tell the Committee how many of these openings were made in or across the line of telephone tunnels? No; I could not. I know that several were made both in and across the line of telephone tunnel. There was, for instance, the one referred to in my previous evidence, at the Civil Service Co-operative Society's gateway, where there was a subsequent reinstatement, one-third of the cost being charged to the party who made the opening, and the other two-thirds of the cost being charged to the Telephone Department.
2865. Notices of all openings are sent to the City Council? Yes; almost invariably. Sometimes they are not, and when that is discovered the people are summoned.
2866. Could you provide the Committee with a return showing the number of the openings and their positions? Yes; I could if I had time.
2867. You said that the City Surveyor's report was compiled hurriedly;—how do you know it was compiled hurriedly? I meant my portion of it. I was only referring to the matter as it affected myself. I do not know anything beyond that. I do not pretend to deal with the City Surveyor's business.
2868. Can you show us an application made by a plumber, or a gasfitter, or a licensed drainer to make an opening opposite 156, Pitt-street, on or about the 19th or 20th of July? If such were received it would be entered in my book, and it would be in the office now.
2869. I refer to the one you had such a difficulty in remembering the other day when Mr. Bavister asked you a question? I do not know. I did not look it up. The Acting City Surveyor informed me that notice had been given, and that is all I knew about it.
2870. Did the party making the hole make an application in the proper way? Yes; so far as I know.
2871. You have no authentic information about it? No; only the Acting City Surveyor's assurance that permission to make the opening had been applied for. I asked if it had been applied for in due form, and he said, "Yes."
2872. Are you quite sure that the Acting City Surveyor did not refuse permission to open up the footpath when the application was first made in regard to that hole in Pitt-street? I cannot say. I can only say that I asked the City Surveyor if application had been made for permission to make the opening, and he said, "Yes."
2873. Can you tell the Committee under whose authority the man was working? I cannot.
2874. Are you sure you cannot? Absolutely certain.
2875. And you saw him putting a hole down in Pitt-street? I did. I did not stay two minutes at the place.
2876. You stayed there long enough to see that there was a hole underneath the timber? Yes. I looked especially for that, but I cannot tell whether that hole was made by him or by others.
2877. Is it not a fact that the man who was making that hole did not know what he was looking for? I asked him what the hole was made for, and he said in connection with the gas—or in connection with a pipe, I think, were his words.
2878. Are you aware that this man was seen lifting the poling-boards over the tunnel, and taking out the packing? I am not aware of it. He might have done so, and I not be aware of it.
2879. If a man so engaged in excavating in the footpath first stated that he was looking for a gas-pipe, and then for a vent-pipe, and then for a water-pipe, what conclusion would you come to? I should say that he was very undecided as to what pipe he wanted.
2880. Supposing he was looking for any of those, would he be likely to find any of them under the poling-boards? I should not think so. There are pipes now lying right on the crown of the arch, but I should not think that he would find any under the poling-boards.
2881. You made a statement to the Committee that you found a vacancy under the poling-boards at the opening made—you do not know at whose instigation that opening was made; you do not know who was the architect? I do not.
2882. When you made that statement the other day did you not know that Mr. Arthur McCredie had told you that he caught a man working there taking out the packing? Mr. Arthur McCredie had stated to me that a man had removed the earth from under the poling-board. I said I did not know whether he had or had not. I only saw that it was not there when I looked.

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2883. You did not state to the Committee the other day that Mr. McCredie told you that? I think it escaped my recollection until you recalled it.
2884. You also knew that a lawsuit had been brought about this place, and that the jury had examined it? I did not know that the jury had examined it. I knew there was a lawsuit, but beyond that I did not know anything further.
2885. What made you so anxious to inform Mr. Gordon of the result of this excavation whilst he was engaged in giving evidence before the Committee? My reasons were because they were filling up the hole, and I wanted to know from him first whether they had authority to open it; and, secondly, whether it would be advisable to fill it up and reinstate the pavement before the necessary works were attended to beneath, over the line of tunnel. Those were my only reasons.
2886. And having reported to him, can you tell the Committee why the hole was filled up so quickly? I cannot.
2887. Or whether the man who was engaged in making the excavation found what he was looking for? I know absolutely nothing about it beyond the facts that I have stated.
2888. Did you consider that the pavement in front of the Criterion Theatre was dangerous to pedestrians prior to the timber being removed from the tunnel? Yes; where the flag had subsided.
2889. Did the flagging subside? A movable flag had subsided there to the extent of several inches, and it was necessary to hoard it up in the interests of the public.
2890. As a matter of fact, that movable flag was like a lid? Yes; like a lid over a hollow place.
2891. And it could be moved by anybody? Yes.
2892. Do you know whether that flagging was removed since the tunnel was carried through there? It did not bear the appearance of having been removed, but I do not know whether it had or had not.
2893. I understood you the other day to say that it was cracked? It was broken.
2894. Do you know how it was broken? I could not say. I concluded that it was broken, owing to the subsidence beneath.
2895. You would not state to the Committee that it had never been lifted, and that no work had been carried on under it after lifting it? Certainly not; but I think if such had been the case I should have noticed it. I did not notice it; but I would not state that it had not occurred.
2896. What time was it when you knew it was hollow, and the subsidence occurred? I think it was late in the day. My attention was called to it, and I sent for a man to take a lamp and a tressel to put over it.
2897. On what date? I could not tell you; but there is a record in the office.
2898. You raised the concrete in Park-street about May last year;—was there a hollow space there? Yes; there was a hollow space there.
2899. Did you report it? No.
2900. This was before the friction between you and Mr. Donald? I considered that that hollow space was caused by the matter that I had reported to the City Surveyor. The operations of the Hydraulic Power Company in going from east to west across Pitt-street.
2901. Are you quite sure the that the Hydraulic Power Company did not lift that lid which you were speaking about a little while ago? I am not sure; but I do not think they did.
2902. They could have lifted it if they liked? Yes; but it was not in their line of work.
2903. The hydraulic pipes are along there, are they not? Yes; but not in the line of work dealt with by them at that time, so far as I know.
2904. They are always opening up streets to make connections with their pipes, are they not? Yes.
2905. They have a special right to open the streets to connect with or to make repairs to their pipes? Under their Act they can do so.
2906. Do they require to give you notice? They give us notice.
2907. They sometimes do the work and give you notice afterwards? In an urgent case. The work would be done without previous notice in case a pipe burst.
2908. Prior to December, 1896, were there any collapses or subsidences of any note over any of the tunnels constructed by the Telephone Department? During the progress of the paving works in Pitt-street, which was prior to December, there were certainly very considerable subsidences.
2909. Had there been any considerable subsidences, would they not have been reported to the City Surveyor and included in his report, if they were prior to December, 1896? I could not say. There was not very much rain about that time, or for some time previous to that.
2910. What is the City Surveyor's report based upon if they are not included in it;—all the subsidences caused by the work of plumbers and drainers are included in the report, and why not any subsidences caused by the action of the Telegraph Department? That is a question which the City Surveyor would be very much better able to answer than I am.
2911. As a matter of fact, are not the pavements over the telephone tunnels in a better condition now than they were before the tunnels were built? A portion of them, certainly. The portions recently dealt with are certainly not, and will have to be gone over again I expect.
2912. Which portions recently dealt with do you mean? In Pitt-street.
2913. Which portions of Pitt-street? Below Bathurst-street none of it has been reinstated except flagged areas. In the portion in Pitt-street, near Vickery's Chambers, the flags, as relaid, will require considerable alteration.
2914. Are they not in course of completion? They have been, so far as one can judge, completed by the Telegraph Department. They have been relaid and left—relaid unsatisfactory.
2915. Where is that? In Pitt-street, from King-street northerly. That is on the contract section.
2916. *Mr. Cook.*] Have you made inquiries whether that has been completed and finally left like that? It is reinstated and left.
2917. Do you know whether it has been finally dealt with? I could not say. I simply state the facts as they appear. I do not know if it has been finally dealt with.
2918. *Mr. G. McCredie.*] Do not the pavements compare favourably with the pavements elsewhere? Portions of them have been left better than they were prior to their disturbance, assuming there will be no further expense to the City Council in connection with subsidences.
2919. Have you not distinctly stated to Mr. Donald that the footpaths were a credit to him, and that Pitt-street especially was better than it had ever been before? I have made such a statement only in regard to sandstone-paved areas. All the tar-paved works in Pitt-street were executed by contract by the

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the City Council, the Government being charged the cost. My assertion, of course, in connection with such a statement could not refer to what was done by ourselves.
2920. Are you acquainted with the City Solicitor or anyone in his office? Yes; I am acquainted with him, and also with Mr. Ball, the chief clerk; but I do not meet Mr. Ball except officially, and I rarely meet the City Solicitor.
2921. You were aware that the City Solicitor conducted the lawsuit against the Postmaster-General, alleging that the defective work of the tunnels had caused damage to building No. 156, Pitt-street? I was aware of it, but not from any personal statement on his part.
2922. You were also aware, were you not, that Mr. Kethel, architect, was the architect for the alteration of the buildings? No; I was not aware of that.
2923. You were not aware that Mr. Kethel advised the City Solicitor in regard to this matter? No; I certainly was not.
2924. Were you asked to give evidence in the case? The case was never mentioned to me in any way, neither about my giving evidence nor otherwise, by the City Solicitor or anyone acting under him.
2925. Are you aware that the case took four days to try, and that the work complained of was pointed out and exposed to the view of the jury at this very identical spot, where a hole was made by a plumber or a gasfitter, or whatever he was? No; I was not aware that such an opening had been made.
2926. I suppose you know that the verdict of the jury was in favour of the Postmaster-General? I read it in the papers.
2927. On all counts? I did not notice that.
2928. Have you had any conversation with Mr. Waldron, or with Mr. Kethel, or with anyone else about this lawsuit? I think I heard it stated that there was some question about reopening the case, but it was only a random statement—I could not tell from whom now.
2929. Do you think that the opening of the case had anything to do with the opening of that footpath? I could not tell you.
2930. In constructing such works as telephone tunnels, which method would, in your opinion, be the better one to ensure the work being carried out perfectly—tunnelling or open-cut? I am not an expert upon such works, and I would rather not give an opinion.
2931. You gave an opinion the other day about the ramming and the tunnelling, did you not? I think I did, but I do not think that that referred specially to the telephone tunnel. I was asked whether I thought a trench could be rammed without ultimate subsidences, and I think I said "No."
2932. Supposing the work were carried out by open-cut, would it not interfere with the traffic considerably? I should say it would.
2933. How long would it take to construct a tunnel (say) 50 feet long by open-cutting in the footway—open it out, take out the earth, and build the brickwork, let it set, and then fill it up? I should say the whole lot could be done inside of a week if sufficient men were egaged.
2934. Are you sure it could be done inside of a week? It merely depends on the number of men you put on.
2935. You would take out 50 feet, take the stuff away, build the brickwork, and drain and render it, and complete it by open-cut within a week? You could not if there were much trenching or rendering put down, but I thought the joints were struck. Fifty feet would practically be ten sections, and five bricklayers could do the brickwork in about four days.
2936. Would it not have taken something like a month to complete it? I should not say so, if you had a number of men on. A fortnight would give plenty of time—a week for the excavation and a week for the brickwork.
2937. Well, all the time that work was going on the footpath would be blocked, would it not? Unquestionably, yes; nearly the whole of the footpath would have to be blocked to do the work with safety to the public.
2938. Supposing that the work were carried out by tunnel—50 feet carried out by tunnel underground—while that work was going on there would be no block of the footway above, would there? No.
2939. Provided that 50 feet were completed underground, how long would it take to remove the upper surface, take out the timbers, and make good the footpath as we are doing now? I should say it would take from two to three days at the outside.
2940. It would take considerably less time than open-cut, and would not interfere with the traffic? Certainly.
2941. Are you aware that the City Council requested us to carry out the work under this method? I am not aware of any such thing; I know nothing of it.
2942. In giving evidence on the last sitting day you stated that the sides and the haunches should have been filled in with sand;—how would you put the sand in? I stated that I had expressed such an opinion to Mr. Donald. I did not say such a thing should be done. I did not give any opinion at all on the tunnel construction.
2943. I understood you to state here that it ought to have been filled in with sand? I beg your pardon. I said that that was an observation made by me to Mr. Donald, and referred to in my report to the City Surveyor.
2944. Supposing it had been filled in with sand? I have already said that I do not wish to give an opinion on tunnel-construction. I am not an expert in the construction of tunnels. My recommendation only had reference to the perpendicular brickwork.
2945. Supposing you filled in the perpendicular brickwork with sand, how would you keep the sand out of the subducts? I do not know.
2946. You are aware that it was the intention of the Department to remove all the timber? No; I was not.
2947. You are not aware that a message was sent to the Council, informing them that it was the intention of the Department to remove the timber? Such a letter might be received, and I might not be aware of it.
2948. You were aware that the Department were removing the timber, and were finishing the work when the Council interfered in Park-street? I was aware that the removal of timber was going on in other places at that time.
2949. Do you know who authorised the interference with the Department when they were at work in Park-street? I do not. I was not present.

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2950. You do not know at whose suggestion, or upon whose report, the Mayor acted? I do not.
2951. It was not at your suggestion? It was not.
2952. Are you aware that the Mayor has stated that he acted on the advice of his officers, and that Mr. Gordon, the Acting City Surveyor, has also stated that it was not on his advice that action was taken? I am not.
2953. What other officer of the Council, besides the Acting City Surveyor or yourself, would be likely to advise the Mayor in such a matter? I do not know of any other officer. The clerk of works might do so; but I think it unlikely.
2954. With reference to the tar-pavement in Clarence-street, you are aware that the pavement in that street and in Kent-street was for the most part worn out, perished, and full of cracks and holes before the Department started their operations there? A portion of it was worn, but certainly not the whole of it.
2955. You know that there were only three pieces which could be called good? I do not know that. I did not inspect the whole length of the pavement.
2956. Did you not know that nearly the whole length had been cut through in the laying of the Hydraulic Power Company's pipes? It may have been, but it would have been reinstated satisfactorily.
2957. The cut which the Hydraulic Power Company made was afterwards made good by inserting a strip in the pavement, was it not? That was done before my time. It was not done during my period of office.
2958. For how long have you been in your office? About five years.
2959. Was that strip not put in while you were in office? I do not remember it being done; I think that it is very unlikely that it was.
2960. Who would have been likely to have been in office when it was done? I could not tell you; Mr. Richards, senior, probably. The whole paving system was under different rules then. People were allowed to put in the section immediately in front of their own premises.
2961. This strip had two joints in it? A portion of it.
2962. Had the strip left in by the Department, against the building-line of which you complained, one or two joints in it? It had one joint. It was not against the building-line, or we should not have complained.
2963. You reported to your superior officer that the joint looked unsightly, did you not? Yes.
2964. Did you think it looked more unsightly than the strip which the Hydraulic Power Company left with two joints? I think it did. It came just in the line of traffic. The water interfered with the pedestrian traffic disagreeably.
2965. The Hydraulic Power Company's strip was near the building-line, was it not? It was near the kerb.
2966. Would there not be more water near the kerb than within a yard of the building-line? There is not so much traffic near the kerb; the traffic is generally near the building-line, exactly in the line of the joint left by the Department.
2967. Do you think people are in the habit of walking nearer to the building-line than to the kerb? They invariably walk closer to the building-line than to the kerb.
2968. In this particular street, the frontage of which is occupied by warehouses and buildings of that description, there would not be so much traffic along the building-line as in the case of shops, would there? There is always a tendency on the part of pedestrians to walk on the building side. It is particularly noticeable in other parts of the city.
2969. You say that the two joints near the pavement left by the Hydraulic Power Company would not let more water into the ground than the one made by the Department? There was only one of the two joints which would allow water to percolate. That would be the joint near the building-line. Probably the conditions in that regard would be equal as between the Hydraulic Power Company's trench and the trench opened by the Department.
2970. You still say that the one joint made by the Department would look more unsightly than the two joints left by the Hydraulic Power Company? In the condition that the two joints were then in, prior to the disturbance.
2971. In some cases the ground was taken out up to the building-line? Yes.
2972. Do you know why? I cannot say.
2973. Was it not because the pavement was too bad and perished to leave in? I think it very likely that they could not form a joint upon it, and that, consequently, it was removed.
2974. Do you state that the bulk of the pavement taken up was in good order, and that it was not uneven, perished, or broken? It was in fair order. It would not necessarily entail any expense on the Council for some time.
2975. Did you meet Mr. Donald and Mr. Gordon, the Acting City Surveyor, by appointment in reference to this pavement on the 29th March? We did meet and have a consultation, but I am not clear as to the date.
2976. Do you know whether it was before or after the lawsuit? I could not tell you.
2977. Do you recollect walking over the pavement with these gentlemen, Mr. Gordon and Mr. Donald, and pointing out the places where, in your opinion, the contour of the pavement was not quite right, and where there were several other little defects which you thought should be remedied? Yes. Mr. Gordon himself attempted to stop the progress of the work in consequence of their being too great a convexity.
2978. Did not Mr. Donald promise to have the matter attended to except the taking up of the strip next the building-line? I think he did.
2979. You know for a fact that that was all done? I know it was not all done.
2980. What part was not done? A long time subsequent to that we had occasion to complain of the condition in which the footpath was left in front of Martin's store (say) from 447 to 451, or thereabouts.
2981. Were there any other places? Not that I can recall immediately.
2982. You ought surely not to have any trouble in recalling these places? I have a great deal to think of in the office. The control of a number of men does not give one much time to devote to particular facts.
2983. There was a portion which the Department completed in front of the Grand Central Coffee Palace, of which you complained in your report? I did not complain of that. It was completed by the City Council for the Electric Telegraph Department, and charged to them.
2984. I mean the portion in front of the Grand Central Coffee Palace? Yes; and a further extension a little beyond.

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2985. I understood that that was a portion in regard to which you said that the top coat was put on too quickly? That was to the south of the Coffee Palace—between the Coffee Palace entrance and King-street. The first opening was reinstated by the Council and charged to the Department.
2986. What about the second portion? The portion from where they connected was done by the Department themselves, I think.
2987. Do you know that the proprietor of the Grand Central Coffee Palace complained about the pavement being left unfinished? He did.
2988. Do you know that it was because of that complaint that the pavement was laid quickly, and that the top-dressing was laid before it was practically ready? I am not aware that it was in consequence of such a complaint that the work was hurried.
2989. In doing this pavement work in front of any building, I suppose you try to meet the requirements of the people as far as possible? Yes.
2990. You endeavour not to inconvenience them? Yes, as far as I can consistently with durability and proper workmanship.
2991. Do you not think that, in the case of such a building as the Coffee Palace, where there would be a number of persons going in and out, the proprietor should be considered? Certainly; but that would not be a reason sufficient to justify me in accepting an inferior pavement on behalf of the Council.
2992. Is it an inferior pavement? I think so.
2993. Have you seen it lately? I have.
2994. Could you tell the difference between that and your own work, if you went to look at it? I think I could. I paid a special visit to it yesterday.
2995. It does not look very bad, does it? Not very bad, no.
2996. Do you not think it would be reasonable to pass the work under the circumstances—that is, having regard to the necessity of suiting the convenience of the people in the buildings? That is a matter for the City Surveyor. My duty is to report if the work is not in accordance with the specifications, and the usual method adopted. The matter is then dealt with by the City Surveyor.
2997. You would not recognise that the work was one of expediency in the circumstances? It would be a question for the City Surveyor to decide whether the Council would accept inferior work on those grounds. That I am not at liberty to decide.
2998. You said in your evidence that the top coat of tar-paving in one street was only a quarter of an inch thick? I think I said it was about half an inch on the top of the knobs.
2999. Did you test it? Yes; in the presence of Mr. Gordon.
3000. In how many places did you find it so thin? We only tested four or five places. If it were as thin as that in only one place, that would be enough to condemn it.
3001. Will you assert that a great bulk of it was not as thick, if not thicker, than that which you laid in Pitt-street, between Liverpool and Goulburn streets, and for which you charged the Department? I will not, because special conditions existed in connection with that case. A subsidence had occurred over the line of the tunnel, and in the terms of the contract, I asked the contractor to make it good. Portion of that subsidence was attended to by the telephone tunnel employees, and the contractor, under protest, rectified the remainder.
3002. You say there were special conditions in that case? Yes; I mean that in the circumstances a certain concession would be made to the contractor, which, under other conditions, would not have been allowed.
3003. I suppose you will admit that we had special conditions to contend with in dealing with the pavement near the Grand Central Coffee Palace? Quite so.
3004. I suppose you will also admit that it is a very difficult matter to deal with the pavement in front of business premises so as to suit the convenience of persons using them? Yes, I do; very difficult.
3005. As a matter of fact, most of this work is work of expediency? Yes.
3006. Is not the portion to which you have referred in Kent-street now in a much better condition than before it was disturbed by the Department? Portions of it are; other portions are not.
3007. Can you tell me what portions are not? I could not say from memory. Those portions which, previous to the disturbance, were in first-class order, could not possibly be in a condition equal to that, from the fact of the joint being there, and secondly from the fact their being subject to further subsidence.
3008. Do you mean to say that it could not be in as good a condition with one joint as with two? There were not two joints. You are under a misapprehension when you say that the two joints extended throughout Kent-street. It was only in the portion between King and Markets street.
3009. Do you think it a fair thing to ask the Department to replace worn-out pavement with first-class new pavement? I consider it fair to ask the Department to leave the pavement in as sound and satisfactory a condition on the completion of their work as it was prior to the disturbance.
3010. I ask you whether you consider it a fair thing to ask the Department to replace old, worn-out pavement with first-class new pavement? If the pavement be disturbed by them, certainly I do—assuming a first-class pavement to constitute a similar material to that disturbed—that is, a first-class pavement of the same material.
3011. Whether the pavement be worn-out, or not, before hand? Certainly. Had the Department approached the Council in the case under notice, and suggested that a new pavement should be laid, and they intended to do so only to the joint, it is probable that an arrangement would have been arrived at under which the Council would have paid their proportion of the cost of the strip undisturbed.
3012. Had the Department allowed the contractor for pavement for the City Council to do all the work, do you think there would have been any trouble? I do not think so, because in that case there would have been no cause for complaint.
3013. Your objection, then, was principally to the men doing the work? I had not the slightest objection to that part of the business. My objection was as to the manner in which the work was done.
3014. How is it that other persons opening up pavement for excavations have been allowed to put in unsightly strips in a number of parts of the city? It is purely a matter of opinion as to what an unsightly strip consists of. In my opinion, the strips to which you refer are not unsightly.
3015. Can you say whether the concrete behind the kerb in the case of the granolithic pavement was put in before the tunnels were constructed? There was no concrete.
3016. Then, can you tell me the reason why you demanded from the Department that they should put 9 inches of concrete behind the kerbing? Prior to the disturbance of the soil behind the kerb by the Department

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Department it was solid and resisted the force resulting from the expansion of the wooden blocks. Once it had been removed the ground could not be replaced so solidly, and the kerbing would be more likely to become displaced by the blocks. The concrete in that case would serve as a preventive. I believe that was the object in asking for it.

3017. You asked the Department to put 9 inches of concrete behind the kerbing, because you did not think the ground would be solid enough? I thought it would not be rammed solid enough to withstand the resistance of the kerb to the pressure of the blocks.

3018. Do you think that if it could not be rammed solid enough, 9 inches of concrete on the ground which was not sufficiently solid would be satisfactory? It would be hardly sufficient, but it would help.

3019. You think, therefore, that it was a fair thing to ask the Department to put in this 9 inches of concrete? I did not ask it myself. The Acting City Surveyor dealt with the matter, and he will be better able to answer your questions.

3020. *Mr. Cook.*] Did you recommend it? I suggested to the Acting City Surveyor that it would be advisable.

3021. *Mr. McCredie.*] If you were the contractor concerned, do you think it would be a fair thing to be asked to put in this concrete? If in my contract there was no price for it, I would not put it in.

3022. Can you tell me the reason why 9 inches of concrete is not required in cases where flagging is put down as well as where granolithic pavement is put down? Similar conditions would not occur in the two cases. The concrete would not be put in, except where the ground was disturbed immediately behind the kerb.

3023. But you disturb the ground immediately behind the kerbing every day, do you not? Not to any great extent. The ground could not be rammed solid in cases where it is disturbed throughout the width of footway.

3024. Can you tell the Committee of any cases where you have laid flagging in the city, and where you have put 9 inches of concrete in after disturbing the earth? We never put it behind flagging, because flagging is easy to restore if it be displaced by pressure. In the case of granolithic pavement, that is not the case. You cannot relay the kerb in front of a granolithic pavement, but you can readily do so in front of a flagging pavement.

3025. In cases where the Water and Sewerage Board have disturbed flagging pavement, have you asked them to put in this 9 inches of concrete? No; the conditions are not the same. The Water and Sewerage Board make a trench 12 inches wide, which is rammed comparatively solid. You cannot ram the whole width of the footway so well.

3026. You think that 9 inches of concrete would prevent any sinking on account of the disturbed nature of the ground? No; I think it would assist the kerb to withstand solidly the pressure of the wooden blocks.

3027. Is it not natural to suppose that the more weight you put upon disturbed ground, the more likely it is to sink? I should not think it would make any difference.

3028. As a matter of fact, the granolithic pavement, when laid, forms a flag in itself;—it consists of solid substance, like a flag of stone? It would be 4 inches deep. The pressure of the blocks is 6 inches below the surface of the kerb. As a consequence, there is no resistance at the bottom. The kerb is pushed in at the bottom, and that leaves a sloping surface at the top.

3029. Is there not a clay joint put in between the blocks and the side of the kerbing to prevent that? Not always; and it is not always effectual.

3030. There is a kerbing in Moore-street, where the blocks acted as you say;—is there 9 inches of concrete behind that kerbing? There is no concrete.

3031. Who did that work? It was done under the supervision of the Council by the contractor.

3032. You insist upon the Government putting 9 inches of concrete behind the kerb, whereas you do not put it in in the case of your own work? The Acting City Surveyor dealt with that matter.

3033. I suppose on your recommendation? I suggested that it should be done.

3034. In giving your evidence last week, you dwelt for a considerable time on the number of loads of material used to fill in the space in the tunnel after taking the timber out? Yes.

3035. Was the report in that case your own report, or the report of your inspector? I stated, I think, that it was an extract from his report to me.

3036. Can you tell me the idea of keeping a check upon the number of loads? I simply thought it advisable to do so in the event of any question arising as to whether or not a space really existed below the timber.

3037. Was any check made upon the size of the loads? No.

3038. Can you tell me how much a dray-load holds? About 21 feet generally, but the quantity varies.

3039. In filling up these holes, was the stuff used put down as additional material? Yes; to distinguish between it and loads removed from one section and replaced in another.

3040. Did you make a calculation as to the cubic feet occupied by the timber which was removed? I did not. I simply stated the number of extra loads put in in a given area.

3041. I suppose you know that a quantity of timber was removed out of each of these sections? Yes.

3042. Take the first hole to which you refer: you say that it was a hole 10 feet long, 8 feet wide, and 5 ft. 6 in. deep; the cubical contents would be 440 cubic feet; loose material thrown into a hole like that would ram down pretty tightly, would it not? Yes; it would not ram so tightly as the undisturbed ground, of course. But let me understand your question. You want to know how, in the case of a hole 5 ft. 6 in. deep, 8 feet wide, and 10 feet long, you would get back the material taken out of it. If it were loose material you could get it back, if it were previously loose; if it had been solid material I do not think you would, although you might do so with an effort.

3043. How much would it ram down in 5 feet if it had not been rammed down before? You might ram it down a foot or 9 inches if it had not been rammed before

3044. Will you tell the Committee what a dray-load of stuff 21 feet would ram to—that is, what the cubical contents would be if it were put into a hole and rammed? I should say that it would ram to about 17 feet. That is only an approximate estimate—it is merely my opinion.

3045. Would you consider it well rammed if you got 17 feet out of 21 feet? If it were rammed as it was shovelled in, you might get it down to a bit less, but it would be rammed at 17 feet. You might get it down 20 per cent.

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3046. I will allow 10 per cent. for the 440 cubic feet, or 44 feet;—have you any idea of the cubical contents of the soil that would have to be put in to occupy the space of the timber taken out from this hole 10 feet long, 8 feet wide, and 5 ft. 6 in. deep? It would be practically 1 foot cube to each foot run for the poling-boards if laid close.
3047. If you worked it out you would find that, allowing for the vacant spaces just behind the caps, spaces which you could not fill in, there would be 2·034 cubic feet for every cubic foot run—that is, for all the timber taken out; allowing for 10 feet of excavation there would be 20·34 cubic feet; in dealing with flagging, the filling-in of excavation is brought up to the level of the top of the flagging, to remain so until such time as the new flagging is put in its place;—is that not so? That is so; but the material is not so calculated.
3048. What do you mean? A portion of that which is used to fill up to the surface-level of the flagging is subsequently removed and put into another section. Those loads are not embraced in the quantity given in my report. That I should regard as a removal. It would not form any portion of the total stated in my report.
3049. How do you know the difference between removals and loads of new stuff? The man is there, and he would know whether a load has been moved from this place to that.
3050. *Mr. Cook.*] Does he follow all the carts about? I presume so.
3051. Do you know that he does? No; I do not.
3052. *Mr. McCredie.*] There was only one inspector there at the first opening? Yes.
3053. There was a number of openings of that kind? I think not. There was only one gang of men working at first, and the inspector followed that particular gang of men.
3054. Do you think it possible for this one man to check the loads? That which he could not state positively he did not include. Unless he were satisfied that a load was an extra load brought from elsewhere, his instructions were—and he assured me that he carried them out in that particular—to make no mention of it.
3055. Then we have to depend entirely upon what this man thought to be a load of fresh material, and what he thought to be merely removal? That is my position.
3056. You do not know whether this man noticed whether the drays were all full? He regarded each dray, I suppose, as a load if it were level with the sideboards. I think it very improbable that they would bring half loads.
3057. There would be ultimately a considerable quantity of surplus material as filling to be removed from the works, and which must be deducted from that which you now call filling? In the section embraced by the quantity, as supplied in my report, there is no surplus stuff to be removed. It was completed at the conclusion of the report. There was no further stuff to remove.
3058. What was the date of this friction which took place between yourself and Mr. Donald? I could tell you by looking it up. I have a record of it.
3059. You could not tell us whether it was before or after the lawsuit which took place between Mr. Thompson and the Department? I could not. I know nothing whatever of the lawsuit.
3060. You state that you were dissatisfied in many cases in your dealings with Mr. Donald;—did you ever make any complaint to us, knowing that we had charge of the works? I did not know that you had charge of the works. I considered that Mr. Donald had entire power to deal with the whole matter. I was not brought into contact with you in connection with the work until recently.
3061. Did you not know that we sent notices to the Council on behalf of the Department to the effect that we intended to open up certain portions of the streets? I believe such a notice was sent, but my attention was not specially directed to the fact that it emanated from you.
3062. It would not have been much trouble to find out, would it? Not had I considered it necessary.
3063. You did not consider the friction between yourself and Mr. Donald of such a serious nature as to justify complaint to us? My previous complaints to Mr. Donald were attended to. Until the matter became of great importance, Mr. Donald always acquiesced in what was required of him, so far as surface work was concerned.
3064. You introduced the question of some reports with regard to Mr. Guest's contract? As to the pavement laid by him.
3065. Do you know that Mr. Guest contracted to do the work to the satisfaction of the Council? I was informed so by Mr. Guest.
3066. You know that he has given a ten years' guarantee to the Council for the replacing of the work? Yes. I do not know that the Council have accepted Mr. Guest's guarantee.
3067. In regard to your complaint about the pavement yesterday, opposite Richardson and Wrench's in Pitt-street, is it not a fact that Mr. Guest wanted you three or four days before to inspect the work, and that you did not do so? I received no communication from Mr. Guest that I did not attend to. As a matter of fact, Mr. Guest had only laid the concrete for two flags; I saw it there.
3068. Did he not ask you on the 18th to see the work before he begun, and that he never saw you until he went to the Town Hall on receipt of a letter from the City Surveyor, when Mr. Brown told him that the whole of the bottom concrete would have to come up, as it had set? I have no recollection of such a request from Mr. Guest; but, as a matter of fact, I was engaged here on Wednesday, and during the greater portion of Thursday I was engaged in the revision of my evidence.
3069. It came on to rain, did it not, when Mr. Guest was putting down the pavement? Yes; I believe that was the reason he was unable to complete it.
3070. Do you think that Mr. Guest could please you in any of these matters? I think it extremely likely. It is not my duty to discriminate between Mr. Guest and anyone else. I have to do only with the work. It does not matter to me who lays it.
3071. Did Mr. Guest pull up all the pavement you complained of? I do not know. I was not there. I have explained several times that I took exception to similar work opposite the Criterion Theatre. I insisted there that the concrete and the other portion should be laid on the same day.
3072. Were there not exceptional circumstances—the wet weather, for instance—which led to the bottom going in, in the way you have described? I think the wet weather certainly had something to do with it. But only yesterday he also completed two sections of concrete, when it was impossible for him to put down the wearing-surface on the same day. If he had started to complete the work at once, he could not have completed it before dark.

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3073. Are you aware that Mr. Guest took up the whole of the work of which you complained? I think it unlikely. I called there later in the evening, and I did not see any signs of the work having been further interfered with. He may have done so; I could not swear that he did not.
3074. You do not know that Mr. Guest took up the whole of the work, and that he put it in in the way that you required? I am not aware of that. I was there to-day, but I did not inspect that particular section. I was there at the luncheon hour.
3075. Was the work all right then? I did not inspect that section then. I simply called to give instructions to the man placed in charge.
3076. You did not look at the work? Not at that portion. It was covered with sand, if my recollection serves me aright. I did not want to enter into any discussion with Mr. Guest.
3077. Your relations with him are not amicable then? I do not discriminate between Mr. Guest and any other person. I deal with the work as laid, and not with the individual who lays it.
3078. There is a clerk of works there? I put a man there to specially observe whether any more was put in in the way which has been described.
3079. Did you ask him about it? I asked him to show me a sample of the material which had been laid there this morning. It had gone through the sieve. There were no pieces one-half of the size of those shown by me this morning in the sample shown to me.
3080. So that practically he said that Mr. Guest was carrying out the work properly? In a different manner from that to which I took exception last evening.
3081. So that Mr. Guest was carrying out the work in this way in consequence of the complaint you made? I think it extremely likely that that is the reason.
3082. The following paragraph appeared in the *Evening News* of 21st July last:—

> There is little further to record with respect to the dispute between the Postmaster-General and the Mayor over the alleged defective work in connection with the telephone tunnels. The cutting across Park-street is still open, and the suspension of vehicular traffic through that important thoroughfare still continues. Since the inspection by the members of the Select Committee yesterday afternoon the sheets of canvas which had been extended over the crossing, by the direction of the Mayor, to prevent damage by rain, have been removed, and there is now no protection against water entering the tunnel should a fall of rain occur. In accordance with a suggestion made by Mr. W. J. Lyne, Chairman of the Select Committee, after the inspection yesterday, a number of Corporation labourers are engaged this morning opening up a cutting of about 12 yards in length in Pitt-street, opposite the Royal Arcade, so that a further inspection may be made. That the work has not been efficiently carried out is shown by the fact that the men engaged in opening up the cutting do not require to use a pick in the course of their operations. They are simply shovelling up the loose matter, composed of half bricks, pieces of rubble, soft sand, and clay, which, judging from appearances, has not been properly tamped. Since the Select Committee has made the necessary inspection there cannot be any cogent reason for keeping that cutting open, and the authorities should see the necessity of filling in the excavation, so as to open the thoroughfare for vehicular traffic with as little delay as possible.

The question I want to ask you is whether the Corporation labourers opened up a cutting of about 12 yards in length in Pitt-street? No.
3083. Then the statement in the paragraph is not correct? It is incorrect. I take it that the portion referred to there was the portion in front of Kiss's, inspected by the Select Committee.
3084. *Mr. Robert Jones.*] In reference to the strip of concrete which you recommended should be laid along the kerbing, have you ever recommended that a similar strip of concrete should be put in in connection with your pavements? I only suggested the advisableness of it to the Acting City Surveyor. I did not recommend it. But we have laid, in our own work, a similar strip. For instance, there is a strip in Macquarie-place.
3085. *Mr. Harris.*] With reference to the work in front of the Imperial Arcade, there is a report on the 6th January, 1896, that the work in front of that arcade is progressing satisfactorily;—are you going over it a second time? Yes. Since that portion was formerly reinstated it has been cut up again, the timber has been removed from beneath, and it is being reinstated a second time.
3086. Was it done satisfactorily on the first occasion? Yes.
3087. *Mr. Bavister.*] You said, in reply to some questions to-day as to certain work which had been done, that you put in the basement of the building at Washington Soul's? The foundations.
3088. Would that be the building to which Mr. Gordon referred when he said that, in consequence of the insecure nature of the foundations, he had to pay careful attention to the building of the Civil Service Co-operative Company? No; the building to which I referred is between Park and Bathurst streets. It was in consequence of my knowledge of that foundation, and the representations made by me in connection therewith to the City Surveyor, that a special communication, I believe, was sent. I also pointed out to Mr. Donald the danger of a collapse if special precautions were not exercised.
3089. Have any of the works executed by you, as a contractor, been subject to investigation? No; I always succeeded in pleasing the architects under whom I worked.
3090. You never had any dispute in regard to the work done by yourself? I never had the slightest dispute.
3091. You said that there was a subsidence over the Hydraulic Power Company's main at Pitt and Park streets, to which you had, on at least two occasions, to devote attention as regards the reinstatement of the footpath? Not in connection with the footway. The Hydraulic Power Company ran their main by tunnel underneath the wooden blocks. Where the kerb subsided it was necessary to replace it. That was done, and in the course of that work I observed that underneath the wooden blocks the ground had not been properly rammed. I made a report to the City Surveyor informing him of what I had observed. It was not on the line of tunnel.
3092. You afterwards had to devote attention to this same position? No; we laid a new kerb there—that was all that was required.
3093. On which side of Park-street does the main run—I mean the one which crosses Pitt-street? On the south side.
3094. On the side nearest John Young's corner? No; on the opposite side. It intersects with the main at the Criterion, and extends along Park-street.
3095. Who suggested the advisableness of recording the number of loads of filling used when the timber was removed? I did so myself.
3096. No one made the suggestion to you? I do not think so.
3097. You are sure of that? I do not remember anyone referring the matter to me. I gave those instructions to the man on the second day he was there, I think.

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3098. In consequence, probably, of the prominence given in the Press to the number of loads of additional stuff required to fill in the excavation in the neighbourhood of Goulburn-street, that would probably operate upon your mind? I do not think it did. I thought that if the man was there, it would be no extra trouble for him to record the number of loads. It would be no more trouble for him to do that than to observe the other work which was proceeding.
3099. Do you remember the prominence given by the Press to the fact that a large quantity of material was required in some position near Goulburn-street? Now you mention it, I do.
3100. Were not the names of Aldermen Waine and David Davis prominent in connection with that matter? They were.
3101. You knew that both of those persons were taking an active interest in this business? At that time Mr. David Davis had not in any way interfered with or identified himself with the matter, so far as I knew. It was at Liverpool-street that he came in. At the meeting of the Water and Sewerage Board he called attention to something in connection with the work, but previous to that I do not know that he had in any way identified himself with it.
3102. Since that date it has been brought under your notice that he was actually interested in it, has it not? Yes.
3103. How? Through the Press only. I think Alderman Davis also told me that he had brought the matter up. I think he met me and told me so. I think he said he considered that the work was insecurely packed.
3104. So that he had a personal communication with you in your official capacity in regard to this work? That which I have stated to you is what transpired.
3105. You knew that Alderman Waine desired this matter exposed? Yes.
3106. You said this morning that Alderman Waine had recommended you to the Council? He introduced me to Sir William Manning, who was then Mayor. That is the full extent of his recommendation, so far as I know.
3107. You would not like to go contrary to his desires, if you could help it? If it were within the scope of my duty I should not hesitate to go counter to his wishes.
3108. You referred to the frequency of your visits to the Builders' Exchange, and I understood you to say that you visited it daily to get letters? My custom is, on coming in in the morning, to call there for letters.
3109. Is there no provision made for the receipt at the Town Hall of letters addressed to you? Yes.
3110. Is it more convenient for you to have two places at which to get your letters than to get them at the one place? I have had correspondents for years past who have been accustomed to address their letters to the Builders' Exchange, and as my stay at the Town Hall may not be permanent, I have not altered my address. The Builders' Exchange would be a permanent address, whatever might happen to me in my official position.
3111. I suppose you pay a merely nominal subscription for your membership at the Builders' Exchange? Yes.
3112. The chief advantage you enjoy being that it is a place at which you can receive and from which you can despatch letters? Yes. The subscription is, I think, 25s. a year.
3113. I think you made it pretty clear to the Committee that your powers are pretty extensive in regard to dealing with footpaths? Always subject to those of the City Surveyor.
3114. But your own powers, without specially consulting the City Surveyor, are of such a nature as to enable you to make it rather difficult for a contractor to carry on work in connection with pavements with satisfaction to himself, if you choose to do so? I have no such power. In the case of any dispute the matter is reported to the City Surveyor, and I receive my instructions directly from him.
3115. As a matter of fact, a contractor doing work under the Corporation, subject to your supervision, would object to be frequently reported by you to the City Surveyor? I should think so.
3116. So that viewed in that light your powers are pretty large? I should have to substantiate any report or complaint by facts. The City Surveyor would not accept my unsupported statements as to inferior material, or inferior class of work.
3117. I understand that you last night gave instructions for the replacing of a considerable section of concrete? Simply because the Acting City Surveyor was not at that time in his office.
3118. So that at times you can act upon your responsibility, without first reporting to the City Surveyor? Yes.
3119. Mr. Guest, the contractor, has had to do a considerable quantity of work under your supervision? Yes, as manager for Mr. Coskerie. He has had full and entire control of work for him.
3120. Is Mr. Guest still a manager for someone else? I could not tell you—certainly not for Mr. Coskerie.
3121. You told the Committee, I think, that your opinion of him as a manager was not a very high one? I I said that my opinion of the work executed by him as a manager was not favourable.
3122. I understood you to say that, as a manager, he was not held in high opinion by you? I should like to correct that. I did not desire to convey that. I do not deal with individuals. I simply deal with the work done, and there my duty ends.
3123. Does it not make a great difference as to the way in which work is done, and is regarded by the inspecting authority, if he holds an opinion that a manager, or the person in charge, is a liberal man, or a man of another character? Certainly not. Any exception which I take to work, I substantiate.
3124. Even if you failed to substantiate any objection which you might take, the delay would cause loss and irritation to the contractor, would it not? It would certainly cause delay, and perhaps irritation.
3125. The delay would cause a direct financial loss to the person concerned? Which might be recovered by him from the Council if I acted unjustly, or in error.
3126. If it could be proved that you were acting unjustly? Certainly, and that would not be difficult.
3127. You made some reference to the pressure exerted by the wooden blocks on the kerb interfering with the surface of the footway? Yes.
3128. What is the greatest rise in the footway you have known to take place under such circumstances? I should say from 3 to 4 inches in the case of tar-paved footways. I think they have bulged as much as that; but, as a rule, the matter would be dealt with by the Council before it became so bad.
3129. Do you remember that about four years ago a portion of the kerbstone on the north side of George-street, near the railway station, between the old police station and Harris-street, was subject to considerable disturbance from the cause you have mentioned? Yes.

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3130. Was there not a greater rise than 3 inches there? No; I do not think there was. The only portion of the footway there which is tar-paved is on the southern side fronting the bridge. There is no tar-pavement on the north side.
3131. You know of some premises there which are considerably below the level of the roadway? Yes; the footway there is flagged.
3132. When was that done? To my knowledge, it has been done for four or five years.
3133. Had not some disturbance taken place there previous to the footway being flagged? I could not say.
3134. Do you know why that portion of the footway was flagged? I do not.
3135. You were present during the whole of the time the opening was being made at Park and Pitt streets? During most of the time.
3136. To which of the men did you give instructions to do some ramming and filling in connection with the hydraulic main? I gave no such instructions.
3137. Did you not say to any of the men under you that something should be done to it, as it was too bad to be left like that? I did not. I instructed them to remove material from under the concrete up to the line of a pipe which was there extending east and west.
3138. You saw evidence that the filling over the hydraulic main had not been satisfactorily rammed at that part, did you not? I did not consider that it was unsatisfactorily rammed; neither did I see any evidence which would lead me to suppose that such was the case.
3139. Did the men under your instructions loosen the earth over that main? No, certainly not.
3140. If Mr. Gordon, the Acting City Surveyor, in his sworn evidence stated that he paid special attention to that matter, that the earth was not rammed, and that it presented no appearance of having been rammed, would you accept his word as conclusive upon that point? I should think there might be a difference of opinion as to the nature of the work. I would rather maintain my own opinion than accept that of another person. My opinion was based upon observation.
3141. Do you think there would be a legitimate difference of opinion as to whether the work had been rammed at all, or only as to whether it had been insufficiently rammed? I should think there might be a difference of opinion as to whether it had been sufficiently rammed, but not as to whether it had been rammed at all.

Joseph Alexander Kethel called in, sworn, and examined:—

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3142. *Chairman.*] What is your occupation? I am an architect.
3143. Do you exercise your profession in Sydney? Yes.
3144. Have you had charge of any building in Pitt-street? Yes.
3145. What building was it? The premises were originally occupied by the *Daily Post* Newspaper Company. It had been vacant, I think, for about thirteen months—I do not know the actual time.
3146. Would that be above King-street? Yes; No. 156.
3147. Did you superintend the excavation in connection with the foundations of the building? Yes; my original commission was to make certain alterations mostly in the back part of the building, and also to alter the front. The alteration to the front was the only structural alteration to the building. It meant cutting away certain of the piers which supported the upper part of the front, throwing the weight which had been borne by those piers on to the piers at the sides by means of an iron girder placed over the opening.
3148. And to do that, did you excavate? When I went into the building first—I think about the end of May, but I would not be certain about the exact date—it was either the end of May or the beginning of June of last year—and while I was measuring up to make certain drawings for the alterations, I noticed cracks which indicated some settlement from a cause outside of the ordinary deterioration of the building. I had a partner at the time, and we made a contract with a firm of builders. We started them to make the alterations according to the drawings we had prepared. I kept the builders working at the back part of the premises upon those alterations which did not affect the structure, while I had the cracks under observation. For about three weeks, I think, I delayed the progress of the works in order that I might watch them. I had them marked, and I found that they were extending upwards and outwards. The cracks occurred in the walls, which extended back at right angles from the front wall. They occurred at points varying from 3 feet to 4 feet 6 inches at the ground-level back from the front wall, and they extended upwards and outwards until they met the front wall. We took certain steps which prevented any further extension.
3149. Was there a new frontage put into the building? We were cutting part of the front out, and making a large shop window where there had been a door and a window. I wrote to one of the trustees of the property, informing him that I would not allow the front to be touched until something had been done to secure it, because immediately we took away any piers that were supporting the upper part of the front, we threw an additional weight on to the damaged portions. I called upon Mr. Donald also, and spoke to him about the state of the building; and after one or two interviews it was arranged by Mr. A. L. McCredie and myself that the engineers for the tunnel would, by their men, do suchunder pinning as I considered necessary to secure the safety of the front. I made a sketch and a rough specification of the work, which were agreed upon. I suggested to Mr. McCredie and Mr. Donald that, as there was a certain element of risk in carrying out this work of underpinning, it would, perhaps, be better for them and for myself if we called for tenders from two or three reputable builders and allowed them to take the whole responsibility.
3150. Before you proceed any further will you tell us why you consulted Mr. McCredie and Mr. Donald? From the nature of the cracks I could come to only one conclusion—that there had been some disturbance of the foundations or of the footpath in front of the building. The cracks were of such a peculiar nature that they could not occur from any cause other than a disturbance of the ground immediately in front of the building. I saw Mr. H. C. Kent, the architect, and took him up to the building. He saw the cracks and went away, and returned with his chief draftsman. His opinion coincided with mine exactly—that there had been some disturbance of ground immediately in front of the building. I did not know of it at first, but on inquiry I found that the telephone tunnel had been built immediately in front of the building.

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3151. Was all this done before you knew there was a telephone tunnel there? Yes; when I found that the telephone tunnel had been quite recently built I called on Mr. Donald. I would like to explain when I ascertained that the tunnel had been built I then wrote to the trustee.
3152. That is how you came to see Mr. Donald and Mr. McCredie? Yes.
3153. Did they take any responsibility at the time? Yes. I do not know whether I am right in repeating this, but the interviews which took place were subsequent to a letter which had been written by the trustees' solicitor. I suppose that the correspondence which passed with the Postal Department was written without prejudice; but at the interviews which took place at my office no reservation of any kind was made until at the last one, when Mr. Donald and Mr. McCredie, on leaving the office, said, "What we have said is without prejudice."
3154. What did they do? They agreed to do the underpinning to my satisfaction. The telephone tunnel had been constructed immediately in front of the building, and was down to a much greater depth than the footings of the foundations of the front of the building. In ordinary work, a contractor, when he excavates to a lower level than any existing foundations of adjoining premises, always underpins—that is, he builds a new foundation below the existing one down to the level of the solid rock, or to some good, substantial bottom, which, if built upon, will not entail any settlement.
3155. Did Mr. McCredie and Mr. Donald carry out what you proposed? They did not; so I carried it out myself through a contractor.
3156. Did they say why they did not? Yes; I mentioned the names of several substantial builders who, in the event of an accident happening, would make good the damage. At first Mr. A. McCredie agreed to this work being done by contract, but Mr. Donald said, "No, it is against our principle; if we employ a contractor he will allow a substantial sum for risk."
3157. Was not your contractor a substantial man? I wanted to be relieved of any responsibility in connection with the matter. Mr. Donald said the contractor would allow a substantial sum for risk, and that he could do the work for the actual cost of labour and material, as he had any amount of both at his disposal. My reason for taking the course I did was, that I understood had I taken any other means to carry out the underpinning, or had I allowed the work to be done by day-labour, there seemed to be no responsible person to take the risk of any mishap; and as the trustee for the building would have been responsible to the beneficiaries in the estate had any damage occurred, I suggested that, as far as we had arranged, the method of underpinning was quite satisfactory, but that he had better see Mr. Thompson or the solicitor to the estate. I believe some correspondence passed between them, and the whole of the negotiations fell through.
3158. Why? Because they would not accept the responsibility of any further mishap.
3159. Was the excavation for the telephone tunnel the cause, to your mind, of the cracking of the building? I found that the excavation round the tunnel had not been filled in, and that it had, undoubtedly, caused the whole of the damage to the front of the building.
3160. What distance was there between the tunnel and the building-line where the foundation was? The actual distance did not exceed 3 feet at the greatest part, but the tunnel had been built in an open cutting immediately in front of the building,
3161. You mean that the ground was opened for the building of the tunnel? Yes; the excavation for this tunnel came, at one end of the building, to within 10 inches of the plumb-line of our front. At the other end of the cutting there was 20 inches. These measurements were taken by myself.
3162. How far did the excavation extend below the excavation for the foundation? The excavation for the tunnel extended down to solid rock. I do not know to what depth it went into the bed of solid rock. This solid rock was from 4 ft. 6 in. to 5 ft. 6 in. below the bottom of our foundations.
3163. Did you excavate down alongside the tunnel? We had to excavate between the tunnel and the front of the building.
3164. Did you see the packing? I saw where the packing should have been. There was no packing. The place where the packing should have been was simply filled in with any sort of rubbish, *débris*, and material which seemed to be from old buildings. Across the top of the tunnel there were old pine planks. The rubbish had been just tossed in on the top of them, and some of it had found its way down between the side of the tunnel and the side of the excavation, but it was so loose that you could put your hand in. You could see the tunnel anywhere. I pushed my arm in across to the tunnel, and then along parallel with the tunnel through the rubbish.
3165. *Mr. Cook.*] Did you say that you found timber in this open cutting? Yes.
3166. *Chairman.*] Was it taken out for the jury to inspect? No. The counsel for the plaintiff begged them to go down and look at it, but they did not accept his suggestion.
3167. Do you say that an open cutting was made to form the tunnel? Yes; the cutting had been driven north and south up and down Pitt-street.
3168. And when the tunnel was finished you say that boards were put over the top of it? They were thrown loosely over the top.
3169. Were they put upon supports? No; they were absolutely without supports.
3170. Resting on the top of the tunnel? Yes. And the material, which was half clay and half decomposed rock, was then thrown in.
3171. Do you say that on the top of the boards loose earth was shovelled in? Yes.
3172. And that some of this earth had got down between the side of the tunnel, and the side of the excavation? Yes.
3173. And on the top of that there was the footpath? Yes, the footpath had been laid.
3174. Of what width was the stuff which you say was so soft that you could put your hand into it? The width varied from 18 inches to 2 feet.
3175. Did this material extend right up to the top? Yes.
3176. Did you underpin the building to the solid rock? I underpinned the building right down to the solid rock. In underpinning, I found that the bed-rock tilted forward towards the tunnel, so that that confirmed my opinion that the tunnel had caused the damage. They had removed the earth abutting the foundations, and had not replaced it with any compact body to resist the pressure of the weight of the walls on the body of clay and gravel. Of course it moved in the direction where there was least resistance, and as it was not held in front, the abutments being removed, it followed the tilt of the rock, and began to slip out into the street.

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3177. *Mr. Cook.*] The foundations had been well put in in the first instance? Yes; they were exceptionally strong. The front was built of stone which I have never seen used before. I believe it is termed "Hell-hole" stone. The hardest Pyrmont sandstone was used, and all the joints were thoroughly grouted up with cement. All the stones were tied together with iron cramps—cramps of bar iron 2 inches by a quarter or three-eighths. These extended over the joints from one end to the other, and were let down into the stones, so that the front could not possibly have cracked under ordinary circumstances. We removed the body of clay under the part of the front we wished to support. We did not underpin right across, because we were removing some of the front to provide for a shop window. We wished to do the thing economically, and we simply underpinned the piers we were leaving in. This was done with ordinary brickwork and cement. The work involved a delay of a fortnight, or a trifle more.
3178. Do you know anything more of the work alongside the tunnel? Only that there had been no packing whatever. At each end of the tunnel there was a drive, and the entrance to the drive had been timbered over with hardwood slabs, supported on hardwood uprights. That, I think, extended about 3 feet across our boundary on the southern side, and on the northern side about 5 feet, so that later on, when the plumber came to make water and gas connections in front, he was unable to do so, except with great trouble. A man took three or four days to make one connection which, under ordinary circumstances, would not have taken more than three or four hours.
3179. That does not point to any fault in the tunnel work? No. The fact of this timber being there with a cavity behind it was a temporary means of preventing a collapse of the footpath. In reality it did not prevent it; it merely postponed it. It was only a matter of time when the timber would decay and the path collapse.
3180. Where was the cavity you described? In behind the upright slabs of timber.
3181. Do you mean outside? Yes. The slabs had been left in at the sides, and there was boarding across the top. A cavity existed underneath, around the brickwork.
3182. Between the top of the tunnel and the boarding over it? Yes.
3183. What cavity was there? About 8 inches. We put a shovel right across without meeting any resistance. I pointed out that as soon as the timber decayed the front of the building would collapse unless it were underpinned.
3184. Have you any knowledge of the life of timber? Yes.
3185. Did you inspect this particular timber? Yes. The boards thrown across the open cutting would not have lasted more than a couple of years, pine being very perishable; but the hardwood timber would last for many years—perhaps eighty or ninety years.
3186. Do you know what kind of hardwood it was? No; it looked like what they call forest mahogany. The life of that timber in such a position would not be many years. Had it been ironbark it would have lasted perhaps eighty or ninety years. The life of timber depends a great deal upon the time at which the tree is felled.
3187. How long would the timber which you saw there last? It is almost impossible to say. The pine would not last more than two years; the other timber might last fifty or sixty years, or it might last 100 years—it is a matter of conjecture.
3188. You had a Supreme Court action? Yes; I was a witness. I mean in the action between the trustees of the property and the Postmaster-General.
3189. You lost the case? Yes.
3190. One point in the action was in connection with the underpinning of the building? Yes; the action was to recover the cost to which the trustees had been put in making good the damage to their building.
3191. Was the City Solicitor, Mr. Waldron, connected with the case? His firm was; but he took no active part in it. The case was in the hands of Mr. Dawson, who attends to the affairs of the Thompson Estate.
3192. Did you hear him say that he would make it sultry for the Post Office people? I never heard that. The only expression of opinion he ever made use of in my presence was in a casual conversation about applying for a new trial. He said, "Thompson, the first loss is best."
3193. To whom did he say that? To Mr. Thompson.
3194. To your knowledge, did he in any way attempt to influence either the City Corporation or anyone else against the Postal Department? No, not in any way. As far as I know, no mention of that was made.
3195. Nor, as far as you know, was any such act done? Whatever action was taken by the Council was taken altogether without any reference to this case.
3196. As far as you know, no influence was used by Mr. Waldron or his firm? No; as far as I know, he knew nothing about it until he saw the report of the Council's proceedings in the newspapers.
3197. *Mr. Nelson.*] You said that you were taking out the front of the building to put in an iron girder? A part of the front.
3198. How far would the iron girder extend across? There was 11 feet 6 inches of actual span.
3199. You said that in underpinning, you found that the foundations of the building rested on rock? No.
3200. You said that the soil beneath the foundations was resting on a rock which was shelving? Yes.
3201. In your opinion, when the soil was cut away from the front, facing the tunnel, the pressure of the building caused the earth to slide forward? Yes.
3202. You also say that that opinion was borne out by other architects? Yes.
3203. Were they men of any standing? Mr. H. C. Kent and Mr. J. Kemp.
3204. You consider that the excavation for the tunnel was the cause of the earth coming forward? Yes.
3205. You say that you spoke to Mr. Donald and Mr. McCredie, and that they admitted that the excavation was the cause? They would not admit anything.
3206. Did they consent to certain things being done? Yes; they agreed to do them.
3207. Was not that an admission? I do not know that you could call it an admission.
3208. You said that they agreed to underpin to your satisfaction? Yes; according to a sketch and specification which I prepared.
3209. You afterwards did the underpinning yourself through contractors? Yes. I may, perhaps, be permitted to add that I called for tenders. I had three tenders, and there was a reply from a fourth builder to the effect that the work was too risky, and that he would not undertake it. 3210.

3210. Was any amount of money offered to you provided you carried out the work upon your own responsibility in the first instance? They offered £15; but I said that that amount would not commence to pay for the shoring. J. A. Kethel. 25 Aug., 1897.

3211. *Chairman.*] Who offered it? I am not sure whether it was Mr. McCredie or Mr. Donald. I believe some offer was made without prejudice.

3212. *Mr. Nelson.*] At this time the tunnel was completed in front of the building? Yes.

3213. And you say that in one corner the excavation was within 10 inches of the building? Yes.

3214. I understood you to say that some timber was left across the crown of the tunnel? Yes; ordinary pine boards, about 12 inches by 1¼ inch.

3215. The cutting was taken right through—it was not driven? That appeared to be the case. I did not see the work done.

3216. Was there any timber standing vertically in the sides of the cutting on either side of the tunnel? We did not see what was on the outside, between the tunnel and the street, but we found no vertical timbers between the tunnel and the building.

3217. I understand that the timber was laid across the top of the tunnel, there being nothing supporting the ends? That is so.

3218. Between the excavation and the brickwork, what was there? Rubbish had been thrown in—all sorts of odds and ends—but it was mostly decomposed rock, and half clay.

3219. Would you consider that some of the material you saw there was a portion of what had been excavated? I think it probably was.

WEDNESDAY, 13 *OCTOBER*, 1897.

Present:—

MR. BAVISTER, MR. COOK, MR. F. CLARKE, MR. HAYES, MR. ROBERT JONES, MR. McGOWEN, MR. NELSON.

W. J. LYNE, ESQ., IN THE CHAIR.

A. L. McCredie, Esq., and G. McCredie, Esq., appeared in person on their own behalf.

Joseph Alexander Kethel recalled and further examined:—

3220. *Mr. G. McCredie.*] How long have you been practising as an architect? For six years. Before that I was four years under indentures, and before that I served five years and three months at building construction—three years with Alexander Dean, and two years and three months with Smith and Bennett, and I had a year at quantity surveying and estimating. J. A. Kethel. 13 Oct., 1897.

3221. You have been in partnership with other architects during the six years, have you not? I was in partnership with one man for about seven months, but we dissolved partnership last January—on the 9th or the 11th, I forget the exact date.

3222. Can you tell the Committee what are the extent of the works you have carried out? I designed and carried out, while a pupil, the building that was afterwards occupied by the Water and Sewerage Board, above the School of Arts. I did not design the 8-scale drawings, but I altered them extensively in three-quarter scale. I was engaged on the Wesleyan Church in York-street; I did almost all the details there. I was engaged on Gardiner's warehouse in York-street. The building was well on, but I did some of the masonry details, and most of the wood details. In connection with the Imperial Arcade, with another gentleman, I designed the 8-scale drawings, and then carried it out single-handed after that. Since I have been practising for myself there has been no big work carried out in Sydney. I have not had an opportunity of carrying any out in my own name; but I have carried out a good deal of domestic work—four or five commissions, ranging from £1,600 to £2,000, and many smaller.

3223. In whose office were you a pupil when you carried out that work? I was articled to Messrs. Rowe and Green, but I was directly under the late W. Wright Campbell, their superintending draughtsman.

3224. You were one of the firm of architects that carried out the alterations to 156, Pitt-street? Yes; I should like to say, when you ask me about my experience, that my architectural work was placed twice on the honor list at the annual classification at South Kensington, England, and one year it was placed first. I was a pupil then.

3225. Who, besides yourself, were the members of the firm of architects that carried out the alterations to 156, Pitt-street? There was only one other member. The firm was called Kethel and Peddle.

3226. Was not Mr. Mann connected with it? Mr. Mann had nothing whatever to do with the job.

3227. With reference to the job at 156, Pitt-street,—did you advise the trustee of the property, or his solicitor, to bring an action against the Postmaster-General? No; that would have been nonsense; I was not his legal adviser.

3228. Was it on your advice that an offer of £15, made without prejudice, was refused? Yes; I said to you at the time that £15 would not commence to pay for the shoring. I think I said so the last day I was here.

3229. Is it not a fact that you asked us to sign a document which would have made the Government responsible, had the building tumbled down from any cause whatever? Yes; I explained that last time I was here. I asked your brother and Mr. Donald. My idea was to connect the Government in some official way with the under-pinning to be done, and not to have irresponsible workmen sent on to the job. I advised them that, certainly, and the trustees' solicitor also advised them, and it was on your refusal to do that, or your partner's refusal to do it, that the negotiations fell through.

3230. You also demand an amount for your fees equal to what we estimated would be the cost of carrying out the under-pinning? Yes; I charged my time at £15. The fees that I received on that work came to £9 17s. 6d., from my own client, apart from the loss of time connected with the negotiations; I lost almost a fortnight, as you must be aware.

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3231. Is it not a fact that you stated in your own office, in the presence of Mr. Donald and Mr. Arthur McCredie, that you would make more money out of the job if the matter went to law? No; it is not a fact. I tried as much as possible to avoid going to law.
3232. You are sure about it? I am quite positive about it.
3233. In carrying out the works at 156, Pitt-street, there were a good many alterations;—I recollect that you stated in the Court that you received more than 5 per cent. commission for carrying out work of that description? Yes, certainly. The charge of the British Institute for that kind of work is 10 per cent., and then we are allowed payment also for any extra time involved. The minimum charge allowed on the scale adopted here by the Institute of Architects in Sydney £3 3s. for a day of five hours, or £1 1s. an hour for any portion of a day not exceeding three hours.
3234. Did you charge more than 5 per cent. in connection with this work? Yes.
3235. And obtained it? Yes, I did. I obtained £9 17s. 6d. actual commission on work done without any fees for loss of time before the case ever went into Court.
3236. During the lawsuit the Jury inspected the excavations, did they not, at the request of the defendant's counsel? No; they neglected to do so. They did not decline; they went there before the case commenced and looked round the building. They could not see the excavations. Our counsel urged them to go down and inspect the excavations, and said that we would take up the pavement in order that they could see them. His Honor Mr. Justice Stephen adjourned the Court for lunch about half an hour earlier, in order that the Jury might go down, but the Jury did not go down. I was there the whole of the time, and the Jury, I say, did not go down.
3237. The case occupied about three days? Four days, I believe.
3238. Counsel was employed on both sides? Yes.
3239. Is it not a fact that the Jury gave a verdict for the defendant on all counts, and added a rider to the effect that there was no negligence on the part of the employees of the Government? I do not know what you mean by "all counts." There could only be one count, in my opinion—that of negligence. When the jury returned their verdict it was simply a verdict for the defendant, and the issue put before them was—"Was there negligence or not?" His Honor then remarked to them, "You mean that no negligence has been shown," or words to that effect. Their verdict was simply a verdict for the defendant.
3240. You do not think it was a fair and just verdict, I suppose? No, certainly not.
3241. In giving evidence the other day, you spoke about the stone in front of this building—156, Pitt-street—and you said it was constructed of a stone which you had never seen used before? What I meant was that I had never seen a harder sandstone used for building purposes anywhere than the stone that was used in the front of the building.
3242. You could not tell whether it had or had not come from "Hell-hole"? No, I could not; nor could anyone else. I may explain that there are three parts of Mr. Saunders' quarry at Pyrmont, or there were. I believe that they call one Paradise, and that they call the others Purgatory and Hell-hole. I believe they are so called on account of the nature of the stone, but once the stone is weathered it puts on a hard surface, or when the quarry sap dries out it hardens right through, and it is impossible then to tell which of the three quarries the stone came from.
3243. In connection with the work in front of 156, Pitt-street, you admit that it was done by open-cut? I believe it was. I do not admit that it was, because I did not see it.
3244. And you say that there were 1¼-inch pine boards taken out of it? I am not sure as to the size, but it was 1¼-inch or 1⅛-inch.
3245. Would it not involve additional work to put any boards at all over the tunnel when it was completed by open-cut? I do not know; I suppose it would.
3246. You say they were pine boards;—are you quite satisfied that there were any pine boards at all there? Yes, I am; they were lying loosely. They did not seem to have been placed there for any given purpose, except just to support the pavement.
3247. You would be surprised to know that there were no pine boards similar to those you described ever purchased or used in connection with the whole of the excavations? Of course I do not know, but I would not be surprised to hear it.
3248. *Chairman.*] But you said there were pine boards there? Yes, there were pine boards there; but I would not be surprised to know that they did not use pine boards; they were similar to scaffolding boards.
3249. *Mr. G. McCredie.*] Would you think it possible they came from the side-walls of the building? Oh, no.
3250. With reference to the pine boards, have you any idea how they came to be there at all? Not the slightest idea.
3251. Were they taken out? Yes; they were taken out.
3252. *Chairman.*] How is it that you say there were pine boards there, and then in answer to a question from Mr. McCredie you say that you are not surprised to hear it stated that there were no pine boards used? Well, from the nature of the work I should think that pine boards would not be at all suitable either for the shoring or for the crown boards.
5253. That is not answering what I wanted to have cleared up, which was this: You say there were pine boards there, as you say, to support the pavement, so far as you could judge; have you any idea how they came there, where they came from, and are you certain they were pine boards? I am certain they were pine boards. I do not know where they came from, unless they were thrown in perhaps from the hoarding that was round the excavation. It struck me that the timbers which were in the cutting came from the palisading round the opening.
3254. *Mr. G. McCredie.*] You do not know who took them out? Yes; Mr. Hardacre took them out. Mr. Hardacre was the foreman bricklayer who carried out the underpinning. They were in our way.
3255. Do you think it was possible for any of your workmen to have put them in? No; utterly impossible. No one in connection with our work could have put them in.
3256. Did you yourself see them taken out? Yes.
3257. Did it let the footpath down when they were taken out? We had encroached on the footpath 3 or 4 feet. To make the excavation we had to break through the footpath. We had to make an excavation down in front of the building to get in the underpinning. These boards were in our way, and we had to remove them when we got down to a depth of a couple of feet.
3258. They were across the tunnel? Yes.

3259.

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3259. Well, if they were across the tunnel, taking them out would naturally let the footpath down? It would in time, perhaps. As they rotted, if they had been left there, they would have let the footpath down.
3260. But taking them out would leave a space, would it not? Yes, it would leave a space; but it does not follow that the earth over the tunnel would collapse.
3261. Referring to your answer to question 3154, did your contractor underpin the walls of the adjoining buildings where your excavations went below the foundations of those walls, especially that on the southern side—I mean Washington Soul's? Yes, he underpinned them. He did not underpin Buttel's old buildings. Their foundation was almost on the rock, and at the time we knew that the buildings were to come down, because we were providing for one of the tenants. We did not have their written consent, but there was no underpinning insisted upon, and the building has since been pulled down, and the Civil Service Co-operative Society's new store is being built on the same site. Knowing that, we did not underpin the wall, because it would simply have been waste of money.
3262. You say that you underpinned Washington Soul's? Yes.
3263. Right down? Yes, right down.
3264. *Mr. Robert Jones.*] You say, in reply to Mr. McCredie, that you are not surprised to hear there were no pine boards used in the work? No; I am not.
3265. Well, are you of opinion that the boards you saw were there by accident or by design of the Government? I can hardly say that. That is not a fair question. They may have been there by accident, or they may have been there by design; but as I was not there when they were put in I cannot express an opinion upon that.
3266. Judging from the position you saw them in, are you of opinion that they were placed there by design by the men who were doing the tunnel, or that they were there by accident? I say now that they seemed to me to have been placed there with the design of supporting the footpath.
3267. What were the supports that they were resting on? They were resting on no supports whatever.
3268. *Mr. Cook.*] You have formed an opinion within the last quarter of an hour, have you? I did not like to express that opinion, but I can form only one opinion about it. I said before, in my evidence, that those boards were not supported at the side, and that there were cavities below them—between the sides of the tunnel and the excavation, where I put my arm through; and following out that idea they seem to have been there for the purpose of supporting the soil above that—the *débris* and rubbish that had been thrown in.
3269. *Mr. Robert Jones.*] What were they resting on? Simply on the crown of the tunnel and the loose rubbish thrown in anyhow.
3270. Well, where would the space be which they would prevent being filled up? The cavities between the brickwork of the tunnel and the sides of the excavation; and I consider that the neglect to fill that cavity was the cause of the damage to our building.
3271. Those portions of the tunnel work you say were not filled up? I say most decidedly that they were not filled up.
3272. And these pine-boards kept them from being filled up? Yes.
3273. What depth of filling was there on the top of these pine boards? I should say 2 or 3 feet.
3274. *Mr. G. McCredie.*] As regards the pine boards, I understand they were taken out? Yes.
3275. If those boards were taken out, your men took them out? Yes; our man, Mr. Hardacre.
3276. And did not the footpath go down when they were taken out, and a space was left? I said before that part of the footpath began to fall in, and some of the loose *débris*, and we had to shore it up to prevent it from falling in to our excavation.
3277. But these boards went across the crown of the tunnel, did they not? Yes.
3278. Well, in the outside portion of the footpath there would be a vacant place when these boards were drawn out? I will not express an opinion about the work outside the tunnel, because I never saw it, but since this work has been done there have been many tons weight on the footpath. The footpath has all been relaid since the soil was put there, and we have had a stack of bricks, fully 10 feet high, right across the front of the building, so that probably the footpath subsided as much as it would.
3279. In taking out those boards, how much earth was above them? Two or 3 feet.
3280. It would be rather a difficult matter to drag a board out against the weight of 2 or 3 feet of soil, would it not? Not the way the soil was thrown in on the top of these boards.
3281. The flagging on the footpath kept all right? It was not flagging—it was simply granolithic cubes, which had mostly been taken up.
3282. And you had those heavy bricks on the top? Not at that time, but since the underpinning was done.
3283. In giving your evidence the other day, I understood you to say that the tenant ran away, because he was afraid of the lawsuit—was that correct? Not the tenant. He was one of the tenants. There were two tenants—Schneider and Lantay. Lantay was finding the money to make the alterations, or most of it, and when this delay occurred, it seemed at the time that there would be a lawsuit against the contractors for delay. They were under a heavy time penalty—I mean the contractors with Schneider and Lantay—and at the time the contractees said that they would enforce that time penalty. Then Foster, who was the contractor for the work, claimed from Mr. Thompson, the trustee, and there seemed every chance of a triangular lawsuit between the contractee, and the contractor, and the lessor; and then Lantay cleared out.
3284. Is he in the city now? I do not know. I have not seen him since.
3285. You are satisfied that it was on account of the lawsuit that he cleared out? I am satisfied that it was on account of the impending trouble. I think I said the last time I gave evidence here that the contract could have been completed within three days at the outside but for these negotiations.
3286. Was not the alleged damage to this building a crack in an old inside wall? No; that was not the alleged damage. The alleged damage was the three cracks in the walls that extended back from the front wall.
3287. Did not Mr. Kemp state in his evidence that the wall had seen the last of its days, and, in fact, was all but rotten? I do not know what he stated. I did not follow his evidence right through; but it is not a fact that the wall was rotten, because most of the bricks were used in the new work.
3288. Had you any accident in carrying on this building—in connection with one of the piers—in going down there to underpin? No; we had no accident of any kind. I should like to say that there was an old well, which had been there before the building was put up originally. The front wall of the building crossed

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crossed this old well; but the well was in such a position that it did not affect the stability of the building at all. The stones had been bonded in such a way as to throw the weight on to the solid rock on each side of the well. I mention this now because it may be mentioned afterwards. There was also an old box-drain, which had been there many years, which was also alleged by the tunnel people to have caused this damage; but it was impossible for it to have caused the damage, for had the building subsided towards the drain the cracks would have appeared in different positions. They would have appeared across the front of the building, whereas there were absolutely no cracks across the front of the building.

3289. *Mr. Bavister.*] What is the name of the firm who first took the contract for that building? Foster & Co., or Foster and Son; I am not quite clear which.

3290. Did you yourself have any portion of the underpinning done by day-work? No.

3291. Then Hardacre, who was the foreman bricklayer, was working for the contractor the whole of the time? Yes. Foster had charge of that job then.

3292. In answer to question 3148, you say, in regard to the cracks: "I had them marked, and I found that they were extending upwards and outwards. The cracks occurred in the walls which extended back at right-angles from the front wall";—do you mean that the cracks extended back at right angles? No; the walls extended back at right-angles.

3293. You spent some time with Mr. Alexander Dean to gain a general knowledge of building construction; during that period was your attention directed to any particular branch? Necessarily it was. All my time there was spent at the trades connected with the carpentering; but, besides that, I attended classes held by an old retired bricklayer two nights a week, for the purpose of learning bricklaying as well, while I was an apprentice to the carpentering.

3294. But while with Mr. Dean you devoted your attention particularly to carpentering? Yes; indoor work.

3295. You had nothing to do directly with the firm in connection with brickwork, masonry, or excavation? No.

3296. That portion of your experience has been entirely theoretical? Yes; except during the time I spent with Smith and Bennett, when I was employed on the erection of buildings—the Custom House, the Post Office, and the Lands Office.

3297. You say that since you have been in practice on your own account no big works have been carried out in Sydney? Not since I have been practising for myself. While I was with Messrs. Rowe and Green, at the Imperial Arcade, we had as much excavating, shoring, and underpinning as you might see in any half dozen jobs.

3298. Do you mean to say that no big building has been carried out in Sydney during the past six years? Hardly any big private buildings. What I meant was, that no large buildings on which a junior architect would have had an opportunity of getting work, had been carried out here during the last six years.

3299. What you really mean is, not that there has been no big works carried out, but none on which you could get employment? That is what I mean.

3300. Some of the largest insurance companies buildings have been built during that period? Yes; but the competition for those were held a long time ago. The Equitable building was designed by their own architect, Mr. Raht, whom they retain on a salary.

3301. Was not the City Bank, in Pitt-street, open to competition? I do not think so. I have not the slightest recollection of its being open to competition. I think it was a direct commission to Mr. Mansfield.

3302. As you have raised the question of large works, what has been the amount of expenditure involved in the biggest work you have undertaken since you have been in practice for yourself? Several over £1,900, but under £2,000, and one £4,500.

3303. You referred just now to a stack of bricks that was 10 feet high; what was the width of it? The width of the stack was about 8 feet.

3304. And the length? It covered almost the whole of our frontage.

3305. It was 1 feet wide, 10 feet high, and 50 feet long? Not 50 feet long. The whole of the frontage was only 30 feet, and we had a cart entrance which was kept clear. The stack was about 15 feet long.

3306. The stack was on the side of the tunnel? Right above the tunnel.

3307. Which you did not believe to be safe? I did not say "which I did not believe to be safe."

3308. Which you have tried to show to this Committee was done in such a manner as to be dangerous to persons using the foothpaths? After we had underpinned our building we had to repack the whole of the stuff and ram it between the front of the tunnel and the front of the building, and that stack was placed over work we had renewed.

3309. You did not take out and re-ram in an efficient manner, according to your own ideas, the stuff on the side of the tunnel farthest removed from the building? No.

3310. Well, if that were faulty, and if the side nearest the building were solid, and if a heavy weight were placed there, any subsidence there would have a tendency to throw the whole of those bricks into the street, would it not? If the weight rested on the faulty part outside; but, as I said, the stack was about 8 feet wide, and the footpath was 12 feet wide, and I think that the outside of the stack would have extended much further, if not to the crown of the arch, which I presume was meant to resist the weight above it.

3311. Assuming the path to be 12 feet wide and the tunnel to be in the centre of the path, would not the centre of the tunnel be 6 feet from your building line? Yes, about.

3312. And were those bricks stacked close up to your building line? Yes; twice we had to shift them to do work in connection with the front of the building. I had not the control of that job, which I would have wished to have had. The clerk of works or the foreman there did not work under my instructions. I was simply there to see that the work was carried out according to the drawings which had been submitted by the lessees to the trustees of the property.

3313. Assuming that the bricks were stacked close to the building line, and that the stack was 8 feet wide, it would extend 2 feet past the centre of the tunnel? Yes, of course it would.

3314. And any subsidence in the ground on which they rested would have a tendency to throw them over into the street to the danger of the traffic? Yes; but of course there are a great many reasons which might prevent it; for instance, if we had a greater strain on that previously, as I believe we had, because we had our spurs to support the building up from the outside there. If we wedge these and throw a greater weight on that ground, then we consolidate it, and make it safer for any weight not greater than that already put on.

3315. You did that, and yet you have been trying to show this Committee that in your opinion that ground was not safe? I expressed no opinion about the ground outside the tunnel; but I say that the ground between the tunnel and the building was decidedly unsafe.
3316. Had you any reason to believe that the outside you did not see was in a better state? No; I had no reason to believe it.
3317. There was nothing to induce you to believe that that was better than that which you knew to be bad? I knew nothing of the work outside the tunnel.
3318. In reply to question 3176 you say: "I found that the bedrock tilted forwards towards the tunnel";—are we assume from that that the bedrock had shifted from its original position? No; certainly not. The incline of the rock was towards the tunnel.
3319. You speak of this foundation having been put in in an exceptionally good manner—bonded together with iron cramps, the joints being thoroughly grouted with cement;—had they not taken the precaution of levelling this sloping rock to receive the foundation? I said, and I have always said, that our foundations did not extend down to the sloping rock. They were foundations which were quite capable of supporting a building of that description; but underneath the foundations, and above the sloping rock, there was a depth of clay, and on removing the soil outside that ("the abutting soil"), naturally the other followed it, the tilt being outwardly, and that was why I based my opinion that the excavation in connection with the tunnel had caused the damage to the building.
3320. You say, in answer to Question 3177: "We wished to do the thing economically, and we simply underpinned the piers we were leaving in";—you avoided every expense that you could avoid? To show you that we did avoid that expense, I may mention that in a work which was carried out under a subsequent contract we had to put in more underpinning. We put in an iron column under a girder in the centre of the building, and we had to put in more underpinning under that.
3321. Then, as a matter of fact, practising the economy you referred to in answer to that question, you did not do all the underpinning that you subsequently found was necessary? No; we did the underpinning that was required by the alterations of front under the first contract. Had the foundation rested on rock there would have been no settlement; it would have been quite safe.
3322. In answer to Question 3183 you say: "We put a shovel right across without meeting with any resistance; I pointed out that as soon as the timber decayed the front of the building would collapse unless it were underpinned";—are we to understand that the front of your building depends on the footpath for support? No; but what you are to understand is, that at each end of the building the timbers that seemed to me to be the entrance to the drives of the tunnel are still in position. There are the uprights of the top. Those uprights are acting, or were acting then, as a support—keeping back the clay from sliding forward; and as soon as they decayed the support would be removed and the thing would collapse.
3323. Then it is not even now underpinned where necessary? Yes, it is underpinned where necessary; but that was the state of affairs at the time when we undertook the underpinning work.
3324. I think you have a general knowledge, or a special knowledge, I might almost say, of timber for many years? Yes.
3325. And you would feel competent to give an authoritative opinion on any question of timber? I do not say that. I have a fair general knowledge—a trade knowledge.
3326. And that you have had for many more years than you have had knowledge as to buildings? Yes.
3327. You would speak with greater experience as to timber than as to general building construction? No; I would not. I speak with a fair knowledge of timbers. I have had to do with the timber trade from selecting the timber in the bush to cutting it up and working it into actual building.
3328. For how many years? I was six months out in the bush. I have had an experience of sixteen or seventeen years in regard to timber. Before I left school I helped my father on busy days. I helped him to take Hudson's and Goodlet and Smith's stock.
3329. In answer to Question 3185 you state: "The hardwood timber would last for many years—perhaps eighty or ninety years"? Yes, I expressed that opinion at the time; but as it was an opinion given hastily, without proper thought, I would like to amend it now, and point out why I believe the timber would not last more than three or four years, viz., because timber in a position like that, with a cavity underneath and a different atmosphere inside, would rot in no time. You have seen it in floors that have had no ventilation underneath; you have seen the joists there go into a dry rot in a few years. There is absolutely no ventilation under this timber, and I would like to amend my answer which was given then, and say that I do not believe that it would have lasted more than five years at the outside.
3330. Having given some consideration to this question since you previously answered it, you now believe that the difference in the life of some pieces of timber under different conditions will vary from ninety years to three or four years? No. I say now that, having given the question due consideration—in fact, I thought on the way down to my office that afternoon that I had made a mistake in giving that answer—I think now it would not last more than four or five years, for the reasons I have given you.
3331. In reply to Question 3187, you say that timber might last 100 years? Yes; of course, some timbers, under different conditions. I have a piece of ironbark now which was felled over 100 years ago in George-street—a piece of the same log out of which Sir George Dibbs made the walking-stick which he presented to Her Majesty. That timber had been embedded for many years, but it was shut off from any atmospheric influence; but this timber was not—there was a cavity underneath it. Had it been embedded solidly its life is merely a matter of conjecture; but, with that cavity underneath it, and no ventilation, its life would not be more than five years.
3332. Is it right, then, to say that this timber you saw, and of which we are speaking, would, under favourable conditions underground, last from ninety to 100 years? It is a matter of conjecture, but it might last hundreds of years.
3333. But in the position it was in underground, the point nearest the air being 3 feet below the ground, it would last only three or four years? No; about five years. I mention that as the outside limit.
3334. You assume that, because you say it is subject to fluctuations of temperature and atmosphere? I say there is no ventilation underneath, and that, with a cavity similar to that, and no ventilation, the life of the timber would be the very shortest.
3335. If there is no ventilation—no current of air—how could the atmosphere change? The atmosphere could change. In winter it must be quite different from what it is in summer.

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3336. Does a large difference occur in summer and in winter at a depth of 3 feet from the air? I should certainly say so.
3337. It is a matter of opinion, I suppose—not of experience? It is a matter of experience. The ground in cold districts will be frozen in winter to such an extent that you would be unable to break it Even in parts of this country the ground cannot be easily worked in winter.
3338. Have you seen it? Yes.
3339. Where? At my own place at Hornsby Junction.
3340. There, frost penetrates the ground 3 feet to such an extent as to make it absolutely impossible to break the earth? I do not say that, but I say that the temperature 3 feet under the surface of the earth would vary according to the season, and that the change of temperature must affect it.
3341. Do you say that frost penetrates the earth to the extent of 3 feet at Hornsby? I say that, if there is the slightest damp in the soil, it must feel the effect of any frost.
3342. What is the greatest depth to which you have seen earth penetrated by frost at Hornsby? I have never experimented.
3343. Then it is not correct that you ever saw frost penetrate 3 feet of the earth at Hornsby? No. No living man has ever seen frost penetrate.
3344. Do you know it is a fact that in some parts of England at times they cannot bury dead bodies, and there are periods of six weeks at a stretch when the people cannot dig graves because of the frost on the ground? Not because of the frost, but of the damp that is in the ground freezing. I know that trees split because of the excessive cold in frosty weather.
3345. In reply to Question 3209 you say, "I had three tenders, and there was a reply from a fourth builder to the effect that the work was too risky, and that he would not undertake it";—what was the name of that builder? The question was, "You afterwards did the underpinning yourself through contractors." It distinctly refers to the work of underpinning there.
3346. *Chairman.*] The tender refused was for the underpinning? Yes.
3347. *Mr. Bavister.*] You did no underpinning yourself directly;—it was all let? Yes; it was all let.
3348. Well, in regard to a portion of the work for which you called tenders, one builder refused to tender because the work was too risky? Yes.
3349. And his name was what? Fishburn.
3350. Not the railway contractor? No; his nephew.
3351. Was that in consequence of your expressed intention to do the thing economically? No. He said he would not undertake work of that sort, and stand a chance of maiming his own men. He distinctly stated his reasons for it at the trial, and his evidence can be obtained. I should like to refer, if I may be permitted, to a point in the specification which I saw when the matter was on evidence at the trial. It has reference to the underpinning. This is the specification of the third section of the telephone tunnel:—"The contractor is to underpin and support existing structures wherever it is found necessary or directed by the engineers."
3352. Was that the specification under which this particular part of the tunnel was carried out? I do not know. I would simply point out that it was contemplated to underpin, and yet in this case, where it was distinctly necessary, there was no underpinning done.
3353. Is there anything in that specification which gives power to the engineer over the work to decide where the underpinning is necessary? Yes; "wherever it is found necessary."
3354. By whom? "Wherever it is found necessary or directed by the engineers." What I say is, that it was evidently contemplated to underpin where necessary, and it was decidedly necessary in such a case as this.
3355. *Mr. Robert Jones.*] Can you give the Committee any idea as to the weight of that stack of bricks to which you referred? There would have been about 14,000 bricks in it, and you can average them at about 280 to the ton; and the total weight of the stack would be about 50 tons.

John Haydon Cardew called in, sworn, and examined.

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3356. *Chairman.*] What is your profession? Civil engineer. I am an Associate Member of the Institute of Civil Engineers.
3357. Have you made a report in connection with what is known as the telephone tunnels? Yes.
3358. Have you got that report, or a copy of it? I have a copy of it here.
3359. Will you produce it, please? I should like to say that I look upon this report as of a confidential nature, and I do not know whether I am at liberty to disclose its contents without the sanction of the Postmaster-General. The Postmaster-General instructed me to make an inspection of the tunnels, but since then I understand he has repudiated those instructions. I am consequently in rather a peculiar position, and I think that the Postmaster-General should relieve me of this confidential state I am in. If I have his permission to produce the report I shall do so. It was sent by me in a confidential way, and I looked upon myself as a confidential adviser.
3360. I think I shall have to rule that you are bound to submit the report. Will you kindly read it? It is as follows:—

The Hon. The Postmaster-General, Sydney,— 75, Pitt-street, Sydney, 14 July, 1897.

Sir,

I have the honor to report that, in accordance with instructions given to me on your behalf by Mr. P. B. Walker, the Chief Electrical Engineer, I have examined all the tunnels so far constructed for the reception of the telephone cables in Pitt-street, Moore-street, King-street, Martin Place, George-street, Barrack, Kent, and Clarence Streets, Devonshire-street, and Campbell-street, with the view of reporting to you on the manner of excavation and construction, and of the materials employed in the work.

Interior Examination.—I walked through the entire length of the tunnel, from the General Post Office up Moore-street, along Castlereagh-street, and up King-street, to the terminus close by St. James' Church.

I then returned, and passed through the tunnel in Pitt-street from Moore-street to the terminus at the Exchange. I then walked through the tunnel from the General Post Office along Martin Place, under George-street, to the dead end opposite the Equitable Building; thence I proceeded along Barrack, Clarence, King, Kent, and Liverpool Streets to Harbour-street.

The next tunnel examined was that in Pitt-street going southwards to Hay-street, then in continuation of the same as far as the bridge in George-street, over the Darling Harbour Railway Line.

Finally, the length in Campbell-street from Pitt to George-street was traversed. I subjected the whole of the work enumerated above to a very searching and critical examination, with a view of discovering any defects of construction or failures in the shape of subsidences or cracks, if any existed. The

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The internal dimensions of the tunnel are 5 ft. 9 in. x 4 ft. 6 in., except the length in Moore-street and Pitt-street between Moore-street and the Exchange, which is 5 ft. 6 in. x 4 ft. 6 in. The specification informs me that the tunnels are lined with 9-inch brickwork, consisting of vertical walls set in cement and on concrete foundations of varying thickness in accordance with the nature of the soil, and an arch of semi-circular form consisting of two rings of radiated bricks, in all 9 inches thick.

The bricks in the side walls are ordinary machine-made stock bricks of coarse material, and appear to be perfectly sound, hard, well-burnt kiln bricks; the radiated bricks in the arch are of a finer material and finish, and are of a good, sound, hard, well-burnt quality.

Four sample bricks were cut out of the arch in Pitt-street at the corner of King-street, and tested for absorption as follows:—

No. 1 *Specimen.*—Rectangular brick (part), weighed dry 6 lb., and after immersion in water for forty-eight hours weighed 6 lb.

Absorption, nil.

The cross section of the brick after breaking exhibited no cavities or fire cracks in the clay, but a density and compactness throughout.

No. 2 *Specimen.*—Radiated brick (part), weighed dry, 5¾ lb.; after forty-eight hours immersion in water it weighed the same, 5¾ lb.

Absorption, nil.

The cross section of the brick after breaking exhibited a very dense and compact material throughout, with no cavities or fire cracks.

Time would not permit of further testing for compression and so on; but from my knowledge of bricks I should say they would stand a compressive stress of 20,000 lb. before cracking, and therefore are of a fairly strong quality.

The face of the bricks used in the side walls was rough, but this roughness is no material drawback.

The cement mortar used in the brickwork consists, so I am told, of two parts of sand to one of cement, and has set hard and firm.

The walls are built in English bond, with ¼ inch joints, in alternate courses of headers and stretchers. The joints appear to be set full and are roughly struck with the trowel, no attempt having been made at pointing the work; so that the appearance of the face of the brickwork is not what would be called highly finished, but it is strong and suitable for the purpose.

The concrete in the foundations, according to specification, should be composed of 25 cubic feet of 2-inch bluestone, 1 cask of cement, and 1 cask of sand, which is equivalent to the proportion of 5 of stone to 1 of sand and 1 of cement.

Concrete of these proportions and materials is of a very strong character, although in my opinion there is a scarcity of sand to fill all the voids in the stones, and I should have preferred the proportions: 4 bluestone, 2 sand, and 1 cement. However, when the concrete is used in mass, as in the tunnel foundations, the filling of the voids is not so important. The foundations and floor show no signs of any settlement or cracks or other disturbance. The concrete on the floor of the tunnel is faced with 1 inch of cement rendering, composed of two parts of sand to one of cement.

I found this cement rendering in some places to be rather soft, notably in the Campbell-street tunnel, and in that length of Pitt-street between Devonshire-street and the General Post Office. What this is due to I am unable to say; but in all probability it is due to one of the three following causes: either the proportions were not adhered to, or the cement was unsound, or the mode of mixing was defective, perhaps by the use of dirty water, or being mixed too long before use. In any case it in no way affects the stability of the tunnel; and as there is very little traffic in the tunnel it may last a long time.

The brickwork in the arch appears to be very good from the inside, and presents a smooth even face, showing that the centering was of planed boards and carefully set. The internal joints of this part of the work are full and hard set. Altogether, the roof presents a most satisfactory appearance.

There is not the slightest sign of settlement, cracks, failure, or disturbance from one end of the brickwork to the other in the whole length of the tunnels.

Where the walls cross old sewers and pipes, jack arches have been turned in them, which is an effective method of preventing settlement that is always to be apprehended in the vicinity of sewers.

Most of the tunnels, excepting that in Martin-place and part of Kent-street, showed signs of weepage, principally below the springing of the arch and at the footings; but this does not appear to be apprehended or provided against, but on the other hand weep-holes have been left in the footings at intervals to allow the water behind the walls to enter the tunnels where it is received into a small gutter or invert in the floor and conducted thence to the subduct and to the sewer. I am informed that this slight moisture is not detrimental to the purposes for which the tunnels were intended, and in that case there was no occasion to incur the heavy expense of puddling the outside of the walls or cement-rendering the inside.

Where the tunnel in Pitt-street, near Hay-street, dips below the level of the sewer, it was found necessary to cement-render the whole of the interior surface below the level of the sewer, and to conduct the drainage into a sumph, from whence it is raised by a hydraulic ejector into the sewer at the higher level.

Several holes were broken through the walls for connections to the street posts, and these gave me a good opportunity of examining the interior of the brickwork, and the packing behind, which in every case was of a most satisfactory nature.

The cement used in the work is principally Goodlet and Smith's, but I am told other cement was used in places. No tests were made by the authorities of the cement, but Messrs. Goodlet and Smith have favoured me with copies of their own tests, made at about the time the cement was manufactured, which will be found in the appendix to this report, and which compares favourably with the Government's and City Council's specifications also appended herewith. Considering the difficulties to be encountered in the shape of old sewers, disturbed ground in old excavations, water and gas service pipes, the necessity for keeping above the street sewer, and below the Hydraulic Company's mains, involving constant variation of grade and alterations in design to meet all these contingencies, and the uncertainty of what was to be met with as the excavation proceeded, I am of the opinion that the brickwork lining has been very creditably carried out, and that the absence of all signs of settlement is a proof of the *bona fides* of the labour employed, and of the thoroughness of the supervision.

The thickness of the walls and arch-ring are sufficient to sustain the greatest load in the deepest ground with a large margin of safety; and I have known similar work at a much greater depth in mines and other places, with a greater superincumbent weight of strata to support, which has safely stood for many years.

Mode of Excavation.—By referring to the annexed drawing [*Appendix* D 1.], it will be seen that the mode of excavating the tunnel is as follows:—

Props, A, of 9-in. x 3-in. hardwood, are first placed at the sides of the proposed excavation, with their feet resting on solid ground below the level of the foundations, and if in soft ground upon bearing blocks or sill-pieces. Cap-pieces, B, also 9 in. x 3 in. hardwood, are then placed on top of the props in such a manner as to be 3 inches above the top of the brick arch.

Poling-boards, C, of 9-in. x 1¼-in. hardwood, and about 7 feet long, placed so as to form a close roofing, are then driven in the direction of the proposed excavation, and at such a slope as to admit of the introduction of the next cap-piece at the proper level, and distant 4 ft. 6 in. from the first cap-piece.

The ground is then excavated somewhat as shown on the drawing as D E F, and a space cleared out to receive the cap-piece as at F; when the set (of props and cap piece) is fixed, a bridging piece, G, is introduced and wedged up from the cap-piece to take the weight of the poling boards, to allow of the next set of poling-boards being driven. As the next set are driven they are wedged up tight to the cap-piece and bridging-piece which keeps everything overhead secure, and in this mannner the work proceeds.

This class of work requires great attention, care, and skill, and the most vigilant supervision, or otherwise falls of soil from overhead will occur. When a sufficient length of excavation has been completed, the concrete foundations are laid and the side walls built; a wooden drum, constructed to the exact radius of the arch is then laid and supported on the side walls, and the arching in of the roof is commenced. All the brickwork is built 9 inches thick, and then the outside of the brick arch is rendered with ½ inch of cement mortar, mixed in the proportion of 2 sand to 1 of cement. Between the two rings constituting the arch was laid a collar joint of cement mortar ½ inch thick.

When each length over the drum was completed (about 4 feet, I think, was the length), the space, H, between the brickwork and the under side of the poling-boards was hand-packed with stone or other convenient material.

If

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If the work is carried out as thus described, and in a skilful manner, there should be no danger of falls or displacement of the footpaths and pavements on the surface.

Sometimes, however, the poling-boards are not skilfully directed and driven, and they are allowed to get too high so that it either becomes necessary to cut longer props or to place more bridging pieces on the cap to support them, and incompetent or lazy workmen will often, instead of doing that, let the poling-boards come down to the level of the cap and prop as already provided, the result of course being a displacement of the superincumbent earth and possibly of the footpath.

Again, sometimes in driving into old disturbed ground as is frequently met with in these tunnels, before any precautions can be taken the face will fall in towards the excavation in the direction of the line K E M, displacing all the ground about M and causing a subsidence at N.

These accidents are inseparable from this class of working, especially in shallow ground, but when they do occur it is always known to the workmen, and the matter should be reported, so that the surface can be examined under the footpaths and made good.

After the brickwork is completed it is generally left to the engineer to decide if the timber shall be withdrawn or not, and I am of the opinion that in this case the timber should have been left in, so as not to cause any settlement in the footpaths; if the timber had been drawn a slight settlement would most likely have taken place; good hardwood timber will last underground for very many years, and as decay takes place the settlement is so gradual that no notice is taken of it. If the tunnel was under buildings then the voids under the timber should be packed with concrete; but there is no such necessity in the class of work under review.

My opinion on the general mode of timbering and excavation as described aforesaid is, that it was the proper system to adopt, and that the strength of the timbering was sufficient.

Packing.—It will be seen by referring to the attached diagram that if the timbering is strong enough to carry the weight of the ground above (as most certainly the "sets" are) then the question of packing becomes an unimportant one at the present, and is only required for the purpose of supporting the timbers as they decay. It is not the want of packing that lets in the roof and causes settlement, it is the first operation of driving the tunnel, either by careless work as previously described or by accident.

Surface Examination.—I was present at the taking up of the ground in Pitt-street, near Bathurst-street, and I saw the timbers exposed and removed; they were sound and in perfect condition as though only just laid. I examined the extrados of the brick arch and found the joints quite full, but most of the cement rendering rubbed off by the packing of the spaces—this is unavoidable in such close work—the packing was close up under the caps and poling-boards, except just behind the cap, which is a difficult place to pack, and where I noticed some voids as on diagram at O.

I was also present on another occasion when the ground was being opened up in Pitt-street, just by Macintosh's entrance gate, the timber here was perfectly sound, and the packing quite close, except as previously described. I noticed two or three brick joints not filled with mortar at this point.

Opposite the Criterion Theatre I examined a settlement of the ground beneath the monolithic pavement leaving a space about 9 inches deep over the head of the tunnel, and for the full width thereof.

I am of the opinion that this is a settlement caused by the driving of the tunnel due to one of the accidents that so often occur in tunnel timbering. The packing under the timbering was quite close, and the settlement could not be due to that.

On the 12th instant I observed a settlement under the wooden pavement at the crossing of Park and Pitt Streets which had left a void under the concrete 9 inches deep, extending for a length of about 8 or 9 feet, and the full width of the tunnel. It is my opinion that this is due to one of those accidents previously described as so likely to occur in the timbering of tunnels. The settlements at these places have been caused by heavy falls of earth into the tunnel and must have been known to the workmen; neglect to report such an occurrence is a very serious matter considering the heavy 'bus traffic that crosses from Pitt into Park-street, and might result in a very serious accident and perhaps loss of life; it might be argued that the concrete under the wood blocks is strong enough to carry the traffic alone, but such is not the case, as only 6 inches is the maximum thickness; for a time it would no doubt do so, but the vibration of the rapidly moving heavy laden vehicles would sooner or later cause "fatigue" in the concrete and thus a collapse.

I have examined other street crossings and have noticed vibration and hollow sounds under passing vehicles which probably indicate other voids, these are at crossing of Bathurst-street in Kent-street, at crossing of Clarence-street in Barrack-street, and at crossing of George-street by the General Post Office, and at crossing of Market-street in Pitt-street; I have very carefully examined the tunnel at these spots underground and there is not the slightest sign of any settlement or cracks in the brickwork or concrete.

In fact these surface voids in no way affect the stability of the work underground, but they do affect the safety of the traffic in the streets.

On the 13th instant the City Council enlarged the opening in Park-street, which disclosed the settlement under the concrete as extending over the greater part of the carriage-way for the full width of the tunnel and ranging in depth from 9 inches to about 2 feet.

Such a settlement could not have occurred without a large quantity of material falling into the tunnel from the roof, and must have been well known to the workmen. It almost appears as if the miners were emboldened by the presence of the concrete flooring overhead to drive the tunnel without timbering the roof, and that in consequence a big fall took place.

I noticed here that there was very little packing at the sides of the tunnel walls, and that the packing under the poling-boards was not so close as at the other places I have examined.

I also notice that many of the joints of the brickwork were not filled with mortar, which, to a certain extent, weakens the brickwork and renders it pervious to water.

In conclusion, I may state that I consider the tunnel itself to be quite safe, but that it is desirable to examine the ground beneath all street crossings or monolithic pavements in order to rectify any settlements that may be discovered.

I may add that the foregoing is a plain statement of the facts of the case as they present themselves to me, which I take it is what you required when you instructed me to report.

Attached to this report are certain cement tests supplied by Goodlet and Smith, extending over the whole period of the supply to the Department; also a specification for cement by the City Council, and a specification for cement by the Department of Public Works.

3361. Do you know, or did you hear, anything of cement used that had previously been condemned? I do not know anything of my own knowledge.

3362. You did not make any tests of any such cement or examine it? I examined the work in the tunnels; but of course if there had been any defective cement used I could not have found out where it was. But I examined every foot of the tunnel I may say, and in the report just read I have given the result of that inspection.

3363. You said in one part of your report that the concrete was in certain proportions, which you described; was that according to actual test, or was it what you were told? It was from the specifications. I am not able to say whether the specification was carried out or not.

3364. What is the shape of the tunnel inside? This drawing shows a sketch of it. It has vertical walls with a semicircular arch.

3365. What is that other document you have there? That is not mentioned in the report, but that is what I call an improved form of tunnel. It is the form of tunnel I should have preferred to use. Instead of vertical walls at the side there would be side arches. [*Appendix* D 2.]

3366. It would be almost in the shape of a horse-shoe? Yes.

3367. That would be what you would consider the more approved form? Yes; I should say that would be the most approved form, because the tunnel would then resist side thrusts much better. There is no provision made in these walls for side thrusts, but only for the vertical thrust. As long as the weight is on the arch it is all right.

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3368. Was there anyone with you when you were making this examination? Yes.
3369. Who? Mr. Hennessey. I went through the tunnels under Mr. Hennessey's guidance. Mr. Walker instructed Mr. Hennessey to accompany me.
3370. Was Mr. Donald with you? Not in the tunnel. Oh, yes; I think he was one day for a little while. He did not go all through the tunnels with me, but he went up Martin-place with me, as far as St. James's Church.
3371. Did he show you the work in any way, or was he simply with you casually? I think he came on purpose. I think he was instructed to come with me, but I do not know. He was there at all events to meet me—he was with Mr. Hennessey.
3372. Did he, as a matter of fact, show you any of the work or explain it? He only showed me the sizes of the tunnels, and explained to me how the first section was made smaller than the subsequent portion. He did not say very much to me while I was there.
3373. I suppose he did not influence you in any way? Not in the slightest. During most of the time I was alone with Mr. Hennessey. I was in the tunnels for about three or four days altogether, and one day I was there entirely by myself, except that there was a lad from the Department who was cutting out the bricks for me.
3374. You have described your idea of the subsidence that you saw at certain places and the cause of it, and you have also stated, I think, that that subsidence must have been known to the workmen? It must have been.
3375. Then are the Committee to infer that you consider the workmen must have known of that subsidence under the footpath and did not give the information? They must have known of it. Several cubic yards would go into the tunnel. They must have been aware of it. That is the opinion I have come to.
3376. And you have no knowledge as to whether the overseer knew anything about it? No. It might have occurred during the night shift, if they were working at night-time, and perhaps Mr. Donald would not be about. I do not know whether they had any tunnel overseers watching the work during the night.
3377. Have you any means of knowing whether the workmen were men who understood the work? No; I do not know anything at all about that. I know it requires skilled men for that class of work.
3378. What would you call skilled men? Men who have been used to that particular class of work before. I have done a great deal of that class of work in the main Sydney sewers—the main Bondi sewer—and we had a great difficulty in getting competent labour for that particular work.
3379. What sort of labour did you get? We got men who had been used to that class of work.
3380. What would you call that class of work;—do you mean to say men who had been used to tunnelling and timbering? Yes, tunnelling and timbering.
3381. Only? Yes.
3382. Do you consider yours to have been an official report? Certainly.
3383. Then if Mr. Walker in his evidence says that no official report of any kind has been obtained except the report of McCredie Brothers, that would seem to be scarcely correct? No; I do not think it is correct.
3384. If Mr. Walker also said that no report had been obtained from anyone else but McCredie Brothers that, I presume, is not correct? Certainly not.
3385. If he also says that no one else had been instructed to report—that he had given no instructions to anyone else to report—that is not correct? That is not true.
3386. If he also says that the Department has given no instruction, is that correct? I presume he is Under Secretary for that Department, and any instructions coming from him I take to be the instructions of the Department.
3387. This report you say was sent in to the Postmaster-General? It was sent in to the Postmaster-General on the 14th July.
3388. Was it returned to you? No.
3389. Did anyone not in the Department—I do not mean Mr. Cook or Mr. Walker—make you an offer to pay for this report? Well, not exactly. I was asked to readdress the report to somebody else and that they would be responsible for the fees.
3390. To whom? McCredie Brothers.
3391. Has there been any communication in any way by which you understand or know that the report has not been received? No; I presume it would have been returned to me if it had not been received, as it came from me.
3392. Have you any reason to suppose that it had not been received or dealt with? Not the slightest. I do not know anything at all about it. I have never seen it since it was sent in.
3393. But is there any other reason? No; there is no other reason that I am aware of.
3394. Have you had any communication from Mr. McCredie about it? Only on the occasion I have just mentioned, when I was asked to readdress the report to McCredie Bros.
3395. Why? He did not state any definite reason why. He asked me to do it. He also asked me to address the account to them, and I declined to do it.
3396. That took place without his giving any reason why? Yes; I think, if I remember rightly, that Mr. McCredie told me that the Postmaster-General held him responsible.
3397. For the report? I suppose he meant that.
3398. Had you had any communication before with Mr. McCredie, as to making the report? No; none whatever. I did not see Mr. McCredie until I met him in Mr. Walker's room. He was in consultation with Mr. Walker when I arrived.
3399. Were you sent for? I was sent for.
3400. And was it then that the instruction was given? Yes.
3401. *Mr. Bavister.*] You made reference, in your opening statement, to the Postmaster-General, and said that he instructed you to make an inspection and report? Yes.
3402. You did not receive any instruction direct from the Postmaster-General, I understand? I got it from the Under Secretary, Mr. P. B. Walker.
3403. Then it was a verbal one? Yes.
3404. Do you know the date of that? I have not the date written down in my note-book, but I think it was the 7th July. It must have been the 7th July, because, according to the first note in my book, the examination commenced on the 8th, which was the next day.
3404½. That was a verbal instruction from Mr. Walker? Yes. 3405.

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3405. How was the interview brought about at which this instruction was given? Mr. Hennessey called upon me at my office.
3406. *Chairman.*] Who is Mr. Hennessey? He is an architect.
3407. In the Department? No. I believe he is engaged by the Postmaster-General in connection with this matter.
3408. *Mr. Bavister.*] Was Mr. Hennessey the person who first spoke to you about this business? Mr. Hennessey was the first who spoke to me.
3409. And had anything been said by him leading you to suppose that you might be engaged to make an inspection and report? Yes, that was what he came for—to ask me if I would undertake the work, and I said yes, I would; and he then instructed me to call upon Mr. P. B. Walker, and asked me at what time I could go there, so I made an appointment for 11 o'clock.
3410. Then your original instruction was from Mr. Hennessey? No; he was only acting as messenger for Mr. Walker.
3411. I hardly think we can take it as authoritative from yourself as to how or why he was acting, but we can take it beyond any contradiction as to whether or not your first instruction in connection with this business was from Mr. Hennessey? No; Mr. Hennessey gave me no instructions at all.
3412. Different constructions may be placed upon the same word; but, clearly, you used the words that Mr. Hennessey "instructed" you to call on Mr. Walker. I was anxious to find out how the first appointment with Mr. Walker came about;—while accepting Mr. Hennessey's request or instructions to wait on Mr. Walker, you did not in any sense consider yourself engaged or instructed? No, not until I had seen Mr. Walker. I was merely asked to call and see Mr. Walker with regard to the matter.
3413. Would you consider it more than a trivial matter to have to inspect and report as to the carrying out of the work of the tunnels? Yes; it was a responsible undertaking.
3414. Would it strike you as being necessary to have a more formal instruction than simply a verbal one? No. I have never had written instructions from the Government yet. I have only quite lately been engaged on the McSharry case, and the whole of my instructions there were verbal.
3415. Have you done work previously under the Postal Department? No, never.
3416. You referred in your report to an opening in Pitt-street, opposite the Criterion Theatre;—do you know on what date that was under your notice? No; the date is not mentioned in my report.
3417. Could you from memory give an idea as to how much earlier it was than the 12th July? I think it was the previous day or two days before. The part opposite the Criterion Theatre I examined on the 8th July. Of course I saw it two or three times, but the first time was on the 8th July.
3418. Coming to that portion of Park and Pitt Streets where there was a very extensive opening made, was your attention directed by the evidence to any other excavation having taken place there—to be more definite, does not the Hydraulic company's pipe run along there? Yes.
3419. Was there any evidence there of insufficient ramming having taken place in connection with that? No; I could not see anything. Of course it would be very difficult to determine that, because it was all fallen in. It might have been insufficient for all I know.
3420. We will come to a matter on which you will have more definite information—the concrete under the wood blocks. I think your own words were "the concrete is sufficient to carry the traffic for a time," and you told us that it would be weakened by the vibration? By the concussion of the traffic.
3421. You are quite satisfied as to the accuracy of that? Yes; quite satisfied.
3422. If a person claiming to be a scientific man said that that concrete was not sufficiently strong to more than carry itself, would you consider his evidence reliable? I should not think that was correct.
3423. You would not look upon such a witness as being an ornament to your profession? Well, I should not like to make any remark of that kind. I did not hear the statement; there may have been something to qualify it.
3424. Would you consider such a statement as to that particular concrete not worthy of much credence? No; I do not think it would be.
3425. It is opposed to your scientific knowledge? Exactly so. Not only that, but it is a matter of fact that it did stand there for a considerable time. It is not a question of my scientific knowledge.
3426. As to the whole of that particular work in the tunnel at the crossing of Pitt and Park Streets, do you think that a person going there for the first time could make a satisfactory inspection of the work in half an hour, a considerable portion of that half an hour being devoted to conversation? No; I think it would take longer than that. I spent two or three days there, off and on.
3427. If a person were to make a statement, testifying that he spent no more time than that at the examination, you would think that his report should not have much weight attached to it? Of course, he might be a man of very quick apprehension. Some men are very quick, and see a thing in a moment. I could not do it in half an hour.
3428. Do you think it would be possible for any man, no matter how quick he might be, to make himself acquainted with all the facts surrounding the case at that particular point in half an hour? No; I do not think he could.
3429. You made reference to the Bondi sewer—was that not principally through rock? A great deal of it was through running sand. I was in charge of Contract No. 8, crossing Rushcutter's Bay, and we had very heavy sand tunnelling there for about 700 or 800 feet in length; and also through Rose Bay, three-quarters of a mile of it.
3430. You say that you were engaged for three or four days in the inspection of the tunnel, and that it was necessary to devote so much time to the inspection? Absolutely necessary.
3431. *Mr. Nelson.*] In giving an illustration of how the tunnel excavation work was done, I take it from the description in your report that you did not see the work being carried on? No; I merely gave a description of the method that ought to be pursued.
3432. And you do not know whether that method was adopted or not? No; I do not.
3433. Reference has been made to Mr. Hennessey, is that Mr. Hennessey of Sheerin and Hennessey? Yes.
3434. While you were getting particulars for the purpose of preparing your report, did you meet any other civil engineers doing some similar work to that which you were doing? Mr. Gummow, the contractor, and Mr. Alderson, the architect. No civil engineers were there. I was the only civil engineer.
3435. Mr. Hennessey and yourself? Mr. Gummow, Mr. Alderson, and myself and Mr. Hennessey.

3436. Were they taking those reports for their own satisfaction? I do not know what instructions they had. J. H. Cardew.

3437. You are justified in saying that they were reporting upon it? Yes, they told me they were. 13 Oct., 1897.

3438. *Mr. R. Jones.*] This report of yours was more from information you received than from anything else, was it not—that is, together with your own observation? No; it was my own observation. I have mentioned what I got from the specifications, and what I was told.

3439. You got information as to some tests, and as to quantities and the mode of mixing mortar? Yes, that information was given to me.

3440. *Chairman.*] You said that you called upon Mr. Walker after Mr. Hennessey asked you whether you could undertake the work? Yes.

3441. And that Mr. McCredie was present? Yes.

3442. Can you give the Committee any idea as to what sort of instructions Mr. Walker gave you? Mr. Walker said to me first of all, after the ordinary salutations of the day had passed, "I understand you have special knowledge and experience in the timbering of tunnels," and I said, yes, I had.

[*Mr. Cook desired it to be noted that he objected to this evidence as bearing upon a matter pending before the law courts.*]

3443. *Chairman.*] I want you to remember what Mr. Walker said to you as far as you can? He then said, "The Postmaster-General wishes you to inspect all the telephone tunnels, and to report to him on their construction, and on the manner in which the work was carried out." After that, there was a considerable amount of conversation, all of which I cannot remember.

3444. But that was the substance? Yes; those were the very words he opened with. He then asked me when I could start and do the work, and all that kind of thing. We discussed the nature of the work, the locality, and so on.

3445. *Mr. Nelson.*] Have you any objection to say what was the cost of your report? I think it was £75.

3446. *Chairman.*] That was your claim? Yes.

3447. *Mr. Cook.*] Have you ever spoken to me in your life before to-day? No; I should not know you if I were to meet you in the street.

3448. *Mr. Bavister.*] I have an impression that when you were speaking, in answer to the Chairman, you said in your first reference to the interview between yourself and Mr. Walker that Mr. Walker incidentally said that you might be required to report; now, in reply to a direct question, you say that Mr. Walker said that the Postmaster-General wanted you to make an inspection;—did Mr. Walker in opening that interview say, "The Postmaster-General wants you to make this inspection and submit a report," or was it incidentally referred to by Mr. Walker in the manner suggested by you in answer to an earlier question by the Chairman? No, it was not incidental at all; it was a direct instruction to inspect and report.

3449. *Mr. George McCredie.*] At your first interview with Mr. Walker, do you remember distinctly whether he asked you to inspect the tunnels for the purpose of giving a report, or for the purpose of giving evidence before the Committee? Both.

3450. Did he mention the report? Yes.

3451. You say I offered to pay on behalf of the firm? No, I did not say you offered to pay. I said you wished me to address the report to you.

3452. And at the interview I told you there was apparently a misunderstanding about the report, and that the Postmaster-General would not acknowledge the report? I believe you did.

3453. And I said I was quite willing if the report was made out to our firm to pay for it—that I was perfectly satisfied with the report; and you then said that you would not recognise us at all, that you recognised the Postmaster-General? Of course, I recognised the party who instructed me. You did not instruct me, so I was not going to recognise you.

WEDNESDAY, 20 *OCTOBER*, 1897.

Present:—

MR. BAVISTER, | MR. COOK,
MR. CANN, | MR. HARRIS,

W. J. LYNE, ESQ., IN THE CHAIR.

A. L. McCredie, Esq., and G. McCredie, Esq., appeared in person in their own behalf.

William Greenwood recalled and further examined:—

3454. *Mr. Harris.*] I think you said that you were a contractor, and had done contracts for the Corporation? I have done as much, I suppose, for the Government as for the Corporation. W. Greenwood.

3455. Have you done a contract lately under the Water and Sewerage Board? I am doing one now under the Government. 20 Oct., 1897.

3456. You carried out part of the water tunnel from Prospect Hill? Not as contractor.

3457. What were you then? I had charge of the works for the contractors on one section.

3458. Who was the contractor? Higgins and Gallagher.

3459. And you were the man in charge? I was engineer and manager for the contractors.

3460. Part of that tunnel at the present time is supposed to be not in a good condition? I do not know that.

3461. I think it is an open channel from Potts' Hill to the reservoir? What you refer to is a covered culvert beneath a black-soil hill about a mile this side of the Prospect Reservoir. I should say that it is as good a piece of work as anything on the water-works.

3462. Is this not a piece that the Board were going to raise, and found it would not carry the weight? No; you are referring to another section. The conduit was let in several contracts, and the bad work was not on the one that I superintended—at least, I know of no bad work there. I may say that I know nothing about any suggested bad work, except a newspaper report, and it did not apply to that particular section.

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3463. *Mr. G. McCredie.*] You said that you received instructions from the City Council to inspect the work at Park-street, and to report to them upon it? Yes.
3464. Were you to report upon the work as completed work, or work in a state of being completed? There was no special reference made to the completion. The only thing I was to report upon was the question of the packing of the headings.
3465. Do you think it is proper to report upon work whilst it is in course of construction as to what it should be when completed? It was not in course of construction.
3466. How do you know that it was not in course of construction? Well, the piece at Park-street which had been opened by the Government authorities had been completed, I take it.
3467. How do you know it was completed? I do not know. It may not be completed to this day. It may want a touch of paint to this day for all I know.
3468. If your report was made on the assumption that the work was completed, and as a matter of fact the work was not completed or passed, do you think your report would be a fair one? My report, as far as it went, was perfectly fair.
3469. You consider that if you were of the opinion that a work was completed, and it was not completed, your report would be a fair report, you having reported upon it as completed, and you discovering afterwards that it was not completed, do you think that it would be a fair report? I could not discover such a thing.
3470. You, as an engineer, in going to report upon a piece of work, naturally want to know the position of that work, whether it is in course of construction or has been passed as completed;—do you think it is fair to give us a report here of the work, on the assumption that it was completed, when, as a matter of fact it was not completed? When a wall such as that in front of me now is built and plastered, whatever paper and paint you put upon it will not affect the brickwork in the interior of the wall, although the wall is not finished.
3471. I am not asking about the brickwork at all;—you said in your examination that you did not go through the tunnel? I did say so, and I still say so. I reported upon Park-street. I said so distinctly. There was no question of going through the tunnel. I never saw the tunnel.
3472. *Mr. Cook.*] Then there is nothing in the parallel—there are no bricks in point? The parallel is this: The part I did report upon—Park-street—was completed.
3473. *Mr. G. McCredie.*] Who told you it was completed? Nobody.
3474. You assumed that it was completed? My report applies to Park-street only.
3475. Well, you assumed it was completed work? Yes, I did.
3476. In dealing with this matter, you said that the packing was done in a slovenly, unsatisfactory, and unworkmanlike manner; can you tell the Committee how it was done, how you know it was done in a slovenly and unworkmanlike manner? Because I saw it. I was there when it was taken up.
3477. Did you measure the spaces between the poling-boards? If you mean to say did I put a rule on to measure them with, I did not.
3478. Therefore it is only your opinion from observation then that it was done in an unsatisfactory, unworkmanlike, and slovenly manner? Yes.
3479. With reference to that portion of the tunnel front in the Civil Service Co-operative Society's new buildings, you said in your evidence, I believe, that you did not examine the tunnel works in front of those buildings? No; I did not.
3480. You do not know then whether there were any spaces between the poling-boards? Not in that case.
3481. Did you see any rubble packing, except at that place? Yes. I pulled out bricks in the Park-street portion.
3482. You do not consider that rubble packing is suitable packing to be used outside the tunnel walls? There is no room for rubble packing outside the tunnel walls—on the top there is room.
3483. You do not think it is suitable? No; not to be placed outside the tunnel walls. If rubble is used it must be honeycombed, and finer material could fall through and would get right down.
3484. Do you think that it is an advantage to have large rubble for the sake of the soakage being carried away? No. You are speaking of the top of the tunnel.
3485. Yes; and down a portion of the side of the wall—it would not stay exactly on the top of the tunnel; naturally it would go down the side of the wall;—what would you pack it with? That is assuming that I had driven it instead of open-cutting it.
3486. Would you have packed it with a poor concrete, or with sand? I might have packed it with sand, with a poor concrete for choice. It depends on the shape of the side walls.
3487. Do you think that it was absolutely necessary for the safety of the upper surface to pack it with poor concrete? I consider it is advisable to make both the sides and the top absolutely safe, both as regards the buildings and the footpath.
3488. You do not think it would be safe without? Not absolutely safe—certainly not. Whatever cavity you leave there, there is a certain amount of danger from it.
3489. I suppose that if the top surface were to be taken out and the timber removed there would be an opportunity of packing it absolutely safe without putting poor concrete in? Well, you could pack down the side walls, I daresay, with sand, and you could also flood it with water then, and that would help to consolidate the filling.
3490. Do you not think that it could be made absolutely safe if you were to take the upper surface out and remove the timber and pack it from the top and allow it to consolidate? When you have once made it, you mean. That depends entirely on the space between the brickwork and the side wall. You may not be able to get down all the way if you are packing from the top. If it were 20 feet in depth, then to do the thing properly it must be filled in in layers. If you fill the whole thing from top to bottom you cannot rely upon it because it may choke. Therefore, to do it from the top is not a satisfactory way for a great depth. All ramming or packing necessary to make a good job should be done in layers and carried up from the bottom.
3491. *Mr. Cook.*] Is there any other way of doing it? Yes. If you make the excavation 20 feet deep, and carry the walls to the top, you have 20 feet of space to fill, and it is not filled up in layers. You must fill it up in layers to make a successful job of it.
3492. *Mr. G. McCredie.*] Is it not possible by taking the top surface out, and removing the timbers and filling it and consolidating it, to make a good job of it? No; you cannot get down to the bottom of the foundation. It depends entirely on the shape of your side walls.

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3493. According to your statement, it is impossible to fill up the hole all at once, and make a solid job of it? No, it is not.
3494. What is the difference? Your excavations are not absolutely straight, and if the excavations are wider at the top than at the bottom there is a chance of the material getting down; but if they narrow, lumps may choke up the narrow part and still leave cavities below.
3495. But if it is rammed and consolidated in layers, why cannot we make a good job of it? In many places there is not sufficient space for the rammer to go down. The width between the brickwork and the side does not afford sufficient room for you to get the rammer down at all.
3496. Where did you see any case of that description? I could not tell you exactly where I saw that.
3497. *Mr. Cook.*] You only examined Park-street? I only examined Park-street after the work was finished; but you cannot be in Sydney twelve months, and walk about the streets and see the telephone tunnels in course of execution, without seeing the nature of the work.
3498. Not if it is underground? The whole of it was not underground; the drives were underground.
3499. *Mr. G. McCredie.*] Well, then, as a matter of fact, it is impossible to make a good job of it if you cannot make a good job of it by taking off the top surface and filling it in and consolidating it? Are you referring to a tunnel driven as a tunnel and then made into an open-cut, or one that is driven as an open-cut—made an open-cut to begin with?
3500. I am talking about a tunnel which has been driven through—timber having been put in, of course, when driving the tunnel—and the brickwork has been completed, and after it has been completed for some time, and has settled, the top surface of the roadway or the pavement has been removed, all the timber taken out, and the space that is left at the side of the brickwork and over the brickwork has been filled in, rammed, and consolidated; I want to know whether it is not possible to make a good job of it? Yes; you can make a fairly satisfactory job of it.
3501. I suppose you know that these tunnels are drained—that they have sub-ducts, and these sub-ducts have pipes leading to the side of the tunnels, the object being to collect the soakage water coming down from the surface owing to the contour of the ground, for the purpose of taking that water into the bottom of the tunnel, and hence into the sewer? I do not know that; but if it is so, I ask how they are laid, and whether the drain is for that purpose or for another purpose?
3502. These are sub-ducts that go along the bottom and take the soakage from each side of the tunnel not connected with any sewer; supposing that the side of the tunnel were filled in with sand instead of rubble to make a sort of French drain to take the water off, would not the sand find its way into the sub-ducts? What are those pipes jointed with? When I tendered for that work there was no such thing in the specifications. If it was put there, I want to know whether it was put there with an open joint or a close joint? From what you say, it might be the very reverse.
3503. *Chairman.*] The question that Mr. McCredie asks is: If drains are placed in a certain way for a certain purpose, and the filling-in is done with sand, whether that sand would not come out from the sides of the tunnel and get through these pipes into the tunnel? If a sub-drain is put in there, Mr. McCredie wishes to know what would be the probability as to sand getting into the drain and choking it? The answer to that question depends entirely on how the joints were made.
3504. *Mr. G. McCredie.*] I suppose you know that in carrying on building construction throughout the city, in nearly all cases of basement construction, French drains are put outside the walls for the purpose of allowing the soakage water to go into the drains on the lower portion of the basement? There are very few of them made so.
3505. Have you had much experience on buildings in Sydney? A good many of them are not made in that way.
3506. You do not know of any buildings where stone rubble work is put outside the walls to form French drains to take away the soakage water? Yes; I know that the new markets are built in that way. They have got rubble from top to bottom.
3507. Do you know any other buildings, either in Pitt-street or George-street, built in the same way? It is seldom that the work can be done in the same way as in the case of the new markets, because the new markets have no buildings adjoining them.
3508. Is it not an effective way of getting rid of the soakage? The soakage in Sydney is a mere nothing. Of course water will go through rubble sooner than through solid ground.
3509. There are a number of buildings in Sydney which have rubble work outside for French drains;—do you know any case where pavements have gone down in front of those buildings—have they gone down in front of the new markets? There is no pavement put there yet.
3510. Do you know of any others? No.
3511. You said in your evidence that the poling-boards in Park-street had not been driven? Yes.
3512. How did you know they had not been driven? One reason was, because the face of the board was as smooth as when it came from the saw; there were no hammer marks upon it.
3513. You were satisfied that the poling-boards had not been driven, because they were not marked? That was one reason.
3514. Is it necessary to mark a board in driving it? No; but if you put any force at the back of the hammer, when you hit the boards it will mark them.
3515. Every one of them? Yes.
3516. Do you not think it possible to do it without? No; I see them driven almost every day, and I see the marks of the hammer.
3517. In the same sort of stuff? No; softer stuff than yours—silt out of the harbour.
3518. I suppose that the evidence of the men who put the boards in would be more certain evidence than yours, inasmuch as you never saw them put in? Yes; and if I brought men forward to prove my case—that they were not driven—I suppose that their evidence would be as reliable as those who said they drove them. I merely used my own judgment about the matter. A man would be mad who thought of driving a board in such soft stuff as that in Park-street. Park-street is the softest ground in the city.
3519. *Mr. Bavister.*] Will you kindly turn to Question 2072; you said, in reply to that question, "then they drilled holes through the concrete";—were those holes drilled through? "Jumped through" might possibly be more correct in that case.
3520. You were there when it was done; will you state how it was done; is your answer a true one;—were they drilled? If by that you mean, did they dig out a hole just the size of a drill, just the same as they would for putting in a charge of powder, I should say, "No."

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3521. I ask you to state to the Committee, to whom you have been sworn to tell the truth, were those holes drilled? I do not know, as a matter of fact, whether they were drilled through or jumped through.
3522. Will you kindly explain how they were done;—state the tools used for the purpose? No.
3523. *Chairman.*] Do you say that because you do not know what particular tool was used? Yes; people use hammers, gads, picks, and such things, to get holes through.
3524. *Mr. Bavister.*] Is the using of a hammer and a gad described amongst persons conversant with such work as drilling? No; I do not think you would call the using of a hammer or a gad drilling.
3525. In reply to that question, you said that the holes were drilled? Well, I think the meaning of that—if you notice the way it is put—is that they did not go on continuously with the thing, but did a piece here, and then did a hole there, and then a hole farther away.
3526. Can you state that you saw any holes drilled through? I would not even like to say that it was knocked through with a hammer or a gad, or whether it was a pick or a gad that went through it.
3527. Did you see a jumper used? I would not like to say that I saw a jumper used.
3528. Did you see one used? I could not say that I did; but a "jumper" in America is a "drill" in this Colony. The two are merely different terms, the use of which depends on where you happen to be.
3529. Did you see a hammer and a drill used in breaking through that concrete? I could not say at this particular time whether they used a drill, gad, or jumper, or what they used.
3530. I think you made an inspection, with a view to reporting to this Committee? Not to report to this Committee.
3531. With a view of furnishing a report as to that particular work? As to the packing.
3532. As to the work? As to the packing. I did not report upon the concrete.
3533. Will you swear to this Committee that your inspection was only for the purpose of reporting on the packing? Yes; I reported on nothing but the packing.
3534. That your report was to be on nothing but the packing? Yes; only on the packing.
3535. You have included in your report reference to the concrete? No.
3536. Nor yet to the brickwork? No.
3537. You have stated that you saw the place at Park-street opened, and the work in connection with that done? Yes.
3538. Did you see a hammer and a drill used in breaking through that concrete? I tell you that I do not know whether they used a hammer, gad, pick, or shovel, or what they used.
3539. Would it not be necessary to know something as to what tools were used before you could say whether the holes had been drilled through? Well, a shovel will not go through concrete, but a pick might; with a great number of strokes you could get through with a pick. The simplest tools to do it with would be a short drill and a hammer.
3540. Did you see a short drill and a hammer used? I cannot say what I saw used four months ago.
3541. If you required a workman in your employ to drill a hole through concrete, or any other substance would you consider that he was carrying out your instructions if he used only a pick? If I wanted to save the core, and wanted a drill put down through the concrete, I might perhaps tell him to use a hammer and a drill, and to save the pieces; but if I went there myself to see it, I could tell without anything further.
3542. If you had certain work to do, and the whole of the tools that were necessary for that kind of work, and if you instructed one of your workmen to drill a hole, would you consider that he carried out your instructions by using a pick only? If I wanted that man to cut through in the quickest time, and if I merely desired to see the thickness of the concrete, it would be immaterial to me whether he used a drill or pick to cut through with.
3543. I have not said anything about your object in view; but I asked you whether you thought that your instructions would be carried out if you having told the workmen to drill a hole he used only a pick? Yes; I would be quite satisfied.
3544. Will you swear that any other tools but a heavy hammer and gads were used for breaking through that concrete? No; I could not say what was used in doing it.
3545. How large a space would you consider it necessary to leave between the kerbstone and the crown of the road in the concrete as a gutter to carry off the water—the water to which you referred in reply to Question 2088 or 2087 or 2085? Perhaps 3 or 4 feet, if you are putting a dam round.
3546. Was a space of more than 3 or 4 feet left at the edge of the kerb next John Young's building, as has been described, unbroken through in the concrete? I should say not
3547. In reply to Question 2088 you said, "Anyhow I was there fifty times, so that it was only a question of memory;" if you were to visit a place fifty times you, being under instructions to inspect and report, that number of visits would enable you to say distinctly as to whether 3 feet or 14 feet had been left? There was no space of 14 feet left. Approximately 3 feet of the surface of the road was left intact.
3548 Where the wood blocks were not taken out? Yes; the surface of the road that carries the water. I take your question to mean that.
3549. Is it a fact that the wood blocks were taken out right across to the kerb? No; they were not.
3550. Is that how confusion arose between 3 feet and 14 feet? It may be in your mind, but not in mine. The confusion is not in my mind, but in Question 2088 which was, "Would you be surprised to hear that they left 14 feet?" It does not say 14 feet of wood blocks or 14 feet of concrete.
3551. In Question 2080 you were asked, "To what distance across Park-street"? Yes; but does it say wood blocks or concrete?
3552. In Question 2075 you were asked, "Were you there when the Corporation was opening this place?" and in Question 2076 you were asked, "How much was open then?" and you said in reply, "They had taken out one slab"? That clearly applies to concrete and not to wood blocks; it was a slab.
3553. In Question 2077 you were asked, "Did you see any earth removed which would add to the spaces?" and you replied, "The skin was perfect"—the skin of what? That is the skin of the earth that had left the concrete.
3554. In speaking just now in reply to Mr. Harris, as to something in connection with the water-works between Sydney and the Prospect Hill tunnel, I understood you to say that you were acting as manager and engineer for the contractor? On contract No. 1, below Prospect, yes.
3555. Did you do any of that work as a contractor yourself? No.

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3556. I think you informed the Committee, at an early stage of this examination, that you had executed a large quantity of wood-blocking in the city? Yes.
3557. As contractor? Yes.
3558. Can you specify the contracts and the localities, from memory? The whole of Elizabeth-street, the whole of Castlereagh-street, the whole of the Circular Quay, George-street from Hunter-street to Argyle-place, Bridge-street, Hunter-street, Macquarie-street, Hamilton-place, and I could not tell you how many others.
3559. Did you do any other portion of the George-street work? I did the piece in front of the "Royal Hotel"—the second time it was laid—that is to say, I took up the asphalt blocks from King-street to Market-street, and put down wood blocks.
3560. All this wood-blocking to which you refer is what may be termed the second stage of wood-blocking, which has been done not with a big open joint? Circular Quay has cement joints grouted close in contact with the timber, but that is the only kind of that work in Sydney.
3561. Have not the wood blocks between the rails of the cable tram been cement grouted? I am not quite positive that it is so. The Oxford-street portion of the tramway that was laid on the Barrack Hill was specified to be grouted when I tendered for it; but it was also specified what was impossible—the blocks to be tarred and grout to be put in. The difficulty was got over somehow; but it was not my contract.
3562. In reply to Question 2160, you said, "In some instances I have left every bit in"—referring to timber used in tunnel construction? Yes.
3563. In reply to Question 2161, "Why," you said, "the ground in some instances is so heavy that you cannot remove it"? Yes.
3564. You can take timber out wherever you put it in unless weight comes on to it—can you not? Probably that would be one of the reasons why you could not take it out.
3565. If no additional weight comes on it you can take it out, can you not? What I had in my mind when I spoke of that was railway tunnel work, which we have had to do in 6 feet lengths at a time. It is only put in a piece at a time when you get round from the headings as you go down, and I think it would be an utter impossibility to remove that.
3566. Would that be owing to additional weight going on it after it has been put in position? Yes. There is no weight upon it at the moment you put it in position.
3567. So that if no weight goes on to the timber other than is on it when you put it in, it is possible to get that timber out? Well, to say no weight is rather stretching the point; for if you anticipate no weight, and there is no weight, you have no need to put the timber in except to prevent the stones from falling down.
3568. In Question 2247 you were asked, "In tunnelling must you recognise no matter what precautions you take, there will be a settlement of some kind, greater or less?" and in reply you said, "Yes; but it would be reduced to a very small amount if you did as I have told you"; and in the following question you were asked, "Then, in tunnelling you must reckon on a settlement?" and in reply you said, "Yes; but very small if it is done properly";—so that if only a small additional weight goes on your timber you are still able to take it out? That is a settlement you are referring to.
3569. I am referring to the timber you were dealing with in your reply? Yes.
3570. That is to say, that you can take it out if only a small amount of weight goes on to it? Yes; you can draw it out.
3571. Then, if so much weight goes on to the timber as to make it impossible to draw it out, you would accept that as proof of the work not being properly executed? Certainly not; not necessarily. The whole of the timber put in railway tunnel work is left in because it does not pay to draw it out; but there is no bad work. If you have two or three hundred feet of crust above your railway tunnel, it is purely a question of economy whether it will pay you to draw out the timber or leave it in; but it is not bad work because you leave the timber there, for it can make no material difference—a railway tunnel for its purposes would be a railway tunnel just the same. It does not affect the masonry lining.
3572. In Question 2333 you were asked, "You stated that you and those with whom you were acting had some reason to believe that the Chairman of this Committee would order a visit of inspection to take place, and that was one of your reasons for keeping it open";—can you say how that impression got into your mind? I told you that in the answer to the next question.
3573. Do you generally take as correct statements appearing in the Press? Well, as a rule they are inspired statements in reference to a matter of that kind.
3574. Where does the inspiration come from? That is more than I know. I am not behind the scenes.
3575. Taking your memory back to what appeared in the Press in connection with this particular business, can you give the Committee any information as to where some of the letters and comments that appeared in the Press, so averse to the interests of tunnelling, and so grossly untrue, came from? If that question means, did I suggest them or write them? I say, "No."
3576. Have you any knowledge as to who did? Not the slightest.
3577. But you admit that inspiration may be of two kinds—statements may be correctly inspired, or they may be inspired not at all correctly? Perhaps I might have said, "official." If you refer to the *Herald* you will see the *Herald* said so, and you may call it semi-official and not inspired.
3578. But your answer does not convey that; you said, "If you refer to the *Herald* about that date, I think you will find it stated that there was still a difference of opinion in regard to the appointment of a Chairman";—that is nothing to provide you with grounds for thinking that the Chairman would order a visit to that place? My answer to Question 2336 implies that. I said, "From common-sense reasons, if a Committee is appointed to carry out a certain work, and the members of the Committee see the work themselves, there is no getting away from it." I meant that they would see for themselves, instead of having to rely on evidence of other people who had seen.
3579. If you were the contractor for any work with which some other persons interfered, would you resent such interference? I do not quite see that that is a parallel case.
3580. I did not ask you as to any parallel, but simply whether, if any outside persons interfered with your work, you would resent such interference? Well, an outside person would be a trespasser. I do not know anyone who could come and interfere with a contract of mine. We do not fence in our works so that people cannot come and look at them when we are doing the work.

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3581. If you were carrying out work and some persons not connected with you or the property came and tried to pull your work to pieces would you try to prevent them from doing so? I do not know that I can say what I would do unless I knew the particular case. Circumstances might cause me to take different action.
3582. In Question 2319 and the following questions you were asked if you had seen any indications of a row;—you were being generally requested to state if, in your opinion, there was anything likely to create a disturbance of the peace? I say no, I did not.
3583. You stated, in reply to some question, that you expected that the workmen under the Government officials would take steps to immediately fill that place up;—did you expect they would do so? I think you will find it was the Corporation expected so.
3584. How do you know they expected so? From their saying so.
3585. Who said so? I cannot say. You will remember that the Mayor himself went to the Inspector of Police or someone.
3586. You were on the ground, and for that reason we look upon your opinion as very valuable if we can only get it? The question of police interference is not an engineering question, and I had nothing whatever to do with it. But they said that the Mayor had left the Town Hall, and that he had gone to Mr. Fosbery; and, as Mr. Fosbery is connected with the Police, I suppose that was a reason for his going there.
3587. You advised the opening to be kept open? Yes.
3588. Did you state how long you considered it necessary to keep it open? No further than I thought that you, as a Committee, would see the work for yourselves, and, certainly, would be in a better position to see it if it were not closed at all.
3589. Did you advise the keeping of the cutting open after the Committee had seen it? No.
3590. Do you think there was any necessity for keeping it open after the Committee had seen it? I do not know what object the Mayor had in view in doing so.
3591. Do you know of any necessity? I do not know of any necessity.
3592. Do you consider that having it kept open was detrimental to the business people in the neighbourhood, and the public generally? No.
3593. If you were in business in the neighbourhood you would just as soon have such an opening in the front of your premises for a month as for a day? Well, if you refer to the publican at the Criterion Theatre corner, I think it was more likely to do him good than harm.
3594. I am not specifying any business? I do not think it has made any material difference to any person since it has been opened.
3595. If you were carrying on business, not in connection with the sale of liquor or with any place of amusement, would you consider that the keeping open of such an opening immediately in front of your place of business would be detrimental to your interests? If kept open a very long time it might be, but not otherwise. It did not affect the footpaths, and I guarantee that, from looking at the daily bank returns of the shopkeepers in the neighbourhood, you could not tell when that street was opened and when it was closed.
3596. Then, if they were to attend here and swear that their daily takings have been very seriously affected, you would not believe them? I would rather see the returns of the money paid into the bank, to know if it was so.
3597. You would not accept their sworn testimony unless you saw their bank-books? I do not know the people, and I know nothing about them.
3598. You stated previously that you advised that this place should be kept open not only for the information of the Committee, but also for the information of the public,—was not that your answer? In this sense, that one party says the work is good and another says it is bad, and if the public see for themselves they can form their own opinion. I do not suppose that a tailor would look at that kind of work, but any mechanic would take an interest in the thing, as to whether it was good or bad work, and would look at it for himself, and I think that quite half the architects and builders in Sydney saw that place and formed an opinion about it.
3599. Are you aware that considerable attention was given to this matter by the builders as an association? I do not belong to their association.
3600. I did not ask you as to your belonging to it, but, do you know that the Builders' Association, as an association, held meetings to which persons other than their own members were invited? No, I do not know that. I was never invited to one.
3601. You did not read all that appeared in the Press, then? I do not know.
3602. You only remember certain portions of what you did see in the Press? I do not know, I am sure. I am not connected with the Builders' Association, and I do not know that they have taken any steps in the matter.
3603. Did you pay much attention to what appeared in the Press during the time of the excitement connected with this business? I probably read a good deal of it. There are some papers I never see.
3604. But it did not come under your notice, or you do not recollect it having come under your notice, that the Builders' Association were taking a great interest in this particular business? No.
3605. *Mr. Harris.*] From whom did you get your instructions to visit this place? In the first instance, from Mr. Gordon, the Acting City Surveyor.
3606. Did he say who sent him to you? He was acting on behalf of the Mayor, and he got instructions from the Mayor.
3607. You got no instructions from the Mayor? Yes, I did.
3608. Through Mr. Gordon? Yes, at that time.
3609. Did the Mayor instruct you afterwards? Yes.
3610. Was anything said about who was to pay you? Yes.
3611. Who was to pay you? The Corporation—those to whom I reported.
3612. Were the instructions in writing? I have the Mayor's signature.
3613. To what? Authorising me to report on that work.
3614. *Chairman.*] Have you that document with you? No, I have not.
3615. Can you attach it to your evidence? Yes. I may state that when I was here first, I thought that written

written instructions had not been given. They were given to me verbally, and promised to be sent to me, and it was not until Mr. Bavister questioned me that I was reminded of the fact that they had not given me written instructions, and I then went and asked for them and got them. W. Greenwood. 20 Oct., 1897.

3616. *Mr. Bavister.*] In this particular connection, you called attention to a telegram; can that be produced too? I do not know whether I could or could not find that.

3617. If it can be found, have you any objection to furnishing it to the Committee with your evidence? No.

3618. Can you recollect by whom that telegram purported to be sent? By Mr. Gordon.

3619. Was that the intimation to which you referred in reference to Mr. Gordon having communicated with you—was it by telegram or by personal interview, first? I think I have said that, some time before that, Mr. Gordon suggested to me that there might be something later, and asked me if I would look at the work near the Civil Service Store.

3620. *Mr. Cook.*] Where was the telegram sent from and where to? Probably from the Town Hall—to me.

3621. Where to? To Croydon.

3622. *Mr. G. McCredie.*] You said in reply to a question asked by Mr. Bavister that you thought it was a wise thing to keep that place in Park-street open so that the public could see it, besides the Committee. Do you think that the public—most of them laymen in connection with this matter—would be able to come to a fair judgment about work, not knowing the circumstances connected with it? Well as regards tunnel driving or heading work I think you could not go into any place where there would be more people who knew more about it than do the people here, for there are very few people in the Colony who have not done some heading driving in their lifetime.

3623. You think there would be nothing in the surrounding circumstances to enable the general public as a body to form a satisfactory judgment? I think they could form just as good an opinion as a Member of Parliament, unless he happens to be a professional.

3624. You do not think that it was left open more for the purpose of agitating the public mind in connection with this matter? I do not know.

3625. You have no idea as to that? No.

3626. As you advised the Mayor in connection with this matter, can you tell us whether it is a fact that for some considerable time the carters of the stone to the new markets were instructed to cart their heavy loads over the Park-street crossing previous to this opening being made? I have no knowledge of anything of the kind. I have no communication with the Council unless I am working for them. I have not spoken to Mr. Gordon or to the City Surveyor since he came back.

3627. The Inspector of Roadways for the City Council is Mr. Lees? Yes.

3628. Can you explain to the Committee how it was that you got your instructions from Mr. Gordon in the first instance, and not from Mr. Lees, in reference to the roadway? Well, Mr. Lees is under Mr. Gordon. He is simply on the staff of the City Surveyor.

3629. Mr. Browne in giving his evidence stated distinctly that he had nothing whatever to do with the roadways, and yet he was one of the prominent officers in connection with that opening? He was there. But I think that Mr. Browne's official title is Inspector of Pavements, and he has the pavements especially under his control. Mr. Lees is Road Surveyor.

3630. But Mr. Browne was superintending the opening of Park-street in your presence? Yes.

3631. *Mr. Cann.*] Have you had any extensive experience in tunnel driving? Yes, more than anybody in this room. I have driven some miles of railway tunnels, and no one else in this room has done so.

3632. Did you ever see a tunnel like this driven before under similar circumstances? Not a telephone tunnel—not a tunnel put down parallel to the street surface.

3633. Did you ever see a tunnel driven with only 2 or 3 feet of covering? Well, they do some things in Sydney with very little more covering than that. When they drove the sewer through the lower portion of Parramatta-street West, towards Abercrombie-street, there was very little covering on the sewer there.

3634. That was an exceptional case? Yes, it was.

3635. You never saw a tunnel of this length with so little covering over the tunnel? No, it is an uncommon thing.

3636. Can you tell me what was the reason for opening up and examining this work? I think that the general reason was because of the settlement causing a liability to accidents in the streets through the pavement falling in.

3637. That is what you were asked to report upon? No, it was not. I was merely asked to report on the packing in the headings. It was never mentioned to me but once previously to the Park-street case.

3638. Why did they want your report on the packings? I suppose simply as evidence in the matter.

3639. Did you yourself attribute the subsidence to the packing? Yes.

3640. What do you mean by the packing? The material that is placed between the brickwork and the timber, and that that was not placed between the timber and the roof.

3641. Was this timber taken out to permit of the packing going in? When are you referring to?

3642. I mean at the time you examined it. At that time the timber was still in.

3643. It was still intact? Yes.

3644. With the timber still intact, and the subsidence that took place, or the amount of stuff supposed to have settled in Park-street, could it have got from the timber towards the arch if any amount of space had been left? Yes; the poling-boards were not close together.

3645. What was the space between them? One might have a butt joint and the next might have a 3-in. space.

3646. But, even admitting that, what was the quantity of ground that would have to come down between the laths to permit of the space that there was between the earth and the concrete? I do not see quite how you could put it into cubes, because it depends on the length.

3647. Well, taking the breadth of Park-street, what quantity of material would have to go down between those 3-in. spaces to allow of the space that there was between the earth and the concrete. Taking the space at 15-in. between the ground and concrete, how much would have to go down between the 3-in. spaces in the laths to allow for that 15-inch space? I think there was not 15-inch space; but even if there was it depends on the area. There is not 15-inch space on the average. I do not think anyone has suggested that.

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3648. What would be the average? I think Park-street would average from 7 to 8 inches perhaps.
3649. For what breadth? Approximately (say) 5 feet.
3650. And what quantity of ground would have to go down through the 3 inch spaces to allow for 5 feet of space? Well, that is 10 cubic feet to the yard run.
3651. Do you think there was space enough between the arch of the tunnel and the timber to allow that quantity of ground to come down? No, not between the arch and the timber. It would have to find its way down the back of the side walls.
3652. Well, between the virgin ground and the arch was there space enough to allow that quantity of earth to come down? Yes. It must have gone somewhere.
3653. *Mr. Cook.*] Was not the timber close down to the brickwork;—what space was there between the crown of the arch and the timber? There is very little space above the crown. It might go down the back of the side walls.
3654. *Mr. Cann.*] Could you tell us what in your opinion was the reason for this agitation commencing? No.
3655. You said you were a tenderer for this tunnel? I said I intended to tender. The Postmaster-General called for tenders for the work. I went to the Post Office, saw the plans, took off my notes, and made everything ready for tendering, and prepared my tender, but a tender form was not there. It was to be there the next day, and I went the next day but the plans had then been removed from the table and the work was going to be done by day-labour, so I do not know exactly whether I was or was not a tenderer—I mean for No. 3 section.
3656. Did you not feel a bit sore because it was to be done by day-labour? No; it would not have been my job.
3657. You naturally took an interest in it because it was to be done by day-labour. No.
3658. Did you ever interview any of the aldermen and bring this particular grievance before them? No. I scarcely speak to the aldermen.
3659. Do you know who the alderman was who first brought it before the Council? No.
3660. Are you acquainted with Mr. Davis? There is no Mr. Davis who is an alderman in the City Council, but I have known him ten or twelve years. However, I do not speak to him once in a year.
3661. You had no part in getting up the agitation? No.
3662. *Mr Cook.*] You know Alderman Waine? Yes. I think you might take it for granted that as a builder in Sydney I would know him, whether he is or is not an alderman.
3663. *Chairman.*] You know every builder in the city? I know most of the builders and contractors in the city.
3664. *Mr. Cann.*] Is it not a fact that the prejudice against the work being done in the way it was done was because it was done by day-labour? Not to my knowledge. I know nothing of the kind.
3665. You never interviewed anybody in reference to the way this work was done before the opening in Park-street? No.
3666. You never took part in any agitation to have that opening made—to investigate it? No.
3667. *Mr. Bavister.*] Do you consider that the system that has been adopted recently in some works of the Government and other persons in carrying out the work by day-labour is one in the public interest? The Government cannot do work as cheaply by day-labour as they could do it by contract. If they were to employ me to-morrow to do it, I could not do it as cheaply by day-labour as by contract. I could not get as much work out of the men. As an engineer, I cannot carry on day-labour work as cheaply as if I let it by contract.
3668. *Mr. Cann.*] Do men work for you by day-work or by contract work? Day-work, because we are not allowed to sublet; but if I were allowed to sublet, I would sublet everything.
3669. Do you sublet an excavation that has perhaps 100 or 150 men working upon it? I am not allowed to do so.
3670. Was it ever done in any big works of this kind? If I had a contract, and were free to do as I liked, I would sublet everything.
3671. Do you, in carrying out excavation works, sublet? Unless there is an embargo put on the contractor; no work is done by day-work.
3672. *Chairman.*] Have you done any contract work here that you have sublet? Yes; but not a drive. I have done no drives in the Colony.
3673. *Mr. Bavister.*] Did you think that the Post and Telegraph Department had acted fairly by the contractors in advertising this work to be let by contract and calling for tenders, and then withdrawing it, and doing it by day-labour? I do not know. I was only put to the inconvenience of going there and taking off my quantities.
3674. Those contractors who had responded to the invitation were in your opinion put to a great loss? No. It only took me perhaps half a day to take off particulars of the contract; that was all the loss to me. If I tendered I should not have got the job, and therefore would have had the same loss. Another contractor would have got it instead of its being done by day-labour, and therefore I did not suffer.
3675. Where you have been at liberty to execute works as you chose, you have always sublet whatever you possibly could? Yes.
3676. And if you were to obtain to-morrow the largest railway contract ever executed in this Colony, you would not employ a single man at day-work if you could avoid it? No; where I could avoid it, certainly not.
3677. You do not, then, regard the system of day-labour with favour? Neither a contractor nor the Government ought to do the work by day-labour? I do not mean specially the Government, for as a contractor I myself would not do it by day-labour.
3678. You do not regard the system of day-labour as being the best? Certainly not.
3679. And you would prevent it if you could? Yes; I would certainly do the work by contract.
3680. Has that idea, that you would prevent the carrying out of any work by day-labour, where you possibly could, unconsciously to yourself influenced your evidence here? I did not say that I would prevent such work being done by day-labour.
3681. Having such a firm conviction against the day-labour system, is it not reasonable to suppose, from the common-sense point of view to which you referred in answering a previous question, that anything that could

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could be looked at in the two ways would not be regarded in the most favourable manner by yourself? I do not think it makes the slightest difference to me which way this work was done. If you ask me to give an opinion on any work, I will give it you irrespective of whether it is done by contract, sub-contract, or by day-labour.
3682. Well, this work has been done in direct opposition to your convictions? No; not necessarily.
3683. It has been done by day-labour? Yes.
3684. Your convictions are that that is not the best way? That is my opinion.
3685. Then, has not this work been done in direct opposition to your convictions? I do not quite see that.
3686. *Mr. Cook.*] Do you think it should not have been done by day-labour? I do not say that.
3687. *Mr. Bavister.*] Your opinion is that such work would be more cheaply done by contract? Most decidedly.
3688. You held that opinion before we commenced this inquiry? Yes; and shall hold it for the next ten years—that such work could be done more cheaply by contract—not this work specially, but any work, no matter what it might be—not necessarily Government or even contractors' work. If you are spending your own private money you can do the work better by contract than by day-labour. The Minister for Public Works himself has recently called for tenders for the building of a house which he is erecting for himself at Leura.
3689. *Mr. Cook.*] You do not think that it could be done as cheaply by day-labour as by contract? I do not think so.
3690. Therefore, you do not think that this work has been carried out in the way it ought to have been? That I do not say at all.
3691. Do you not think so? I did not say so. I say that it could be done more cheaply by contract. I do not say that you were wrong in doing it by day-labour. You may have had other reasons for it.
3692. You think you would be doing wrong if you did that work by day-labour? I do not say so.
3693. I am asking you your opinion? No; I do not think I should be doing wrong in doing so.
3694. But you said you would not let out work to be done by day-labour? I said that I would not do my own work by day-labour whether I were an engineer or a contractor.
3695. Why? Because I could get it done much more cheaply by contract.
3696. Therefore you think that the Government, in doing this work by day-labour, were doing wrong? No; I do not say so at all. They may have had some reason for it—doubtless they had. If they were simply seeking the cheapest way to do the work, they would let it by contract; that I certainly say.
3697. Supposing there were no other reason except the financial one, then would you think they were doing wrong in doing the work by day-labour? Yes, certainly; because it could be done more cheaply by contract.
3698. That would be your opinion? Yes, I am sure it would. Unquestionably it could be done more cheaply by contract; any work could.
3699. Therefore, naturally, you do not look kindly on anything done by day-labour? It does not make the slightest difference to me. I am not fixed to New South Wales.
3700. Still you have an opinion, I suppose, like most other men, and a feeling like most other men? My opinion is that all work can be done more cheaply by contract.
3701. Therefore you are opposed to any day-labour system? No, I am not.
3702. Then you have no definite opinions about anything, except in the abstract? I say that all work can be done more cheaply by contract than by day-labour, no matter whether you are making boots, or clothes, or cutting coal.
3703. What is your feeling and attitude in regard to this work being done by day-labour? I have no feeling about it.
3704. No feeling at all? None at all.
3705. *Chairman.*] In reference to the matter of day-labour and the matter of contract work, do I understand you to say that you consider that in all cases such as this it is more economical to do the work by contract? Yes.
3706. And in the matter of the Government carrying this out, do I understand you also to say that there might be some other reason, such as a question of policy? There might be other reasons for it.
3707. Some questions were asked you in reference to the non-completion of the work at Park-street when you examined and reported upon it;—as far as you could judge, was that work completed? Yes.
3708. Do you know what has been done to that part of the work at Park-street since your previous examination? Generally speaking, I think that right through the streets the footpath pavement or roadway has been removed and the material taken out and the timber drawn, and it has been repacked down about as far as the haunches.
3709. Did the appearance of the work when you examined and reported upon it lead you to the conclusion that it would have been done if attention had not been directed to it by this inquiry? Well; of course you can tell nothing further than that the road is there and the traffic passing over it.
3710. I am speaking of the time when you examined the work underneath for the purpose of reporting; did it look as though it were the intention to do what has been done to it since—to remove the timber or anything of that kind? No.
3711. *Mr. Cook.*] Have you not sworn to this Committee that you believed that they were engaged in this work? No; that is a totally different matter.
3712. *Chairman.*] There was one question I took particular notice of in reference to the space that was left for ramming the sides of the tunnel; I understood you to say that in some places there was very little space—scarcely enough for the rammer to get down? Yes.
3713. Did the excavation, as far as you saw it at those places, simply give bare room to do the brickwork of the tunnel inside? To give sufficient room and not much more.
3714. Some questions were asked you in reference to the method adopted to get underneath the cement at Park-street—I mean regarding the word "drilling";—do I understand you to say that you were there when this concrete was penetrated? Yes.
3715. And do I also understand you to say that in using the word "drilling" you intended it to be construed to mean that the method was adopted of making holes at certain points without taking it out continuously? They began the work as near as I know about half-past 2, and it was about 4 o'clock when

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when I got there. At that time some part of the works was exposed, and some broken through; but in that case instead of taking out the concrete in large slabs, or continuously, they made a hole through, and I used the word "drill."

3716. Some questions have been asked by Mr. Bavister which might be construed to infer that there had been some communication between yourself and myself in reference to keeping this tunnel opening; in case there should be any misapprehension, I want to know if you and I ever met before you came to this Committee? I never spoke to you in my life, that I know of.

3717. You never had any communication with me, or I with you? Not to my knowledge.

3718. Some questions have been asked in reference to the disadvantage to the tradespeople from Park-street being closed up for a certain time;—do I understand your reply to those questions to mean that it did no serious harm, and a number of people were attracted to that particular spot during that time? In the case of a publican he would probably be more likely to gain than to lose by it.

3719. In reference to your replies concerning the public, judging for themselves as to the manner in which the work had been carried out, do you mean that the whole public, or that only the professional part of the public who looked at the work, could judge for themselves. Well, if it even comes to working-men, most working-men here are judges as to whether a heading is driven or packed properly, and they could come to some conclusion.

3720. You mean that anyone with ordinary intelligence could judge? Yes, and see for himself the rights of the case.

3721. *Mr. Bavister.*] You stated in reply to a question from me that, if to-morrow or on any subsequent day, you had the largest railway contract ever executed in New South Wales you would not employ a single person upon it at day-labour? Generally speaking I would prefer contract work, no matter what the job might be. There are about two contractors in England who carry out their work by day-labour, against, I suppose, 100 contractors who do everything by piece-work. When I was there Mr. Aird, of Lucas and Aird, the largest railway contractors, did his work by day-labour; but you may take it that fifty to one of the railway contractors in England do their work by sub-contract.

3722. We are to understand that the English custom is, that for one contractor who carries out his work by employing men by the day, fifty sublet every possible portion? I am speaking of public works contractors and not of builders. We never confuse the word "builders" and the word "contractors" at Home. Here the word "contractor" seems to be a common word for both builders and contractors. In England, a contractor carries out railways, waterworks, and works of that sort, but he never touches buildings. I do the same here.

3723. In contracting for a railway or large waterworks he would not interfere with the building portion of it? It depends upon what you call "building." The whole of a railway, from start to finish, is let in one contract, but the station buildings, even in this Colony, are distinct from the other work.

3724. But with regard to bridges, the contractors are paid for their construction? They are always let along with the contract. A bridge goes in with the railway contract, whether it is iron or wood.

3725. *Chairman.*] Did you give evidence before the Royal Commission that inquired into the Public Works Department? Yes; for the Government.

3726. On behalf of the Public Works Department? Yes.

3727. *Mr. Cook.*] On behalf of the contractors? No; on behalf of the Government who paid me for it.

3728. You gave evidence in favour of Carter and Gummow, did you not? No; I gave it in favour of the Government.

3729. *Mr. Cann.*] Do you remember the completion of the Metropolitan Underground Railway in England? Yes.

3730. Who was the contractor? There were several contractors. It was let in sections. Which particular piece do you mean?

3731. I mean the piece between the Mansion House and Aldgate? I do not know whether it was Furness or Webster.

3732. Was he one of the contractors who do all their work by subletting to the men? It is a matter of twenty or thirty years ago. In railway construction every bit of the tunnel driving, the heading driving, fixing the ribs to turn the tunnel arch on, and fixing the leading frames for the tunnel, building the brickwork, everything in fact in connection with the railway works was always let. We never made a centre for a viaduct, or anything of that kind, without having piece-work.

3733. Do you think it is possible to carry out work like the connection between the Mansion House and Aldgate by piece-work? I said that Aird was the exception, who never did. Lucas and Aird have done a lot of London work, and they always do it by day-labour. I never knew them to let a contract.

3734. *Mr. Cook.*] Are you opposed to the policy of the Government in carrying out these day-labour works? As a citizen, I am.

3735. You are opposed to the policy of the Government in carrying out the works that had been done by day-labour? General work by day-labour, certainly.

3736. *Mr. Bavister.*] From your previously being asked by the Mayor, or someone on his behalf, you then had it within your knowledge that the Postal authorities were extracting the timber, and had commenced somewhere near the railway station, and had completed that work up to the Criterion Theatre at the time the opening was made in Park-street? No.

3737. You did not? No. I think you are wrong. I think that at the time the work in front of the Civil Service Co-operative Society's new stores was exposed, the Postal authorities had not commenced to remove any timber at all in the city. I have already said that I have never been spoken to on behalf of the Corporation, with the exception of a reference to the work in front of the Civil Service store, practically, until the day of the Park-street affair.

3738. Was it within your knowledge that the Post Office Department were taking the timber out, and had commenced somewhere near the Railway Station, and had completed taking out the whole of the timber right up to the "Criterion Hotel" at the time the opening was made in Park-street, when you were communicated with by the Municipal authorities? If the work were being done I should have known it, as I am in town every day.

3739. And you saw that that was being carried out? I do not remember now, but I daresay it was.

3740. You told us that it was a matter of impossibility for anybody to be in the city streets daily, and not know what was being done? Yes; but I do not keep a diary

3741.

3741. Speaking from memory, I think you will be able to say whether you recollect that timbers were being taken out previous to your being called in by the Corporation? Yes, they were. W. Greenwood.
3742. And you had no reason to doubt that they were going to continue and remove the whole of them? The Government might stop work at a moment's notice. 20 Oct., 1897.
3743. There was nothing to indicate that they were going to cease it? No.
3744. If you had undertaken to do this tunnel in the manner you thought best, and the City Council had come to you and said, "You shall not do this work by open-cut, you must do it in tunnel," would you not have considered that they were making it very difficult for you to execute the work satisfactorily? If I had a contract to do the work in whichever way I liked and the Government interfered I would have a very good claim against the Government.
3745. If you had the choice of constructing such a work either in tunnel or by open-cut, which way do you consider you could complete the work most satisfactorily to prevent subsidence after you had completed it? I could do it cheapest by open-cut.
3746. I do not mean as to cost;—but which way could you do it most efficiently and surest? By open-cut, either as regards cost or efficiency.
3747. So that when the Corporation prohibited this work from being done by open-cut, and insisted on its being done in tunnel, they made it very difficult to efficiently complete the work and prevent subsidence? I do not know that they did that.
3748. But if they did it, would that be the effect? I do not know anything at all about what the Corporation did. I say that open-cut would be the most economical and most efficient.
3749. If the contractor had intended to do this work by open-cut, and then had been prevented from doing so, his work would have been rendered more difficult to leave in an efficient state, or it would have been more liable to subsidence, having been done by tunnel than if he had been permitted to carry it out by open-cut? Yes.

The Committee met again at 2·10 p.m.

Present:

MR. COOK, | MR. HARRIS.

J. H. CANN, ESQ., IN THE CHAIR.

George McCredie sworn and examined:—

3750. *Chairman.*] What are you? An architect and consulting engineer.
3751. You are aware that the Committee are inquiring into the question of the telephone tunnels? Yes. G. McCredie.
3752. Have you had much experience in this kind of work? Yes; I have had considerable experience in excavating work. 20 Oct., 1897.
3753. Where? There was one job at Darling Island—a very large job of excavating work, the contract for which amounted to £33,000. There was also a job in George-street, at Holdsworth and Macpherson's; there was a very large amount of excavating there, over the Tank Stream. Holdsworth and Macpherson's building represents £38,000.
3754. What general professional experience have you had, especially in work of this nature? My experience has extended over a period of seventeen years, and has included practical work as well as designing and supervising. When I was 18 years of age I left this Colony in charge of a squad of men who went to Townsville, in Queensland, and carried out there some very extensive excavating work in connection with a slip and reclamation works.
3755. *Mr. Cook.*] Whose works were they? They were for the A.S.N. Company.
3756. For whom you were engineer? Yes; I was appointed engineer in charge of the work after my time was out.
3757. *Chairman.*] Did you do any tunnel work during your experience? In regard to tunnels such as the telephone tunnels, the work under consideration is the first of the kind that has been carried out in this Colony; but other excavating work that I have had to do has been equally as difficult. In Townsville the whole of the excavation was in soft mud, and we had to slab it and retain it while we carried on the work. I should like to mention also that I served my time at the trade as a carpenter and joiner, while I was at the same time learning my profession.
3758. Do you hold any diploma as an architect or an engineer, certifying that you have passed an examination? No; it is not a usual thing for engineers carrying out works of this kind to have diplomas. I can give you a certificate from the manager of the company, which I received after carrying out the work, and I also received a cheque as a bonus.
3759. You do not hold any of the usual diplomas such as those given to members of societies, and which carry certain letters? No. I may state that it is not necessary to pass an examination in order to get such diplomas. The letters M.I.C.E. and M.I.M.E. are generally obtained by reason of the amount of experience you have gained, and the works you have been connected with. I could apply to have these letters attached to my name on account of having carried out large works. To become associated with any of these institutions it is not necessary to pass an examination.
3760. *Mr. Cook.*] Your brother obtained his by examination, did he not? He got his by the work he carried out. I do not think there is any examination. Most of the engineers in the city who have these letters after their names, either apply for them or are recommended for them at Home. It must be shown that they have done a certain class of work, and have carried it out successfully before they get the letters to their names. It is not a matter I have attended to, or I might have had them. My brother is a member of the Institute of Mechanical Engineers, and he has been asked several times to become a member of the Institute of Civil Engineers, but he has never taken the trouble to do so. I have been a member of the Engineers' Association of New South Wales for many years.
3761. I understand it is your desire to make a statement with reference to the Post Office tunnels? Yes; I will make a statement of the facts in connection with my appointment, and right up to the present time. My connection with the tunnels as the junior member of the firm of A. L. and G. McCredie dates back to

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G. McCredie. 20 Oct., 1897.

the beginning of 1892, when, in response to a request by the late Mr. E. C. Cracknell, I, in company with my brother, met Mr. Cracknell in consultation at his office. At this meeting Mr. Cracknell asked our opinion as to the best method to adopt in order to remove the telegraph poles and wires from the streets. He said he favoured an underground system if it could be adopted, and suggested that the wires and cables might be laid through the sewers. This we objected to, on the ground that we thought if cables were to be laid underground at all they should be easily accessible, so that the Department could control them at will without any trouble or additional expense. The reason why Mr. Cracknell sent for our firm was, he said, because he knew it would be necessary to pierce the foundations of the Post Office. Knowing that we commanded the most reliable information regarding that structure, he thought we would be the best firm to deal with the question. We prepared plans and specifications and recommended the system of tunnels which has been adopted. In preparing these plans and specifications, after we got out a draft, we submitted them to Mr. Cracknell and had a number of interviews with him. We discussed thoroughly the sort of materials that were to be used in the construction of the tunnels, and particularly the class of bricks that were to be used. The discussion about the bricks was as to whether it would be necessary to use double-pressed bricks or the ordinary plastic bricks. The arguments used in favour of the plastic bricks were that the cost was a very great deal less than that of the double-pressed bricks—that they were quite strong enough for the purpose; and as it would be necessary to cut numbers of holes through them from time to time to make the connections for distributing the wires to the various premises, these bricks would be easier worked, easier cut, than the double-pressed bricks. After a long discussion we decided that the plastic bricks were the best, and those are the bricks which have been used in carrying out the work in the tunnels. The first contract was carried out by Chambers and Grocock, under our supervision, and we were then instructed to prepare plans for the second contract; but for some reason or other—I believe it was owing to scarcity of funds—the work was not carried out. This took place in December, 1892. I was returned to Parliament in May, 1893, which position I held until June, 1894. In January, 1895, we were instructed to submit plans for the second contract, which were approved of, and the work, after being tendered for, was carried out by Mr. Charles Grocock under our supervision, with Mr. Donald as clerk of works. Mr. Donald's appointment was made on my recommendation, in the name of the firm, and in the absence of my brother, who was the senior member, and who was in Queensland at the time. The recommendation was made from a number of applications which were sent in to our office. I selected Mr Donald on account of his knowledge of general building construction, and of the high opinion I entertained of his honesty and integrity. I may state that there was another ex-Member of Parliament among the applicants—Mr. Darnley. As I have said, there was quite a number of applications, and the selection resolved itself into a choice between these two practical men. Mr. Darnley was a plasterer by trade, and knowing that Mr. Donald was a bricklayer and stonemason, and knowing that the construction of the tunnels would involve a knowledge of that particular class of work, I recommended Mr. Donald to the position, and the recommendation was accepted. About the middle of 1895 we received instructions to submit plans for another contract. We submitted plans which were approved of and the work was ordered to be carried out under the day-labour system. Since then, from time to time, we were instructed to proceed with further extensions of the work, and we were doing so when the Council interfered. When proceeding with the work, we acquainted the Council with the extent of the operations, and they insisted upon the work being done underground. We did this in the busiest portions of the city, but the greater portion of the work was carried out with open cuttings, which method gives more room to work, affords daylight, and gives better facilities for building brickwork, and the packing can be rammed and consolidated with more certainty and less chance of settlement. When we adopted the method of tunnelling, the upper surface was supported with timber. But the difficulties surrounding this method soon made themselves apparent, and we decided to have the whole of the timbers removed from the upper surface as soon as circumstances would permit. I may explain in connection with the difficulties surrounding this matter that we soon found out where we had the timber so close to the surface that a great amount of annoyance and trouble was caused by licensed drainers and plumbers, and people making connections with premises, coming into contact with the timber and removing portions of it. We could see the difficulty connected with it, and whatever happened, whether the excavations were made good or not, we were alive to the fact that the Department would be blamed if there were any settlements in connection with it. When the comments were first made in the City Council relative to this method, we wrote to the Postmaster-General under date June 23rd, 1897, pointing out that we intended to remove the timbers; and, as in the meantime the Council had taken exception to their presence, we recommended that they should be removed at once, and in reply we received instructions to have them removed forthwith. We were carrying out these instructions when the Council took possession of the work. The works stood then in an unfinished state, and consequently have not been passed by our firm. I should like to read the letter which we sent to the Postmaster-General which points out the position exactly. It is as follows:—

The Honorable the Postmaster-General. Mutual Life of New York Buildings, Martin-place,
Sydney, 23 June, 1897.

Dear Sir,

With reference to the telephone tunnels, and the comments of the City Council as to the manner in which the work has been carried out, we have the honor to submit the following report:—

In executing the works, we have adopted, as far as practicable, the best and most economical method, viz.:—By open cuttings, giving more room and light to work, and better facilities for filling round and ramming over to support pavements. Where we found it possible to adopt this method without completely blocking traffic and interfering with the citizens' business, we were compelled to tunnel, supporting the surface above in the usual and proper way with 1¼-inch hardwood planking and 3-inch uprights, and, as it was practically impossible to remove the timbers and still retain the ground above, we followed the usual course adopted in carrying out work of this description, viz., filled in with good solid packing the space between the outside crown of the arch and the underside of planking, so that no serious settlement could possibly take place.

Although satisfied as to the stability of this method, we intended, when opportunities offered, either through excavations or relaying pavements, to have the timbers removed and used in again, and in several instances we have already done this. The portions in Pitt-street particularly referred to by the Council were those places noted to have the timber removed and purposely left unpacked, so that when the timber was removed the more effective system of filling and consolidating could be adopted.

The pavement over this or any other portion of the tunnels did not collapse, but was removed by the Council's officers. As to the statement made by one of them *re* the stability of the timber, our reply is: it has served its purpose, has now been removed, will bear inspection, and can be used again for similar work.

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In carrying out this class of work we expect some settlement of the filling, and have at all times been prepared to remedy anything caused by the works, and so far no inconvenience has occurred; and it seems strange that the Council's officers, instead of trying to assist the Department, has adopted the opposite course. G. McCredie. 20 Oct., 1897.

From the inception of the day-labour system we have been subjected to disparaging remarks from contractors (who are the real sufferers), and, as a contracting alderman has taken the principal part in this matter, we are led to the conclusion that it is the system that has been attacked. The first open attack (tried in the Supreme Court), Thompson *v.* the Postmaster-General, was conducted by the City Solicitor against the Government; and, after a lengthy trial and a careful inspection of the work by the jury, Thompson lost on all counts.

Following this, and during the excavations of the adjoining building for the Civil Service stores, the Acting City Surveyor, evidently anxious to show defects in the work, went so far as to state that no packing had been put round the brickwork of tunnel. Fortunately one of the men who had been employed removing the packing, came forward and made a declaration to that effect.

From the foregoing you will easily understand how we are led to the conclusion that there is a persistent attempt to upset the system, and although we regret at having to bring these matters under your notice, in justice to the Clerk of Works and the workmen, who have done their work faithfully and well, we deem it our duty to do so.

Owing to the objections raised by the City Council to the timbering, and the expense at different times that would be necessary in making good settlements, we recommend that the whole of the timbers be taken out forthwith.

We are, &c.,

A. L. & G. McCREDIE,

Engineers in charge of the Work.

It will be seen from the statement I have made that the work was practically taken out of our hands before it was completed. In carrying out sections of this work it has been our custom, before finally handing over the work, to have an inspection, and to pass it. In the case of the first section, we went carefully through it with Mr. Cracknell before the work was finally handed over, and in this case we should have done the same thing. It is a work of expediency, and we endeavoured to get as far advanced as possible with the brickwork in the tunnels, so as to enable the Department to put their cables in, and get rid of the poles as soon as possible. As soon as we had the brickwork sufficiently advanced we allowed the Department to come in and put their cables in, and proceed with their portion of the work, so that there would be no delay.

3762. Did you write to the Department, relative to the complaints made in the City Council, prior to the institution of the present inquiry? Yes.

3763. How long before? The letter to the Department which I read just now is dated the 23rd June, and this inquiry commenced on the 15th July, so that it would be about three weeks before.

3764. At the time the trouble began the tunnels were not completed? That is so. As engineers we have to pass the work as completed. When it is finished we give our certificate. It was not completed. We were going on with the work, and it was taken out of our hands.

3765. Has it been completed since? We have not finally passed it yet. Most of the work is completed now. We have yet to make the final inspection. Tunnel work is of that description that you must take time. For instance, it was only the other day that we insisted upon certain portions of the pavement that was being done under contract, and which was not to our satisfaction, being made good. I refer to the granolithic pavement. The work is not finally passed yet.

3766. *Mr. Cook.*] As a matter of fact it will be some little time yet before you can pass it? Yes.

3767. *Chairman.*] So that actually the interference with the carrying out of the work was before you had completed the work? Yes.

WEDNESDAY, 27 OCTOBER, 1897.

Present:—

MR. BAVISTER, MR. CANN, MR. COOK, MR. ROBERT JONES, MR. McGOWEN.

W. J. LYNE, ESQ., IN THE CHAIR.

A. L. McCredie, Esq., and G. McCredie, Esq., appeared in person in their own behalf.

G. McCredie recalled and further examined:—

3768. *Mr. Bavister.*] You said in your evidence that you had carried out work for the A.S.N. Co.? Yes. G. McCredie.

3769. Were the works that you did for them extensive works? Yes; I entered their employ twenty-four years ago, and I remained in it for seven years—prior to starting in business for myself. 27 Oct., 1897.

3770. Virtually, then, you did the whole of the building and engineering works in connection with the establishment of their business? Yes; in that department. I went to Townsville in charge of a squad of men to build a large store there, a wharf, and a slip—for the purpose of slipping the local steamers, and when I had completed that work at Townsville I was sent to Cairns by the first steamer that went to Cairns, which was then called Trinity Bay. After I came back from Townsville I was appointed by the company working foreman and superintendent in connection with the building of Campbell's wharfs. The Government have since purchased that property.

3771. At Dawes' Point? Yes. Sir George Dibbs was at the time chairman of the company.

3772. Did they do that work then, without the intervention of a contractor? Yes.

3773. All those works? Yes; all those works were done by day-labour. The A.S.N. Co. did all their work by day-labour at that time.

3774. Can you state, within reasonable limits or in round figures, the amount of work that was done under your supervision by day-labour by that company during that period? During the period that I was in the company's employ as working foreman, and in charge of works, I suppose that the work carried out in my department must have represented fully £60,000 or £70,000. The work in all their departments was carried out under the day-labour system.

3775. Did they, having so extensively employed day-labour, give any expression of opinion as to their satisfaction with that kind of work? They seemed to be perfectly satisfied with it. After I came back from Townsville I received a letter from the company expressing their satisfaction with the manner in which the work had been carried out.

G. McCredie. 27 Oct., 1897.

3776. And that had been carried out by day-labour? Yes; I have the letter here. It goes back a good many years, but it might be worth while for me to read it. It expresses the company's satisfaction with the manner in which the work had been carried out:—

Dear Sir, Australasian Steam Navigation Company, Sydney, 10 April, 1877.

When I placed in your hands the important work of erecting a wharf on the company's land at Townsville, and, if possible, designing and constructing a slip on which to place the company's local steamers for repairs, I had every confidence in the former work being carried out in a satisfactory manner, but I had little idea that I should find in one of your years the amount of sterling ability to create and carry out the latter important work. It has given me great pleasure to inspect these works, and the inspection has given me very lofty ideas of your future career. I considered it my duty to mention my estimation of your zeal and ability to the Board of Directors, and they have instructed me, as a mark of their appreciation of your conduct of the works, to enclose you the cheque herewith.

Yours, &c.,
F. H. TROUTON,
Manager.

Mr. George McCredie, Pyrmont.

3777. Your connection with these telephone tunnel works is based on an extended experience of works of a similar nature? Yes. After I left the A.S.N. Co.'s service I had a great deal of connection with work of a similar nature.

3778. Perhaps you will refer to some other works of a similar description with which you have been connected? In my professional capacity I had to do with Smith's wharf, Miller's Point; additions to Dibbs' wharf; erection of the Clarence and Richmond River Steam Navigation Co.'s wharf and stores and the necessary reclamation; the Tasmanian Steam Navigation Co.'s wharf and stores; the Union Steamship's Co.'s extensive premises, Margaret-street; Huddard Parker's wharfs and stores; the Illawarra Steam Navigation Co.'s wharfs and stores and extensive reclamation works; the Newcastle Steamship Co.'s extensive works; the A.U.S.N. works; additions to W. Howard Smith's and additions to the new Hunter River Steam Navigation Co.'s premises; McIlwraith, McEachern's; Hon. Robt. Reid's premises; Union Company's property above the Pyrmont bridge; Deering's property; Mr. J. C. Ellis' premises and reclamation works at Pyrmont; Darling Island and Goodlet and Smith's; and, in fact, we did nearly all the work in that portion of the harbour. I may also say that ever since that time up to the present our firm have been the consulting engineers and architects to the A.U.S.N. Co. and the Union S.S. Co. of New Zealand—permanently employed by them in that capacity.

3779. One of the previous witnesses here stated that there had been no works of any magnitude in building or in drafting and planning during the last six years in this city; can you give us any idea of the works, that have been executed by you, or under your supervision, during that period? Yes; I can mention some of them. During the last six years we have designed and carried out the following works, each costing over £3,000:—A.U.S.N. Co.'s, £25,000; Robt. Reid's, £11,000; Holdsworth, McPherson's, £38,000; Burns, Philp, & Co.'s, to whom we are the consulting architects, £15,000; flour-mill, Sussex-street, £12,000; Deaf, Dumb, and Blind Institution, £12,000; Hentsch's bond, £15,000; Henry Bull & Co.'s, York-street, £6,000; Central Electric Lighting Station, £3,000. That is a total of nine jobs, representing £137,000, that we have carried out during the last six years outside of any Government work. In addition to that, we did some work for the Government of Queensland. We carried out the Toombool Divisional Board's sewerage scheme. I have not taken into consideration any of the smaller works.

3780. Nothing below £3,000? No. At the present time we have in hand one railway, and the plans and specifications have gone home for an extensive graving dock, and most likely this work will be carried out, and the excavations alone will cost £50,000.

3781. All the works that you now mention, with the exception of one, were open to the whole of the profession? Yes.

3782. In regard to only one of them were you retained as the consulting engineers? Yes; that is all.

3783. In carrying out such extensive works, have you ever met with any accident? No; we have never met with any accidents at all in connection with the construction.

3784. In carrying out such works, you must have come into connection with various corporations and other authorities—have you ever known a case in which such authorities, or any other persons, interfered with your work, taking it out of your control, or in any way taking it from you? No. We have never been interfered with in carrying out any of our work since we have been in the profession, until we had these telephone tunnel works in hand.

3785. Can you state how the City Council first came into connection with this work—what was their first act without consulting you? Their first act without consulting us was in connection with the excavation in Pitt-street, near Liverpool-street, I think.

3786. What stage were your works at at that particular place—had you completed your work? No; we had not completed the work.

3787. They came while you were in the course of carrying out the work? Yes; we were carrying out the instructions of the Postmaster-General when they came and interfered with us.

3788. Can you state what that interference consisted of—can you give us some general idea of what took place? The first intimation that I personally had of the interference was something I saw in the public Press. My brother was the first person with whom the City Council came in contact in connection with the matter, but I believe that the adverse criticism that appeared in the public Press was caused by the action of the City Council.

3789. What did any persons sent by the City Council first do in connection with your works? They took possession of the work without consulting us in any way whatever.

3790. Which position was that at? There were others before that further down the street, but the one I particularly referred to is Park-street.

3791. That would be after you had put the tunnel in position, and when the path was being reinstated? Yes.

3792. Before setting their workmen to do anything, did they make any communication with you from the Town Hall;—did they ask for any explanation or information from you? No; we had never any complaints from them even.

3793. Then did it come as a matter of surprise to you that the Corporation workmen were interfering with that work? It did come as a matter of surprise to me in one way, but not in another, for I anticipated, from what I had heard from contractors and others, that there would be some attempt to try to upset the system under which we were carrying out the work.

3794. Was the work in such a condition as might have led the Corporation or anyone else to suppose that you had completed it and left it? No.

3795. Were your workmen still engaged on that particular portion of the work? Our workmen were still engaged in carrying out that particular portion of the work. G. McCredie. 27 Oct., 1897.

3796. In your evidence you say that no collapses have taken place;—what are the Committee to understand by that? Well, a collapse is quite different from a settlement. A collapse is where the earth or pavement tumbles in and leaves a hole. In carrying out this class of work, which is very difficult to carry out, we expect settlements, and at all times in connection with this work we have been willing to make, and have made, good any slight settlements that have taken place, but there has not been a collapse from beginning to end of the tunnel since it has been carried out by day-labour.

3797. You would consider a settlement something which took place gradually, and a collapse something that took place suddenly, of which no previous indication was given? Yes; that is what I consider a collapse.

3798. As regards the settlements to which you referred as being inevitable in such a work, were there any of such a nature as to constitute a danger to the public? No.

3799. Did you take every precaution that could be taken, and which your extensive experience suggested, to prevent any danger accruing to the public? Yes; we took every precaution. The work was carried out from beginning to end without a single accident, without any buildings being let down or even cracked, and without any trouble as regards connecting-pipes—gas, water or sewer pipes. The Hydraulic Company's pipe followed along the top of the tunnel all the way up Pitt-street, and it is well known that there is about 700 lb. or 800 lb. water pressure in that pipe, and if there had been the slightest settlement under it, or if it had not been properly supported while the work was being carried out, there would have been very great danger to men's lives, and the fact of all the work being carried out without any mishap, I think, shows pretty conclusively that every precaution was taken in connection with the carrying out of the work.

3800. One witness who has attended before this Committee—a professional gentleman—stated that among the instructions received by him for his particular work was one as to strict economy;—were you hampered by such instructions? No.

3801. Was there anything to prevent you from incurring whatever expenditure you deemed necessary for the public safety? No; there was nothing.

3802. You made reference just now to the Hydraulic Power Company's main; was there not some trouble with the corporation, or some members of the corporation, as to a water supply main for the city;—was not an assertion made in the Press by an alderman and a member of the Metropolitan Water and Sewerage Board—Alderman Davis—that the water-main had subsided for a considerable distance? Yes; there was an assertion made that it had subsided 3 inches—an assertion reported in the public Press. I believe it was made at a meeting of the Water and Sewerage Board. But it had not the slightest foundation.

3803. If such a subsidence had taken place in connection with that pipe, would it not inevitably have caused a very extensive leakage? Yes.

3804. Did any leakage take place? No.

3805. What was the dimension of that main? It was a 6-inch main.

3806. Some reference was made by you in your statement as to the carrying out of work by open-cut being preferable for many reasons, principally that of satisfactory ramming and reinstatement of pavement;—if that is so, why did you tunnel? We were compelled to tunnel. In the first place, at our first interviews with Mr. Cracknell, that was made one of the conditions. He said that the work would have to be done underground. He told us that he had received an intimation from the City Council to that effect, and afterwards in carrying out the work from time to time we received communications from the City Council, insisting upon our tunnelling; and we did tunnel, except in places in regard to which we found that we could without difficulty arrange with the owners of the property in some portions of the city to do the work by open-cut. Wherever we could possibly do it by open-cut we did. We would never have put a tunnel so close to the pavement if we had been permitted to carry out all the work by open-cut.

3807. A great deal of attention has been directed during this inquiry to the position opposite the Civil Service Co-operative Societies' new stores in Pitt-street;—did you see the packing taken out at that position? No.

3808. Did you see it while it was in that position? Yes.

3809. Did you consider that the packing there was good? Yes; it was as good as it was possible to do it under the circumstances. It was good packing. There was a statement made at the time that there was no packing there; and we then thought that more was likely to be made of the matter than really did take place afterwards. The Mayor and some of the City Council's officers were down there at the time, and statements were made at the place, I believe, that there was no packing there, and that there was going to be a showing-up in connection with the matter. However, one of the men who dug the packing out made a declaration that he dug it out, and the whole affair seemed to drop from then.

3810. You do know the packing was removed, then? Yes.

3811. And evidence can be obtained by this Committee from some persons who removed it? From the man who dug it out under instructions from the contractor.

3812. *Chairman.*] Have you that declaration? One declaration is in the Post Office Department.

3813. *Mr. Bavister.*] Perhaps it would be advisable to know how it has come to your knowledge that such a declaration exists? Well, I was sitting in Mr. Donald's office talking over some matter in connection with the tunnel when a man came and asked for Mr. Donald. He was shown into the room, and he said that he was working for the contractor at this particular place, and that from what he had heard he was under the impression that the men were blamed for leaving the packing out around the tunnel, and he thought it was his duty, as the man who was employed to take this packing out, to come forward and state that was the case.

3814. *Chairman.*] What is his name? You can get it from the declaration; I cannot tell you it from memory. I will get him to come here, and there is another man also who will come. When he made that statement I said "As far as the statement is concerned it is no good; you will have to make it on oath"; and so he made the declaration in my presence, and I sent it over to the Post Office.

3815. *Mr. Bavister.*] In carrying out this work, before you broke the ground or interfered with the pavement in the different streets through which your work took you, did you examine the pavement? Yes; I went carefully over the pavement.

3816.

G. McCredie. 27 Oct., 1897.

3816. Did you actually replace it in as good a condition as it was before you interfered with it? I have no hesitation in saying that it was replaced in a much better condition than it was in before we started. Anyone who compared the work over the tunnels with similar work done on the other side of the streets could, without even having a particular knowledge of that class of work, come to a conclusion as to which is the better work, as completed.

3817. Were your instructions to leave everything in as good a condition as you found it in? Our instructions to Mr. Donald were that he was to make everything as good, if not better—he was rather to err in making it better than when he took it up.

3818. You have several times referred to the feeling exhibited by contractors and comments made by them as to this tunnel work being carried out by day-labour? Yes.

3819. Was there any indication of a combined agitation of that kind? It is pretty well known that we are acquainted with nearly every contractor in the city. We prefer contract work. As professional men we get more commission out of it—it costs more money; and in this particular case in connection with the carrying out of the work by day-labour we were repeatedly accosted by contractors as to the fact that if this day-labour system were encouraged their means of living would be taken from them, and I was rather surprised to see it left alone so long. As regards the City Council's officers, and the feeling that was displayed by them, I may say that it was not until some time after we had started the day-labour work that we saw that their actions expressed their feelings so plainly. For instance—if I may mention it to make it plain to the Committee how I arrived at this conclusion, whilst we were carrying out No. 2 section under contract there was what you may call a collapse or a falling in of the ground down at the Exchange. All the pavement fell in, and also the wall of the side kitchen of the Exchange. The contractor was responsible for it, and if anything at all serious ever occurred that was the most serious thing that ever occurred in connection with the tunnels.

3820. Did the Builders' and Contractors' Association hold public meetings to direct attention to that failure? No. Mr. Richards, the City Surveyor, came down and insisted on its being made good as soon as possible, and of course we did that at once, and there was not a single comment made in regard to it.

3821. Who was the gentleman then holding the position of Mayor of the city? Mr. Lees. Mr. Richards, the City Surveyor, himself took the whole matter in hand and had it put to rights. We never had any trouble with the footways at all. If there was a flag loose, and it was beginning to rock, our men were sent down and they put it to rights, and the Inspector of Pavements would see that it was done satisfactorily, and we had no bother. But from the time when the Builders' and Contractors' Association, and the Chamber of Manufactures, I think, passed a resolution that they would upset the system of day-labour, or something to that effect, our trouble began. At that time the contractors were excavating for the Civil Service Co-operative Society's new stores, and, to my mind, there was a most glaring attempt to start it there, and I am perfectly satisfied in my own mind that if it had not been that this man came forward with his declaration, and they knew of it, there would then have been no trouble and agitation such as was caused by the statements in the Press afterwards. In connection with the work at Park-street, and further down Pitt-street, near Liverpool-street, there were evident attempts to find fault with everything as it went along.

3822. Then, are we to understand that your impression is that the opposition, and the agitation that took place, principally by contractors and others similarly interested, arose not because in their opinion the work was defective, but because they felt that their mode of obtaining a livelihood was jeopardised by day-labour? I am satisfied that is the whole cause, and I am the more convinced of it now because in going down to the Exchange and in opening up Spring-street, where there was a nest of pipes similar to that at Park-street, we found nearly as big a void as at Park-street, but there was nothing said about it; and in regard to that portion of the works from Moore-street to the Exchange, the City Council's officers never interfered in any way or made any complaint, and they had equally as much right to complain then, as under the day-labour system. Then, again, I may refer to Mr. Browne's evidence, in connection with the times that he visited the Builders' Exchange. He is an an officer of the City Council. He has his office at the Town Hall, and yet his evidence goes to show that he attended at the Builders' and Contractors' Association rooms every morning at 9 o'clock for the purpose of getting his letters and so forth, and although I asked him about his being there half an hour one morning, as he stated before this Committee he was, I found when the evidence was sent to me that that had been altered so that he said that he had not been half an hour there. I know that he had been half an hour there that morning. If an officer of the City Council has the interests of the Corporation and the citizens at heart, the Builders' and Contractors' Association Exchange is not the place for him to spend his mornings at.

3823. Are you aware that a number of meetings were held at the Builders' and Contractors' Exchange—meetings which were convened by a combination of the contractors, the Chamber of Manufactures, and the officials of the National Association—Captain Hynes and Mr. Epps, the secretary—to agitate in connection with this matter? I am aware that there were meetings of that description. I do not know where they were held.

3824. Do you know whether this Captain Hynes is the same gentleman who was so prominently engaged employing free labour during certain trade disputes here? Yes, I do—during the A.S.N. Company's strike. He was connected with the A.S.N. Company.

3825. And now that this matter is so far completed that an expression of opinion can make no difference, are you still of opinion that day-labour was the best method in the public interest by which to carry out this work? Certainly I am.

3826. That by doing it in that manner the best work at the least cost has been obtained by the State? Yes. In connection with this particular work, I may state that a contractor tendering for tunnelling in the city, especially tunnelling of this description, where he has to meet with so many obstacles in the shape of pipes near the surface, and go so close to buildings, and has to take a considerable amount of risk, must allow a big margin for that risk in the first place.

3827. If he errs it will be on the side of safety for the men? Yes. On the other hand, the Government carrying out the work by the day-labour system pay exactly for what is done—whatever work is carried out they pay for it, and if any buildings are damaged or tumble down—and every job of this description is liable to risk of this sort—they then pay the exact amount that it should cost them. On the other hand, very often in contract work they pay for what they do not get.

3828. Reference was made by one of the witnesses to the expense of works carried out in the old country by

by contract, he making particular reference to the Metropolitan Railway;—do you know that there is an authority in London known as the Metropolitan Board of Works? Yes. G. McCredie. 27 Oct., 1897.

3829. Are you also aware whether they would not permit very much of that work to be done by contract;—in other words, is it not a fact that a large portion of the work of the Metropolitan Railway was carried out by the Board of Works themselves? By day-labour, yes.

3830. *Chairman.*] How do you know? I have the authority here for that statement.

3831. *Mr. Cook.*] Both Mr. Davis and Mr. Cardew submitted what they considered an improved plan for a tunnel. I now hand you the plan attached to Mr. Cardew's evidence, according to which he said he would have constructed a tunnel if he had had charge of the work;—how does that plan compare with yours? That plan is more for a sewer. Most people, in dealing with this tunnel, so far as I can see, have treated it the same as if it were a sewer. It is right enough to build a sewer in that way, where you want a good scour, and there are other reasons in connection with pressure, but in this tunnel the walls are built straight up for the express purpose of arranging for the cables. The matter was thoroughly threshed out by Mr. Cracknell. Two or three shapes were submitted; and it was decided that the more room we could get at the foot of the tunnel the better for the purpose of conducting the cables. There is a truck run along the tunnel with cables, and there is a big drum put in for the purpose of distributing them on the racks. You can easily understand why the tunnel was made square. It was for the purpose of having sufficient room at the bottom of the tunnel, where the men have to work, and also in view of the fact that at some future time it might be found necessary to put up extra racks, and then they could be put up the centre. There is any amount of room.

3832. To get the necessary room at the bottom in a tunnel of the shape before you, you would have to make a very much larger tunnel, would you not? Yes; a very much larger tunnel. To get sufficient width at the bottom we would have to go right out.

3833. And incur much more expense? Yes.

3834. Which is the cheaper form of construction? The one we built according to is the cheaper form.

3835. It is both cheaper and you get more room, and it is in every way more suitable for the work of the Department? Yes. In Mr. Davis's evidence, at page 28, he says:—

> Looking at the tunnels as a whole, I am of opinion, in view of what is required of them, that while the work that has been executed is of a rather inferior quality, it will answer the purpose for which it is intended. Of course, in judging the work as a whole, the cost must be borne in mind. If the Postal Department have value for the money expended, and that which will answer the purpose for which it is required, then no exception can be taken to the quality of the brickwork. In other words, if the Department has only paid for a third or fourth class job, which in my opinion it is, then it seems to me that the amount paid would correspond with the description of brickwork put in. As to the cost of the work, as far as the brickwork is concerned, I have no means of judging whether it has been reasonable or otherwise. I do, however, think that if, in the lengths where a tunnel was driven near the surface of the streets, an open trench had been excavated, a considerable sum would have been saved, and the brickwork put in at less cost, more satisfactorily, and at same time all the trouble that has arisen through the packing of the tunnel, and the settlement of the ground over the tunnel, would have been obviated.

I should like to state in reference to that part of Mr. Davis's statement where he refers to the brickwork that in my opinion he treats that as a sewer. Double-pressed bricks are put in brickwork for sewers for the purpose of giving an even surface, so as not to retard the progress of fœcal matter, but that was utterly unnecessary in connection with this work. As a matter of fact, had we put double-pressed bricks in the tunnels instead of the bricks that we used, it would have cost £5,000 or £6,000 additional, with no extra benefit.

3836. Statements have been made from time to time in connection with the day-labour work that there has been a motive for doing inferior work, that motive being to compare one work favourably with the other—that is to say, that work has been done faultily so as to enable it to be done more cheaply. Mr. Bavister asked you a question leading up to that point; he asked you whether instruction had ever been given to you in regard to economy;—has anything ever been said to you by any officer of the Department relative to the cost of carrying out this work? No.

3837. As a matter of fact, you were never interfered with in any way? No; at least the only interference we have had has been the City Council's insistence on having the work done in tunnel where we would have done it in open-cut.

3838. *Mr. Robert Jones.*] Mr. Davis, in his evidence, stated the price per cubic yard for compo. He stated the quantities that he would mix, and what the total result would be. He gives the quantity of cement as three and a quarter to three and a half casks to make a yard of compo.;—do you think it would take that quantity of cement to make a yard of compo.? No; I know it would not. I have tested it.

3839. You are satisfied it would not? It takes barely three casks.

3840. Hardly that? We tested it for shrinkage and everything else.

3841. That is 12 or 15 per cent.? Yes.

3842. And three and a quarter or three and a half casks of cement would make more than a yard of compo., at one in two? Yes.

3843. Then Mr. Davis was not correct in saying that it would take three and a quarter to three and a half casks? He was not correct in stating that.

3844. *Chairman.*] Had you any conversation or instructions in reference to this matter with anyone except Mr. Cracknell, in the first instance? No; Mr. Cracknell, in the first instance, was the only one.

3845. Had you ever any instructions or interview with Mr. Walker? No; I never knew Mr. Walker until after this lot of work was started. He had nothing to do with it so far as we were concerned.

3846. Here is a minute in Mr. Walker's evidence in which he refers to yourself and your brother in connection with the supervision of this work? Yes; but I am talking about the very start.

3847. I am talking about any time; that minute was written on 12th August, 1895? I meant at the very start of the work; when it was put in our hands.

3848. I mean have you ever had instructions from Mr. Walker? I have had instructions from Mr. Walker, as electrical engineer, since Mr. Cracknell died.

3849. Did you ever have any interview with Mr. Cook, the Postmaster-General, in reference to this matter? Yes; I have had numerous interviews with Mr. Cook.

3850. At any time prior to this inquiry? I had very little to do with Mr. Cook. The instructions received by us were from Mr. Walker.

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3851. Were those instructions given in writing, or verbally? Some in writing and some verbally, as contingencies arose.
3852. Did you have any interview with Mr. Cook since he has been Postmaster-General, in reference to changing this work from contract to day-labour? Yes; I had an interview with Mr. Cook with reference to that.
3853. Can you state the nature of that interview? I do not recollect the particulars of it; but Mr. Cook sent for us, and said he intended to carry on the work by day-labour.
3854. Do you know about what time that was? About the time that tenders for the work from Moore-street up Barrack-street were called for. Plans and specification were prepared for calling for tenders for it, and the Postmaster-General decided to carry it out by day-labour, and he intimated to us that he intended to do that.
3855. You say that he told you that he intended to carry out the work by day-labour? Yes.
3856. Did he give you any further instructions? No; only to supervise.
3857. Or make any further statement? Not that I know of.
3858. Did you have any conversation with him as to the class of labour? No.
3859. Nor as to the tunnelling? No; we had no talk at all about that.
3860. You stated in your evidence that there were a large number of applicants for the position of superintendent? Yes.
3861. Have you a list of the applications? No.
3862. Have you got the applications? We had the applications, but when we shifted from our office in Pitt-street I think they were all destroyed.
3863. Can you give the Committee a list of those applications? I believe that I could give the Committee a list of them if I could remember them. I have already mentioned two of the applicants—Donald and Darnley.
3864. Can you state now from memory the names of any of the other applicants? There were about half a dozen applicants.
3865. You have stated that there were a great number? I did not say a great number; I said there were a number. Applications were not advertised for by us, for appointment to the position of clerk of works.
3866. You said that there were quite a number of applications? A number of applicants.
3867. I want you to supply the Committee with the names of the applicants? I would have a job to get them now, except I could remember the names. There were only about half a dozen of them. We do not generally invite applications for such a position.
3868. I am asking you these questions on your own statement, when you said there were only two, that the question of appointment was between, viz., Mr. Donald and Mr. Darnley? Yes; it resolved itself into two.
3869. I want to place on evidence the names of the men that applied? I could get you them, I believe. I have not the letters, because they have been destroyed.
3870. You say that you recommended Mr. Donald? Yes.
3871. Was that done entirely on your own motion? Yes.
3872. You never had any conversation with anybody about it? I never had any conversation with anybody about it.
3873. He was not recommended to you by anyone? No.
3874. Did Mr. Donald apply to you personally? He sent in a written application. He said he saw a notice in the paper that work was going on, and he thought there might be an opening for him as clerk of works, and he would like to be considered.
3875. Did you act all through the matter of recommending the appointment of Mr. Donald? Yes; my brother was absent in Queensland at the time, and I had to act for the firm.
3876. Had you anything at all to do in any way with the appointment of the men who carried out the work? No; not a single man did I appoint or recommend, or have anything to do with his appointment.
3877. Who had the appointment of the men? Mr. Donald, as manager of the works. If any men came to the office, we always referred them to Mr. Donald.
3878. You said in your evidence to-day that the City Council insisted on the work being done by tunnelling? Yes.
3879. Where is the letter in which they so insisted? Two letters have been put in.
3880. You hold that the letters written by the City Council caused you to carry out the work by tunnelling instead of by open-cutting? Yes.
3881. Did you intend, previous to that, to carry it out by open-cutting? Yes; we would have carried out every bit of it by open-cutting if we could.
3882. At the time that letter was written had any of the work been already done? The contract work—No. 1 section.
3883. Was that all done by open-cutting? That was done by tunnelling, under instructions from Mr. Cracknell. He instructed us to put in the specification that it was to be done underground; he would not allow any of it to be opened up, because he had received a communication from the City Council to that effect.
3884. But was that letter, which has been referred to, written before the contract work was carried out? One of the letters, I think, was written when the second contract was being carried out, and the other when the day-labour work was being carried out. We gave notice to the City Council that we were proceeding with the work, and that is the reply we got.
3885. At Question 1302 you were asked by Mr. Cook:

> I have here a letter, under date of 13th May, 1895, from the Town Clerk to the Deputy Postmaster-General; it is in these terms:—"Sir,—I reply to yours of 3rd instant, *re* the construction of the second section of the underground tunnel for telegraph and telephone wires along Pitt-street, I have the honor to inform you that permission is granted for the street to be opened up without prejudice to the rights or the future requirements of the City Council, and conditionally that the work be proceeded with as may be directed by the Corporation; and all operations carried on underground, and disturbed surfaces made good to the satisfaction of the City Surveyor."

? That is in regard to the second section.
3886. Do you know of any letter written by the City Council before that date? Only from Mr. Cracknell's statement.

3887. Before that date was the work carried out by tunnelling? The first section was let to be carried out by tunnelling, and the City Council were making Moore-street at the time. They were forming Moore-street after the big fire, and a portion on the side of Moore-street was done open-cut; that is, the first section up Moore-street.
3888. What I want to know is, before the date of this letter, which it is held was an instruction from the City Corporation to do the work by tunnelling, had work been done by tunnelling? Yes.
3889. By whose directions? By Mr. Cracknell's directions.
3890. Then, as a matter of fact, according to that statement, it was not in consequence of this letter from the City Council of the 13th May, 1895, that the work was done by tunnelling? Yes; that is the reason why it was done by tunnelling. That letter was sent on to us.
3891. You have said that before that date the work was, to a large extent, done by tunnelling? Yes.
3892. Then how could it be that in consequence of this letter work was done by tunnelling before this letter was written? In regard to every section, the Corporation sent us a letter to do the work underground.
3893. But did you not say that Mr. Cracknell told you? He told me we were to prepare a specification in accordance with the instruction of the City Council to do the work underground.
3894. Where are those instructions? We have not got them.
3895. You have said that when each section was to be proceeded with you got instructions from the City Council? Yes.
3896. Then, if you got those instructions, you must have got them otherwise than through Mr. Cracknell? Yes; after Mr. Cracknell died they came through Mr. Walker. A copy of the letter was forwarded to us for information.
3897. Have you those copies? Yes; we have.
3898. Can you produce them? Yes.
3899. Was there not some work done by tunnelling previous to that letter? Yes; there was some work done by tunnelling.
3900. *Mr. Cook.*] That letter came to you in May; at the time that letter was received Mr. Grocock had commenced the work at the Exchange end, had he not; you have told us this morning that he let a lot of the pavement down;—was not the first part of the work, to the Exchange, done open-cut? That was done open-cut.
3901. And it was owing to complaints about open-cut that the Mayor sent you this letter? Yes; we got instructions after that to do it all underground. Mr. Richards complained greatly about that open-cut down at the Exchange.
3902. Here is a letter put in by Mr. Walker, dated 7th January, 1892, and signed by John R. Palmer, for Henry J. Daniels, Town Clerk:—

> I am directed by the Right Worshipful the Mayor to request that, as the construction of Moore-street is about to be proceeded with, all wires and other overhead provisions passing over the thoroughfare may be carried through a subway; the work could be conveniently carried out simultaneously with the formation of the roadway, and with obvious advantage.

Have you ever seen that letter before? Yes; I saw it before.
3903. Was that a letter in reference to the construction of the subway? I understood that letter to be a letter to get the Government to go on with the construction of the tunnels to do away with the wires overhead, if they had any idea of doing that.
3904. Is it your opinion that the object of that letter was to get the Government to carry out this work at the same time as the Moore-street work was being carried out, so that it could be done open-cut? I could not tell you that. That letter was not submitted to me; we had nothing to do with that letter.
3905. But there is nothing in that letter which directs a tunnel to be made? No.
3906. *Mr. Robert Jones.*] As to the selection of a clerk of works, you say that there were six applications? Yes; about six.
3907. You reduced the number of applications, as is usually done, until it came at last to two? Yes.
3908. And you selected, eventually, and recommended the person you thought was the most competent of the two? Yes.
3909. *Chairman.*] Can you say what proportion of open-cutting and what proportion of tunnelling there have been in connection with this work into which we have been inquiring—the whole of the work from the date of that letter, 13th May, 1895? About three-fourths of it has been done open-cut.
3910. Then, if that is so, you did not consider that letter was an instruction to do the whole of it by tunnelling? We did not consider it was an instruction to do the whole of it by tunnelling where we could carry it out by open-cutting without interfering with the traffic. We preferred open-cutting.
3911. In your evidence to-day you stated that no part of the footpath gave way above the tunnel? I said that no part collapsed—that means a big hole.
3912. Do you still say that along Pitt-street none of the surface gave way? None of it gave way.
3913. Then, all the evidence given to the effect that it did give way must be untrue? Yes, certainly wrong, so far as regards collapses. I may say that the impression the public got at Park-street in connection with the opening there—and even now the public are of the same impression—was that the Government left that hole, which you know very well they did not do. The hole was dug out under instructions from the City Corporation officers, and all the holes referred to by the Press were opened by the Corporation officers.
3914. *Mr. Cook.*] You do not mean to suggest in your answer to Mr. Lyne that where they speak of ordinary settlement in Pitt-street they are wrong? I do not reckon that ordinary settlement is a collapse. A settlement of pavement, where a flag will rock, or anything like that, which we expect, we do not reckon as a collapse.
3915. *Chairman.*] You, I suppose, saw the opening at Park-street? Yes.
3916. There was a space between the concrete and the top of the ground? Yes.
3917. Do you suggest that the Corporation dug that out? No; I say that the space between the concrete and the top of the ground was there before we ever started the tunnel—that there was a void there.
3918. What part do you refer to as having been dug out by the Corporation? They dug out holes to expose the works. The public are under the impression that these holes were left there by us.
3919. You said that you had not passed this work at the time the Corporation took action? No; we have not passed it yet—final inspection.

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3920. What am I to understand you to mean by finally passing it? Well, in works of that description, in course of construction, we know very well that there is all the finishing to be done, and settlement which we expect in that sort of work to be made good. In all tunnelling you expect a slight settlement, especially where there is a net-work of pipes.
3921. What do you do—for instance, when you say you pass a work, what course of action do you follow? We have an inspection with the engineer in charge for the Department, and give a final certificate that the work is passed.
3922. *Mr. Cook.*] A certificate that the work has been completed satisfactorily? Yes, to our satisfaction.
3923. *Chairman.*] In one part of your evidence the other day you stated that you commenced to remove the timber before this inquiry began; had you commenced to remove the timber before the agitation began, and before the statements were made by the Corporation and the Press? We had removed some of it. You will see from the letter to the Postmaster-General that we had removed some of it.
3924. But you have said, before this inquiry commenced;—I ask you whether, before the agitation commenced, and the statements were made in the Press, you had commenced to remove the timber from the tunnel? Yes; you will see from that letter to the Postmaster-General that we had already removed some of it.
3925. In reference to that particular portion of your letter to the Postmaster-General, under date 23rd June, 1897, where you say, "Although satisfied as to the stability of this method, we intended, when opportunities offered, either through excavations, or relaying pavements, to have the timbers removed and used in again, and in several instances, we have already done this";—do you mean to say that you were going to keep the timber there until it became necessary for some reason to relay the pavements, and to have excavations made, and at that particular time you were going to remove the timber? No; I mean to say that it was our intention—because of what we found in carrying out the work, to recommend the Postmaster-General to take out every piece of timber. We found it such a difficulty on account of its being so close to the surface, and having to combat the troubles arising from meeting with sewer, gas, and water pipes, and knowing that the surface would be repeatedly disturbed by plumbers, licensed drainers, and gas-fitters, and that we could not be responsible for the putting of the earth back, and the making good of the excavations, as they ought to be, that we intended to recommend the Postmaster-General to take every bit of the timber out from end to end. We had fully determined to do that.
3926. But you do not say that in this letter, do you? We say in that letter that we intended to take the timbers out, and so we did.
3927. You say in that letter that you intended to take them out "when opportunities offered, either through excavations or relaying pavements"; if that was your intention, might it not be five or six years before the timbers were taken out? No; it is not five or six years since.
3928. Would it not probably be five or six years before some portions of the pavements had to be relayed, or excavations made that would cause the timbers to be removed? It did not necessarily follow. As far as regards the pavements, what we meant to convey by that letter to the Postmaster-General was that we were not afraid of the timber rotting, and that as opportunities occurred when pavements were raised—for instance, in front of the Civil Service stores, and other places, where the pavement would be made good—we would whip all the timber out at the same time.
3929. But what I asked you was whether if you waited until those opportunities arose it might not be some years before it was done? I do not know about that. As regards Park-street, we were determined to do it as soon as we had a chance of getting it out, because we knew that there was a void sound, but at the same time the street was perfectly safe for traffic.
3930. Have you any idea, except the one you stated just now, which was that that cavity existed before the tunnel was made—do you feel quite certain as to that, or have you any other theory as to how that cavity came to exist there? I am quite certain that there was a void there before the tunnel was made.
3931. How did you put the poling-boards in? We first put the uprights up, and where the ground was soft we put a foot-piece right across, and then a top-plate on the top of them; then we put the poling-boards in over the top of the top-plate, with a slight inclination.
3932. Did you drive them in or excavate to put them in? We drove them and excavated as we went along. You will get an exact description of that from Mr. Donald.
3933. Did you leave the question of how to put the poling-boards in to Mr. Donald? To Mr. Donald and his men. Of course we were always ready to advise him.
3934. *Mr. McGowen.*] Did you give him instructions to carry it out on those lines to which you have referred? Yes.
3935. *Mr. Cook.*] Was the same way adopted as contractors adopt? Yes. The men working there were good men, who thoroughly understood how to do it.
3936. *Chairman.*] If several civil engineers who have been examined by the Committee have stated that that void between the under part of the concrete and the surface of the ground was caused through the method by which the tunnel had been driven—that is, by the earth being allowed to come down on the poling-boards, or past the poling-boards, after they had been driven—would you say they were incorrect? Yes; I would say they were incorrect. I should like to point out that the only place where there was any trouble of that sort was where there were nests of pipes. The plan that my brother put in is correct, and shows the exact position of the pipes at that particular place. I think there were fourteen pipes in Park-street. Where we crossed other streets where there were no pipes there was no void, a fact showing pretty plainly to me that I was correct in my idea that it was the multiplicity of the pipes and the looseness of the packing that was put around them that caused the void. I think that Mr. Ives, in his evidence, spoke about a void across George-street. There was no void across George-street, but there was an old sewer, which we filled up when we took the timber out.
3937. Have you any idea of the cost of taking the timber out? I have not the account of the cost.
3938. But would it not have to go through you to be certified? I suppose it is not all completed yet. We have a memo. of the cost in the office, and can give it to you.
3939. You referred to some alderman; you said some person who was a contracting alderman had raised some objection, and caused great trouble and opposition during the time of the day-labour work? Yes; Alderman Waine.
3940. Did you give any instructions to Mr. Donald as to the kind of packing and the method of packing along this tunnel? No particular instructions—only general instructions in inspecting the work. The specification describes what is to be done.

3941. You gave no special instructions? No.
3942. The packing is done differently in different places? Yes; according to the material. It is a work of expediency. I gave no particular instructions to Mr. Donald in this matter. He had his specification to work on.
3943. And if he put in packing that is considered inferior, you do not take the responsibility for it? Yes; we are quite satisfied with the packing.
3944. I want to know who is to be held responsible—Mr. Donald is only the superintending overseer, and you are the engineer, and, for instance, in some places the packing has been done with a kind of rubble? Yes; we are satisfied with that.
3945. Was it under your instructions that that was done? Yes.
3946. In some places there is a space behind the caps;—is it usual to leave such spaces? Yes; that packing is done as well as it is possible to do it in a dark, unhandy place to work in. The men in carrying out that work carried it out faithfully and well. It was a very awkward place in which to work. They had to reach in and pack, and there were bound to be some voids, but the settlement could not be a serious one. It could only be done gradually; there could be no such danger as the Mayor complained about.
3947. Do I understand you to say in connection with the foundation of that building in Pitt-street that the packing was removed? Yes; here is the declaration.
3948. The declaration you put in now is by a man who was employed by the contractor? Yes. It is as follows:—

I, GEORGE BANCROFT, hereby declare that I have been employed on the work of excavating for the cellar for the building now being erected for the Civil Service Co-operative Society, Pitt-street, and that I was so employed in close proximity to the telephone tunnel on the 5th instant, and for several days before and since. While working at the place, the timber supporting the cap timbers of the tunnel was in my way. I asked a labourer to knock it out, which he did. I then saw that the space between the brickwork of the tunnel and the timber above had been thoroughly filled and well rammed. In continuing my work I had to cut away the material at the side of and on the arch of the tunnel. Part of the materials fell out when the supports were taken away, and when the other parts were taken out by me and other men.

3949. To what particular part does this declaration apply—is it the place where the foundation was the subject of a lawsuit? No; it is the next property to that.
3950. Does this declaration refer to the spot of which photographs were exhibited by Mr. Gordon? I never saw the photographs. While you are on the subject of packing, I should like to refer to a statement in connection with the Manchester drainage works, contained in a report of the proceedings of the Institution of the Mechanical Engineers. Referring to the packing, the report says:—

As the building of the crown progressed, the four side bars were taken out, while the three crown bars with the head-trees and roof-boards were left in permanently, and the space above the crown of the sewer was filled in with brick packing.

3951. *Mr. Cann.*] Can you tell us what depth of cover there was over that packing? The report says:—

The main intercepting sewers vary in size from 2 feet wide by 3 feet high to 14 feet wide by 10½ feet high. All the sewers up to 5 feet diameter have been built in two rings of brickwork; from 5 feet to 10 feet diameter in three rings; and the main outfall, which is 14 feet wide by 10½ feet high, in four rings. In the smaller sewers blue bricks have been used for the inner ring, and common reds for the outer or back ring. Both hydraulic lime and cement mortar have been used, whichever was considered most suited to the nature of the ground.

3952. *Chairman.*] How deep was that under the surface of the ground? The report says:—

But it is worthy of note that in crossing under three main lines of railway—viz., the Cheshire lines to Liverpool, the Midland line to London, and the South Junction lines—although the crown of the sewer, 14 feet wide by 10½ feet high, was within 2 feet of the sleepers, no accident occurred, nor were any trains ever delayed.

At page 504, "Practical Tunnelling," by Simms, referring to the Paris underground railway, says:—

The height of the vertical side wall is 9 ft. 5 in., and the width 45 inches, including the void, filled with loose stones for drainage channels. The width of the tunnel is 29 ft. 6 in. It may be added that along the side walls refuges are formed for the use of the tracksmen, at intervals of about 50 feet, and a narrow walk is left at the foot of the walls 17 inches wide.

At page 501 of the same publication, there is the following statement:—

Various gradients extend for some 1,800 feet, the rail-level consequently varying from 15 feet to 27 ft. 7 in. below the surface.

At page 244 of the same publication, there is a diagram of the tunnel of the Glasgow water-works, showing rubble packing over the top. At page 385, in connection with the Totley tunnel, there is an authority on bricks as follows:—

It may here be mentioned that there would appear to be nothing better for lining purposes than brindle bricks.

That is a brick very much like the one we have used. It is called "brindle" because of its colour.

Blue bricks are not considered suitable. In one case, where a very smooth glazed brick had been used, an invert had been blown up by hydrostatic pressure, whereas the brindle—a less expensive brick—was rougher on its surface, and, therefore, held the cement more tightly. In the case of the glazed bricks referred to, the bricks came away, leaving the face of the cement perfectly smooth; but when the brindle brick was substituted the strength of the invert was much increased, whilst, at the same time, the cost of the brickwork was much reduced.

3953. *Mr. McGowen.*] Did you pack your tunnel in that way? Yes, with the same kind of material.
3954. *Chairman.*] A good deal of the packing is metal, is it not? No; a good deal of sandstone, broken bricks, and rubble.
3955. That is what I meant; I did not mean smelted metal, but blue-metal, or something like that? There is no blue-metal in the packing.
3956. You had a diagram before you to-day, which was put in by Mr. Cardew, of the shape of the tunnel;—is the shape which he proposes a stronger shape than the one you constructed? You may call it a stronger shape. For sewerage purposes, it is better than a square surface—it gives a better scour. The trouble all through this inquiry is that all the engineers have been butting up against a sewer; but it is not a sewer.
3957. But the shape of your tunnel is that the sides are upright? Yes.
3958. The shape of that suggested by Mr. Cardew is that they are oval? Yes.
3959. And by being oval do not the sides resist the outside pressure better? Yes; they are better for resisting pressure. Of course you know in connection with our straight wall we have counter ports, we have

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have piers. They would not have them in that suggested by Mr. Cardew, and it is a question whether our piers do not more than make up for the strength that would be obtained by making it this other shape. Our piers are nearly 8 feet apart, and in some cases there are projections 9 inches built solid in cement.

3960. There has been some evidence given, I think, about 400 casks of faulty cement? Yes.

3961. Do you know anything about that cement? No; I had nothing to do with the buying of anything.

3962. But had you not to pass the cement? Yes; we passed the cement, as regards the work, and when we saw anything faulty we complained about it. I know the cement you refer to, and I know where it was used, and it can be seen now.

3963. But do you not pass the cement before it is used;—would not the cement pass your tests as the engineers, or receive your sanction, before it is used? Well, we go by the test; that cement was bought under test.

3964. But evidence has been given that it would not stand the test? There is a certificate of test given with the sale of cement. This cement was not purchased, as has been publicly stated, as condemned cement.

3965. It was stated that it was? I did not purchase the cement; but I believe that you can get evidence that it was purchased with a certificate.

3966. Who bought the cement? I cannot tell you. All I know is where it was used.

3967. Did you not test it before it was used? No.

3968. Did you see the certificate of test before it was used? Mr. Donald has the certificate of test.

3969. But did you see it? I never saw it.

3970. Did you test the cement after it was used? Mr. Donald informed me that it was bought subject to its passing, and anything not up to the test was to be returned. It is used in certain portions of the tunnels that can now be inspected at any time.

3971. But do you not test the whole of the concrete after it is made? No; we do not do that. We would never be doing anything else.

3972. Well, who does? The manager does that.

3973. Whom do you call the manager? Mr. Donald is the manager.

3974. Is he qualified to test cement? Yes; I think so. He knows when it is good cement, or he should.

3975. But is it not customary for the supervising engineer to test such things? I have built a good many buildings in Sydney, but I never submitted any cask of cement to test. We can tell in practice whether it is a success or not.

3976. But in the cases to which you refer you decided whether the cement was good or not? We generally see the brand and the certificate.

3977. But did you in this case? Personally, I did not. There was a certificate with it, I believe; but I did not see it myself.

3978. A great deal has been said about the bricks;—where were they purchased? I believe they were purchased at Cook Bros.' brickworks.

3979. Who purchased them? I do not know. We had nothing to do with purchasing the material.

3980. Did you pass them? Yes; we examined them and passed them.

3981. Did you test them? Yes.

3982. Have you a copy of the tests? We can give you a copy of them.

3983. *Mr. Cook.*] You saw the cement being used? Yes; and I have seen it since, and I am perfectly satisfied with it.

3984. *Chairman.*] You made a statement, which seems to me to be a rather an important one; you said that the Chamber of Manufactures, the National Association, and the Builders' and Contractors' Association combined together to try and prevent this work from being approved of, or to crush it? I said that, and I do believe it.

3985. You also said that a resolution was passed by the Chamber of Manufactures with reference to this matter? I did not say so. I said that I believed that the Builders' and Contractors' Association and the Chamber of Manufactures agreed to combine together to do away with the day-labour system, and I took that from the daily papers.

3986. But do you know of your own knowledge that any such resolution was passed by the Chamber of Manufactures? No.

3987. Do you know of your own knowledge of any combination between the three parties? No. I merely go by what I see in the Press.

3988. Do you know whether the Corporation of Sydney do, or do not do, a great deal of their work by day-labour? They do a lot of their work by day-labour.

3989. Do they do most of it by day-labour? I could not tell you unless I were to see their books.

3990. Do you know what contract work they do? I believe they do a good deal of the wood-blocking by contract.

3991. You do not know what proportion of their work they do by day-labour? No; I do not.

3992. *Mr. McGowen.*] You produced an affidavit from the man Bancroft? Yes.

3993. You get copies of this evidence? Yes.

3994. Mr. Gordon came here and produced photographs, six altogether, showing the state of the tunnel opposite the Civil Service Co-operative Society's new building in Pitt-street, and he swore in his evidence, "I could poke the long handle of a shovel or a pick-handle through it anywhere";—does that affidavit refer to that place? Yes.

3995. And does that affidavit by Mr. Bancroft account for Mr. Gordon being able to put in the handle of a shovel? I do not know. If it were taken away he could put himself there.

3996. In other words, if that affidavit by that man is true, the photographs and the evidence given by Mr. Gordon, in regard to the packing in front of the Civil Service Co-operative Society's new store being of no use, are not worth having? No; they are not worth having.

3997. *Chairman.*] You said you would telephone down for some documents? Yes; I have obtained copies of letters dated 13th May, 1895, 14th May, 1895, and 19th September, 1895. They relate to the question of the construction of the tunnel, as to whether the method should be underground or otherwise.

3998. The originals of these letters have already been put in evidence? Yes.

3999. Have you copies of any other instructions or letters from the City Council, either through the

the Department, or direct? No. We had letters from the Department, but I do not think there are any from the Council bearing on that subject. I was asked as to what authority I had for saying that there had been a combination, consisting of the Australasian National League, the Builders' and Contractors' Association, and the Chamber of Manufactures. The authority I have is *Liberty*, the organ of the National League. Its title is "Liberty—The Journal of the Australasian National League (New South Wales Section)." The copy I hold in my hand is dated the 24th June, 1897. I should like to state that among the general council of the League I noticed the names of George Chamier, consulting engineer, and I. E. Ives, the Mayor of Sydney, and there are also the names of a number of builders, including Alexander Dean, Captain Hynes, and others. G. McCredie. 27 Oct., 1897.

4000. No other witnesses? No. In this number of the 24th June there is a leading article, headed, "A United Protest—The Day-labour Fetish," which says:—

The report in another column of the meeting held under the joint auspices of the National League, the Builders' and Contractors' Association, and Chamber of Manufactures, is specially interesting and valuable at this time, showing as it does that at last there is a prospect of some unanimity between different elements in the Colony, which have hitherto been kept distinct, upon matters affecting the public interest. In the past all these organisations, and others with similar interests, have been content to work apart on their own lines as to matters in which they have had any interest, and in some instances all have been fighting for the same end, but in different directions, with no practical results. "Union is strength" is a trite remark, but, nevertheless, a true one, and it is to be sincerely hoped that now the first step has been taken organisations having kindred interests may be drawn more together, when it can be done for the public good. The meeting in question dealt with a subject upon which a very great deal of the future prosperity or otherwise of this Colony depends. It has been frequently referred to in these columns, and much that is now being made manifest has been fully predicted by us. The great value of this meeting has been that it has been the means of placing before the public facts which should go much further to convince them than any quantity of economic dissertation. The time for theoretical speculation has passed; the time for practical protest and opposition has arrived.

That is the authority I have for making the statement I did. In the report of the meeting referred to in that article I find it stated:—

As announced in the last issue of *Liberty*, the general council of the National League recently determined to take active steps to oppose the extension of the day-labour system introduced by the Minister for Public Works, and appointed delegates to co-operate in the matter with other organisations which might be interested. The result was that the Builders' and Contractors' Association and the Chamber of Manufactures extended invitations to the League to join them in the matter, and it was decided to hold a meeting under the joint auspices of these bodies and the Government Contractors' Association, at which a paper on the subject should be read.

I take for my authority in connection with the Metropolitan Board of Works in London the same paper, *Liberty*, of the 24th August, 1897, where it describes how the Metropolitan Board of Works have been carrying out work by day-labour. I have a letter from the London County Council, in reply to an inquiry that was made, and addressed to Mr. George Donald. It is as follows:—

Sir, Spring Gardens, S.W., 12 November, 1895.

In reply to your letter of the 3rd October, inquiring about the method adopted by the Council for carrying out its own work, all that I am able to say is this: The Council, when it came to the decision to do many of its own works, instead of entrusting them to a contractor, selected a man of great experience and of proved capacity in carrying out large works efficiently and economically, and appointed him "Manager of Works." His position is in many respects like that of a contractor carrying out works on his own account—that is to say, he, under the direction of a Committee of the Council, buys all the materials required in the market on the most favourable terms possible, has under him the best foremen of works that he can obtain, who in their turn are empowered to take on the most suitable workmen, and generally does what a contractor would do who had undertaken large works, the main difference being that the profit which would go to a contractor is saved by the Council.

I am, &c.,
H. DE LA HOOKE,
Clerk of the Council.

George Donald called in and examined, having made an affirmation:—

4001. *Chairman.*] What is your business? I am a builder and contractor. G. Donald. 27 Oct., 1897.

4002. What are your qualifications? I served my time with my father as a mason and bricklayer. I left him when between 20 and 21 years of age, and I then worked for four years on railway construction works, working on two viaducts—on Nos. 5 and 16 viaducts on No. 7 contract. No. 5 contract included the Zigzag, and No. 7 was from Rydal, 17 miles along, to near Locksley. After that I was two years at Hill End, mining part of the time, and then I commenced contracting on my own account, and I continued contracting until two years ago. The contracts I have done embraced work in most of the Government Departments, including the Colonial Architect's Department, the Roads and Bridges Department, Railway Construction Department, and Railway Permanent-way Department. My contracts also included several churches and hotels, and numerous smaller buildings. I also erected a number of schools for the Public Instruction Department. I built two court-houses under the Colonial Architect's Department, and had several roads and bridge contracts.

4003. You were at one time a Member of the Legislative Assembly? Yes.

4004. For how long? Three years.

4005. Are you at present employed superintending the construction of the telephone tunnel-work? Yes.

4006. When were you appointed to that work? I was appointed on the 4th May, 1895, according to the following letter:—

Postal and Electric Telegraph Department, General Post Office, Sydney, 4 May, 1895.

THE Postmaster-General hereby appoints Mr. George Donald as Clerk of Works in connection with the construction of the second section of the underground tunnels for this Department from the junction of Pitt and Moore streets to The Exchange, along Pitt-street, at a salary at the rate of £4 per week, the arrangement to be terminated at any time or upon completion of the contract for the work.

P. B. WALKER
(For Deputy Postmaster-General).

Mr. George Donald, care of Messrs. A. L. and G. McCredie, 250, Pitt-street, Sydney.

4007. What are your duties in connection with the construction of the tunnel? To purchase all the materials required, to engage men, to supervise the works, to discharge the men when not required or when the work is finished, and to carry on the work as efficiently and economically as possible.

4008. You have to do that, have you not, under Messrs. McCredie Bros., as engineers? Yes.

4009. Have you a copy of your application for employment? No; I have not.

4010. What caused you to apply? I was down in Sydney on other business. I was doing some work at the time, and I came down to Sydney in connection with that work, and I saw that a length of the tunnel was

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was to be constructed, and having known Mr. McCredie, I made application, wishing to get to Sydney for a few months, and Mr. McCredie recommended my appointment. I asked Mr. McCredie no questions, only if the work was to be done, and handed my application to him.

4011. Had you any conversation with the Postmaster-General with reference to the appointment? Afterwards I had.

4012. But before? No. I do not think I had. I do not remember having any. I certainly never asked the Postmaster-General for the appointment nor to recommend me. I knew that the Postmaster-General was sufficiently acquainted with my qualifications, that if I were recommended by Mr. McCredie, he could not refuse to appoint me unless he had a much superior man. If Mr. McCredie recommended someone else, of course I took it that the Postmaster-General would consider that he was a superior man to me, and would appoint him.

4013. The question is a simple one;—did you ever have any conversation with the Postmaster-General on the subject before you were appointed? I believe I spoke to him once, but I did not ask him to recommend me.

4014. You obtained the appointment? Yes.

4115. And you say that one of your duties, amongst others, was to engage the men for the work? Yes.

4016. Did you engage the men for the work? I engaged them all.

4017. Do you keep a book with a record of the names of the men employed? Yes.

4018. Have you got it here? Yes; I have the names and a copy of the pay-sheet. Here are copies of the pay-sheets for the different weeks, and I turn up one which is the largest pay-sheet we had, and includes the largest number of men we had employed on the work.

4019. How many men did you usually employ on the work? The number of men in this pay-sheet is exceptionally large. I only had this number for about a fortnight. From the 24th to the 30th April, 1896, there were 172 miners and labourers employed, and fifty carters.

4020. How much were the weekly payments? For that week the amount was £350 14s. 9d. for the miners and labourers, and £145 6s. 2d. for the carters.

4021. Some of the men you call miners and some labourers? Yes.

4022. What wages do you pay the labourers? From 6s. to 7s. 6d.

4023. And the miners? From 7s. 6d. to 8s. 6d. Included in the number of 172 are the bricklayers and their labourers.

4024. What was about the average number of men employed? I suppose about eighty.

4025. There have been some statements made about these men being mostly obtained from Lithgow—from the Postmaster-General's electorate, and from the electorate you formerly represented—and it is just as well to have the matter cleared up;—how many men were employed from that district? I think the number of men who came down to work in the tunnel under me was about eighteen—that was when I had these 172 men employed—and they were discharged just the same as the others.

4026. Are any of them at work now? No; none of them are at work now. They took their chance with the others. I dismissed them just the same as the others.

4027. *Mr. Cook.*] That is to say, the number of men was constantly varying with the exigencies of the work? Yes; and these men had to take their chance the same as the other men. I gave them no preference. At first when I came I gave the men I knew the preference, because all the men about Sydney were total strangers to me, and I could not tell whether they were fit to commence to drive.

4028. *Chairman.*] One engineer in his evidence made some reference to the fact that miners were not the best class of men to do such work as this;—what is your opinion? That rather surprises me, because, if miners are not the best class of men to mine, who would be?

4029. To do tunnel-work, such as this? Tunnelling is mining.

4030. That is the distinction that one of the witnesses made? I might ask, without disrespect, if he is an expert.

4031. He gave his evidence as an expert? I am afraid some of the experts do not know much of what they are talking about.

4032. What is your opinion? If you ask me if I consider that miners are the best men to do this work, I say certainly.

4033. There has been a statement made to me that either the Postmaster-General or someone on his behalf had a conversation with you before you got this work, when there was some trouble as to your contesting the election against him, and that you had some promise either from him or on his behalf that if you did not contest the election some work would be found for you;—is there any truth in that? No, certainly not.

4034. No such conversation occurred, and you were not approached in any way? No.

4035. Nor was any promise made to you? No; no promise whatever, and nothing of the sort. The idea never presented itself to me, and there was no such conversation.

4036. Do you remain with the men when they are doing the work;—are you in the tunnel or about the work most of the time? I am about the work all day.

4037. A statement has been made in evidence by one engineer to the effect that the subsidence or space that was discovered at Park-street must have been known to the men who were working; his idea was that the slip took place when they were driving the poling-boards or driving the tunnel ahead, and that they must have known something about it—that there had been some such slip or subsidence underneath the concrete;—was ever anything of the kind reported to you? No; not there.

4038. Were you at that particular part of the work about the time it was being done? I was there two or three times every day.

4039. Did you see anything while the work was going on there that would lead you to suppose there had been a falling away or a subsidence which would allow of a subsidence underneath the concrete? No.

4040. Did you see the poling-boards driven? I saw some of them driven. Of course, I could not see everyone, but I saw some of them driven there.

4041. How were they driven, or how were they put in? There is in timbering what the miners call the permanent set—that is, a pair of uprights and a cap-piece of 9 x 3 timber. In commencing to drive the first permanent set is fixed. Then the boards are placed in at the top, over the top of the cap-piece. The boards are entered like that—a little space beyond the cap. Then the stuff is cut away in front of the boards 2 or 3 inches, then they are driven again a few inches at a time.

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4042. It is cut away a few inches before it goes in? Yes; each board is driven in, and the next board is brought forward a few inches more until they have to cut away as far as they can reach handily, and then they cut down the face, and then they repeat the process; and when they get in about half the length of the poling-boards they put up a temporary set—that is, two uprights and a cap-piece. The cap-piece is set slightly higher than the permanent cap-piece, so as to give the poling-boards a proper grade upwards for the purpose of allowing the next set to be brought in underneath without lowering the grade of the tunnel, and to keep the permanent cap-piece level; because under the ends of the poling-boards there is a bridging piece, a thin piece of timber; it does not matter what the thickness is—in this case it was a piece of a poling-board 1¼ inch; it is then placed under the boards, which are driven home. When putting in the next permanent set the bridging piece is put in, some wedges or blocks are put in to keep the boards that are already driven the proper height to allow for driving the next set. Then the next set is driven in, and the process is repeated.
4043. To do that there would be an excavation a little above the poling-board as it went in first? No.
4044. When you excavate ahead, as you have described, you excavate a little more, or some more, than the actual size of the board? No, not the 16th of an inch, because the board is driven hard. Suppose this is the ground, the board is driven close up like that, and when the board is in there is a strain on the board over the temporary piece. The more it is driven the greater is the strain, keeping it hard up to the ground over the temporary set. The permanent set at the end of the poling-board is fixed before the temporary set is moved.
4045. But the temporary set is above the permanent set? It is slightly higher.
4046. Then you draw the temporary set? You fix the permanent set first.
4047. Then you draw the temporary set? Yes.
4048. When you draw the temporary set that leaves a space? No.
4049. It must leave the space of the board? No; because the boards do not come down? I would explain by reference to this drawing [*Exhibit* B, No. 1]. The false set is put about the centre of the poling-boards, and a little higher than the preceding permanent set. The poling-board is then driven on from the false set until it reaches to where the next permanent set is fixed. Then, as soon as the next permanent set is fixed, we block under the lathing and bridging to keep the bridging-piece sufficiently high to allow the following set to be driven between the bridge and the cap-piece. Then the poling-boards are driven home. The end of the poling-board reaches about across the permanent set.
4050. And then the temporary set is removed? Then the temporary set is removed, and left until required for the next, when the process is repeated.
4051. *Mr. Cann.*] Did you always bring your poling-boards up tight to the ground, whether there was room for the new poling-boards to come away or not? Yes; I always instructed the miners to do so.
4052. You never allowed the poling-boards to be dropped down on to the new bridge or the next new set? No; I would not allow that in any case.
4053. *Chairman.*] Was that possible to be done without your knowledge? It could have been done without my seeing it.
4054. Then is it your opinion that there was no space of any moment left above the poling-boards at any part of the tunnel after they were in place? It is my opinion there was no space left. I may say that I am certain there was no space left that I know of.
4055. Were you much at the work when it was going through, under Park-street? I was there several times a day.
4056. Had you ever any suspicion that there was any space above, such as was discovered? Yes; I knew there was a space above.
4057. How did you know? I stood there two years before I knew anything about the tunnel, and heard a hollow sound. That was when I occupied a room at the corner of the street, when I was a Member of the House. I occupied the room for two years.
4058. If that is so and you knew there was a space there, why did you not ascertain it when the work was going through? Because I considered it no business of mine.
4059. But if there was a space there, such as there turned out to be afterwards, would you not think that would be likely to be injurious to the work you were doing? No; we could drive under any kind of ground.
4060. It has been stated in evidence, as the opinion of some of the experts, that that space was caused by the earth falling through the poling-boards? That is a matter of impossibility.
4061. Why? With the exception of an old shaft that was discovered afterwards and the Hydraulic Company's excavation for the pipe, the ground was sound ground, and it was ground that would never fall through the poling-boards.
4062. What width were the poling-boards apart? They were sometimes placed close together—sometimes 1½ inches and about 2 inches. At that place the poling-boards were kept about 1½ inches apart.
4063. How was the packing done on the sides of the tunnel? It was packed on the sides before the arch was turned.
4064. How was it done;—did you see it done? Yes; I saw the most of it done. I examined the most of it before the arch was put on, and it was done as well as men could do it.
4065. What space was there between the tunnel side of the wall and the earth outside? From 4 to 8 inches—a little irregular.
4066. And was that filled? That was filled.
4067. With packing? It was filled with material that was taken out of the tunnel.
4068. Was it rammed in any way? Yes; it was all rammed.
4069. And that was done when you inspected it before you put the spring on the arch? I inspected it as a rule, and missed very little of it anywhere, before the arch was sprung.
4070. How did you do the packing in above the arch? That was placed in from the end. After the arch was turned, after one drum length was built, the material was placed in from the end of the brickwork before the drum was removed, and was rammed in from the end. The drum is the wooden centre. The brickwork is built on it.
4071. How did you do the packing behind the cross-pieces? The cross-pieces would go across the top of the brickwork in that way, slightly above the brickwork; in some places the brickwork is built up to them. The material being rammed in from the front of the cross-pieces, it could not possibly be packed tight

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right up to the back of the cross-pieces. Where the cross-pieces were there was a slight space left more or less in width.
4071½. A slight vacancy behind? Yes.
4072. *Mr. Cann.*] The space would be the thickness of the cross-piece itself, and of a V shape? Yes.
4073. *Chairman.*] Have you found any other places with spaces in like there was in Park-street over the tunnel;—I mean in taking out the timber? There was none so bad as Park-street; but wherever the Hydraulic Company's pipe or other pipes came underneath the concrete there was a space over the pipe.
4074. Did you examine that place at Park-street? Yes.
4075. Did you examine the space over the hydraulic main there? Yes.
4076. What depth of space did you find there? From 1 inch up to 8 inches deep over the pipe. It was 8 inches deep under the concrete towards the south side.
4077. What was the space that was found under the concrete at other parts,—not at the Hydraulic Company's pipe, at Park-street? There was a space of from 18 inches to 20 inches deep over where we afterwards found an old shaft.
4078. What space was there at different points where that old shaft was—I do not mean over the shaft, but where there was no shaft? It went from nothing to several inches.
4079. Did it go to 9 inches? I do not think so. I do not think it is 9 inches on the sound ground anywhere.
4080. Then what is your theory about that;—where there was a space and there was no hydraulic main, or there was no shaft? Well, it is hard to account for how that went down. There were traces of water having soaked under the concrete and found its way down over the material, and in afterwards excavating we found that the water had unmistakably been in the ground where the old shaft was.
4081. But I want you to say, with regard to the points, where there was no doubt about there being no shaft; I want you to give evidence irrespective of there being a shaft;—the shaft, of course, was an old shaft filled up? Yes; the shaft had been sunk and filled up. I cannot account for that going down, only through the hydraulic pipe having cut the ground through.
4082. I mean where there is no hydraulic pipe? I am speaking of the sound ground. I could not account for the subsidence. I saw the timbers and paid attention to the timbers under the middle of the street, because we had to contend with a lot of water in excavating, and we put sole pieces under the uprights there. What timber I saw driven was driven in the manner I have described, and the miners knew that that pipe was there, and that the ground was cut through on that side. They were old experienced miners, and they were particularly careful about it.
4083. *Mr. Cann.*] Did you drive any side laths? I do not remember any being driven there. I do not think there was any necessity.
4084. Was the ground stiff enough to stand without side laths? I believe it was.
4085. You did not think it was necessary to put side laths in? No. I do not remember. I would not say positively that we did. The ground appeared to be sound.
4086. *Mr. G. McCredie.*] Do you think the water had something to do with it. There is no doubt the water had something to do with it. I have not any doubt about that.
4087. *Mr. Cann.*] Was the water quick there? No; it was not quick, but it kept soaking through in a good big space.
4088. *Chairman.*] What rate of pay do you get? I was getting £4 a week until the management of the work was placed in my hands, and then it was raised to £6.
4089. What were you doing before the management was placed in your hands? I was clerk of works over the contract.
4090. What do you mean by the works being placed in your hands? The management of the works. I was clerk of works on the contract first—on the contract before the day-labour was initiated.
4091. And then when day-labour was started you were in charge of the works? Yes.
4092. And you got £6 a week? Yes.
4093. You say that it was your duty to purchase everything? Yes; to order everything.
4094. The statement has been made concerning a certain quantity of cement that it was not of a good class, and would not stand the ordinary test, but had been refused and condemned by the Works Department, the quantity consisting of something like 400 casks;—do you know anything about that? I purchased a quantity of cement. My arrangement was for 520 casks. It was sold to me as surplus stock of a contractor.
4095. What contractor? I was not told what contractor.
4096. *Mr. Cook.*] You have known since? Yes. Messrs. Carter and Gummow were the contractors. The first time I knew to whom the cement belonged was when I got this letter:—

Dear Sir, 237, Castlereagh-street, Sydney, 11 May, 1896.
Re the purchase of 520 casks of cement, will you oblige me by having the official purchase order made out in the name of Messrs. Carter, Gummow, & Co., who undertake to deliver the cement to your order. By doing this you will greatly facilitate business for me.
Yours faithfully,
HENRY GURNEY.

Mr. Gurney is the man from whom I purchased the cement.
4097. *Mr. Robert Jones.*] You purchased it through an agent? Yes.
4098. *Chairman.*] Did you have that cement tested? No; only in a practical way—by trying it in the work.
4099. Did you know before you used it that it had been twice condemned by the Works Department? No.
4100. Was it customary for you to have cement that you purchased tested? No. The first cement I used from Goodlet and Smith's, and Mr. Goodlet showed me the test he had made of the cement, and which he guaranteed to be correct.
4101. When you bought this cement did you see the result of any tests? I was shown some tests afterwards.
4102. But at the time? No, not at the time I bought it. I took it to be good cement from its appearance. I took it in small quantities with the understanding that if I did not find it good I would reject it.
4103. How did you come to the conclusion that it was good? I tested some in the work.
4104. I do not quite understand how you tested it in the work? Practically used it; I used a little.

4105. Then how did you test it after it was used? According to the hardness it arrives at, say, in a fortnight. If it gets as hard as the good cement it is practically as good.
4106. But in this case you tried it after it had been used up in concrete or mortar? The first lot I tried I tried in the practical work.
4107. A week or two after it had been used? Yes.
4108. *Mr. Cook.*] But, as a matter of fact, putting it in the practical work was the test—was not that it? That would test it—yes. I tested it in a few bricks in the yard first. Then I put a small quantity in the work. When that small test in the yard turned out right, I tested a small quantity in the work; and then, when I found that the quantity I had put in the work, after letting it stand a fortnight, was as hard as the other, I considered that it was good.
4109. *Chairman.*] Would you have been satisfied with a lower test than the test which was applied by the Works Department? Not if I were testing it in the same way. I should consider that the cement should stand the test that is considered the correct thing by the Works Department.
4110. Do you know that evidence has been given before this Committee that this identical cement was tried twice and condemned? I did not know anything about that.
4111. If evidence has been given that it was twice tested at different intervals by the Works Department under their test, and condemned, would you consider that cement fit to use in this work? I would not have used it. But what I tried is there to be seen now, any day.
4112. *Mr. Cann.*] Have you found the cement you bought in that way good enough and satisfactory? Yes; I found it good enough until the last lot they sent, which was lumpy, and I rejected it.
4113. *Chairman.*] What proportion of it was that? I used 408 casks, and rejected the last 112 casks.
4114. What date was it when you rejected it? I could not say.
4115. *Mr. Cook.*] Before this inquiry opened? Yes; long before.
4116. *Mr. G. McCredie.*] It must have been twelve months before? Long before.
4117. *Chairman.*] You rejected that 112 casks of cement before this inquiry started? Yes.
4118. Had you been informed by anyone at that time that the cement had been condemned? I had heard so.
4119. I understood you to say you had not heard so when you used it? No; not when I used it.
4120. *Mr. Cann.*] Did you find it defective, and was that the reason of your rejecting the other portion? The last lot they sent was lumpy, and I refused to take it. I would not take any more.
4121. Did you find any defect in the portion you had used, as a reason for testing the other? We did not test the other. It was too lumpy. I could see that without any test.
4122. You had not found what you had used up to that stage defective? No. But the men who were unloading the other said it was lumpy, and so I examined two or three of the bags and sent the cement back and would not have any more.
4123. *Chairman.*] Were you ever told at any time to be as economical as you could with this work? I do not remember being told so in so many words, but I understood it was part of my duty to be economical, consistent with securing efficiency.
4124. But you say you were never distinctly told—directly told—that you were to carry out the work as economically as possible? No; I was never told so distinctly.
4125. Did you purchase the timber that was used? No; I simply ordered it. The timber came under contract. I ordered the quantity.
4126. Where from? The contract was held by Eaton Bros., of the North Shore, first, and next by a man named Marshall, at Pyrmont.
4127. What class of timber was it? Hardwood.
4128. Do you know what kind? There was some tallow-wood, a little ironbark, but not much, some blackbutt, and some gums.
4129. Spotted gum? There was some spotted gum amongst it.
4130. Was any of the timber that was supplied rejected? No; I do not remember rejecting any.
4131. Was it inspected as it came? Yes; I inspected it as it came.
4132. Was it all sound? Yes; there might be a knot-hole here and there.
4133. There was no rot about it? No rot that I saw. Several pieces had a little rot at the end. That was simply rot that occurred in the tree before it was cut.
4134. Are you a judge of the life of timber? I should not like to say I am a judge, but I have had a little experience in the matter.
4135. What is your opinion as to the life of this timber that was put in? I should say it would last forty or fifty years.
4136. Under what conditions? Under the conditions it was in.
4137. You know, I suppose, that it depends a good deal on the conditions under which you put timber in as to how long it will last—any kind of timber? Of course.
4138. Did you receive any instructions to take the timber out? I received instructions to take it out in places, and often discussed with McCredie Brothers as to taking the whole of it out when opportunity arrived.
4139. Do you know when you received instructions to take it out in places? I could not say the date.
4140. Have you any idea of the time? It was during the progress of the work along Pitt-street, and we took it out in some places.
4141. Did you take it out in some places at an earlier date in the work? Yes; I think in one place where the bricklayers had knocked one of the struts away, and let the footpath down.
4142. Whereabouts was that? I could not say exactly, but I think it was between King and Market streets. One of the bricklayers in going along with the drumming, as we call it—that is putting the arch over—found a strut was in his way, and foolishly knocked it down, and let part of the footpath down.
4143. Was that while the work was in course of construction? Yes.
4144. Was it before the work was opened at Park-street? Yes; a long time—twelve months or more; I suppose, sixteen months.
4145. Before your attention was called to some inferior work, or supposed inferior work, had you decided to take out the whole of the timber? We had been discussing about taking the whole of the timber out; but in the particular place you refer to—I presume it is between Liverpool and Goulburn streets—that had been left by my orders with the intention of taking the whole of it out between those two streets, and we had taken the bulk of it out with the exception of two pieces. 4146.

G. Donald. 4146. *Mr. Cook.*] How long ago was that? This was in April, 1896.
4147. Which part was it you took out there? We took out part of the timber between Liverpool and
27 Oct., 1897. Goulburn streets.
4148. *Chairman.*] I asked you just now whether before the agitation, of which this inquiry was the result, had you determined to take out the whole of the timbering? We had been discussing it with Mr. McCredie, and we had come to the conclusion that it would be better to take it out whenever an opportunity would occur.
4149. What would be an opportunity? Well, after we had got sufficient tunnelling done, so that they could have got the cables in. We put no timber in under the roadways except in Pitt-street.
4150. Why did you put it in in Pitt-street only? Because of the objection the City Council made to our opening the footpath in a busy thoroughfare like that.
4151. Do you mean to say you opened the footpath in other places? Yes.

WEDNESDAY, 3 NOVEMBER, 1897.

Present:—

MR. CANN, | MR. HARRIS,
MR. COOK, | MR. ROBERT JONES,

W. J. LYNE, ESQ., IN THE CHAIR.

A. L. McCredie, Esq., and G. McCredie, Esq., appeared in person in their own behalf.

George Donald recalled and further examined:—

G. Donald. 4152. *Mr. G. McCredie.*] Do you remember what happened in front of the Civil Service Co-operative
3 Nov., 1897. Society's new building in connection with the packing over the tunnel? Yes; I had a note from Mr. Gordon, the Acting City Surveyor, asking me to meet him there about 3 o'clock on a certain day.
4153. Did you go then to inspect it with Mr. Gordon? I went and met him there, and he took me down below, and pointed out where the material had been taken from the side and the top of the tunnel, from the crown of the arch downwards; and he told me that that had never been filled. He said he was there the whole time, and saw the vacancy when the ground was first opened to it.
4154. Were there any other persons there with you? I am not certain whether it was then that Mr. Arthur McCredie was with me, or whether it was afterwards on the same day; but if I look up my notes I can tell you.
4155. I should like to know who was there at the time you made the inspection? Whether it was just at that time or an hour or so later I do not know; but I think it was later, when Mr. Cook, the Mayor, Mr. Arthur McCredie, Mr. Gordon, and some other gentlemen, whom I do not know, and myself, were there.
4156. Were any of the aldermen there? I think there were one or two aldermen there; but I would not be certain. We went down below to look at the work. The defects were pointed out by Mr. Gordon to the Mayor, and he pointed out some stones, part of the packing, on the top of the tunnel. He said, "Your Worship, you see how loose it is"; and he took hold of two or three of the stones, and tried to pull them away; but he could not move them.
4157. If it has been said by a previous witness that you could poke a long-handled shovel, or a pick-handle, through it anywhere, would that be a correct statement? No; I saw Mr. Gordon try all he could to do that. He poked the handle of a long-handled shovel just at the back of the cap-piece, where a vacancy is certain to occur through the men working in the position from which it was packed; and he tried it elsewhere. He put the end of a pick-handle between two pieces of stone in a few inches. I only saw him do that in one place, although he tried in several places.
4158. In your opinion, had that been properly packed? Yes, all along there, because I watched every drum being packed, for the simple reason that that was the first packing from the commencement of No. 4 section. At the end of the first section—one or two lengths between the shafts—was the first packing we did on the tunnel, and I watched every drum to see that it was thoroughly packed.
4159. When you inspected it on that occasion did you notice whether the uprights supporting the cross-timbers were in the same position as when you left it after the packing was done? There were none of our uprights in. They had been taken out, and temporary ones had been placed in, with the bottoms resting on little recesses cut in the side of the haunch of the tunnel—cut in the bricks.
4160. Can you tell the Committee who took those uprights out? Not of my own knowledge, but I was told afterwards by the men who did it that they had knocked them out because they were in their way.
4161. How do you account for the material being off the top of the tunnel? When the excavation was cut into it, and the material was taken away from the side, the timber being driven out and the stuff cut away to give room for the men to get the temporary props in, would necessarily cause the stuff to give way; in fact, they would have to cut most of it away to do that work, even if it were clay, but as the packing was sandy material and stones it would fall away, with the least disturbance, from off the haunch of the arch up to the crown.
4162. Were there any drain-pipes shown in the excavation on that portion of the tunnel? There was one about the middle of the front of the building.
4163. Was the ground filled in solidly round it? No; there was a vacancy above, and I think a little to one side, which is a common occurrence.
4164. You were present when a workman came into the office one day, and made a declaration in connection with this portion of the work? Yes; a young man named Bancroft, who had been working there, came in and said that he was ready to make a declaration. He made a statement first, and I asked him if he would put it in writing and sign it. He said, "Certainly." I wrote it out, and he signed it in your and my presence.
4165. In connection with this matter, there was another man who made a similar statement to you? A man named Toohey met me in the street shortly after Bancroft made that declaration, and he said that he had heard there was some noise about the tunnel, and that it was stated that no packing had been put between the brickwork and the timber, and he was prepared either to go before the Court or to make a declaration to the effect that it was full-packed, and that he, being foreman, gave orders for it to be dug out, as the timber was in the way of the bricklayers. 4166.

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4166. There is a matter in connection with an adjoining building, and we might as well deal with that before we go to Park-street;—do you remember an affair in connection with 156, Pitt-street? Yes.
4167. Will you relate to the Committee what occurred in connection with this matter, so far as you can remember? Yes. When we commenced the shaft in front of 156, Pitt-street, as the shop part of the building was empty at the time I came to the conclusion that we had better make the shaft the whole width of the building so far as we could get—that is, make an open-cut—and we took out the whole width with the exception of 8 feet for a gateway. After we had sunk the shaft—I suppose we had bottomed about two days—when a crack in the inside wall was pointed out to me. I took particular notice of the crack, and from that time I watched it nearly every time I went past it until we had the brickwork complete. I came to the conclusion, before we had completed the brickwork, that the crack was caused by something else than the excavation for the tunnel. In driving, in coming up to the side of the gateway, we came across an old drain, which was choked; we found afterwards it had been cut through and blocked. The water coming down from the yard ran into the drain at the entrance, and had no exit, and all the water, except in flood-time, simply soaked away through the ground, and as we excavated under the drain the water broke into our excavation, and caused a good deal of the stuff to come down from the top, and occasioned us a good deal of trouble both then and afterwards, because the water continued to come down while we were there. The ground just at that point was soft for several feet down, and my opinion then was, and ever since has been, that the drain was the cause of the subsidence of the old wall. The old wall itself had not only the crack that was near the front wall, but several other cracks, going back for about 15 or 16 feet. One of the cracks was an old one extending from the ground up to the top of the wall.
4168. Those cracks were in the side wall—not in the front wall at all? There were no cracks at all in the front wall, and I saw no movement or any sign of movement of the front wall.
4169. You are satisfied that the excavation of the tunnel had nothing whatever to do with those cracks? I say that the excavation of the tunnel had nothing whatever to do with them. If it had had anything to do with them the front wall would have moved, and being a polished-stone wall, it would have shown the slightest movement.
4170. *Mr. Cann.*] About what date was this observation of yours? When I first saw it was, I think, sometime in November, 1895. I do not know the exact date. I have lost the note-book that I had at the time, and I did not keep a duplicate of it, but since I lost that note-book I keep my notes in triplicate.
4171. It was long before there was any inquiry in reference to the Post Office tunnel, I suppose? Over twelve months. That was six months before the commencement of the lawsuit in reference to one of the buildings in Pitt-street. I may say that the first thing I knew of any action being taken in reference to a lawsuit was a letter sent by Waldron and Dawson, addressed to the Postmaster-General. That letter was sent to me for report. It was received by me on the 20th June, 1896, and it gave notice that damage had been caused by the construction of the tunnel to premises 156, Pitt-street. I think it was dated 19th June. I wrote a report on the matter.
4172. *Mr. G. McCredie.*] Have you got that report? I have a copy of the report here.
4173. Will you read it? Yes; it is as follows:—

Sir, 20 June, 1896.

In reply to letter B 2-2,046, 19th June (from Waldron and Dawson, solicitors), "drawing attention to damage done to premises, 156, Pitt-street, in consequence of the construction of subway for the telegraph and telephone service," I have the honor to report as follows:—I, in conjunction with Mr. A. L. McCredie, inspected the premises this morning, and found that a settlement had taken place at the lower part of the wall, under the first floor, at the south side of cartway, extending upwards and outwards from the ground to about 4 or 5 feet, and has opened at the widest part about the eighth of an inch.

My attention had been drawn to the crack while the excavation was being done, it was carefully watched, and special attention was given to having the brickwork in the tunnel speedily and carefully done, and thoroughly packed at his particular place. The crack has not extended in length or width since then.

It would be impossible to say whether the crack was caused by the excavation for the tunnel or not, as we found the ground at this place soft and sodden with water, caused by defective drainage under the cartway at the side of the wall. No serious damage has been done to the building, and the crack can be easily repaired, and under the then existing circumstances would be perfectly safe. The alterations now being made, however, will, through the removal of one of the centre piers out of the front, cause more weight to be thrown on this part of the wall than was originally carried, or intended to be carried.

Assuming that the damage was caused by the excavations, we consider that the damage to the wall can be easily repaired, and that if the Department pay half the cost of underpinning, which might be by the contractors for the alterations, it would be a fair recompense.

I am, &c.,
P. B. Walker, Esq., Secretary for Telegraphs. GEORGE DONALD.

4174. After you sent that letter, when did you hear further in connection with this matter? I again saw Mr. P. B. Walker on the 25th June, and was instructed by him to see Waldron and Dawson, and to make an offer of the amount that we recommended—that was £15.
4175. That was without prejudice? Yes, certainly. I saw a representative of Waldron and Dawson. I do not know whether the head of the firm or not. I think it was Mr. Dawson, and I stated that I did not consider that the tunnel had been the cause of the crack at all, but that, to save any trouble, and to bring the matter to an amicable issue, I was instructed to make an offer of the amount we considered would cover the cost of underpinning the pier that was alleged to be damaged, and I offered the amount of £15, without prejudice. Mr. Dawson informed me that he could not say anything further until he had seen Mr. Thompson, who was the trustee of the property. I did not hear any more until the 3rd July, when I was rung up by Mr. Dawson on the telephone, and I called upon him. He said that Mr. Thompson did not consider that the offer of £15 was sufficient, but would wait until the alterations were complete. I cautioned him about the fact that two piers were being removed from the front wall, which would cause more weight to be thrown on the damaged pier than it was originally intended to carry. I also told him that the front stonework was not properly tied into the other work, and also that the building was very old, and the foundation was not taken down to the rock. The brickwork had been badly done in the first instance, and that the Department could not be held responsible for further damage unless the present damage was repaired first. I again offered, without prejudice, £15, or to save any trouble I would do the repairs myself.
4176. That is, that the Department would do the repairs? Yes, the Department would do the repairs, at whatever it might cost. On the 6th July, Mr. Dawson rang me up, and said that Mr. Thompson would agree

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agree that we should do the work if it were done under the supervision and to the specification of their architect, and if the architect's commission and legal expenses were paid. I replied that we had no objection to do it to his specification. I have said that his supervision was not necessary, but I did not object to it, and that a reasonable amount would be allowed for legal expenses. My estimate, then, was that those legal expenses, the architect's commission, and the underpinning of one pier, could be covered by the amount offered—£15. On the 7th July, Mr. Kethel called at my office, and arranged that Mr. Arthur McCredie and I should meet Mr. Thompson, the trustee, at Mr. Kethel's office. On the 8th July, Mr. McCredie and I went to Mr. Kethel's office. Mr. Thompson, the trustee, was not there. We waited something like half an hour for him. During that time we discussed the matter, and we ascertained from Mr. Kethel that he expected a considerable sum for his share, and also for the lawyer's fees, amounting to something considerably more than I considered the work should cost. He stated that for work of that sort he got 7½ per cent. commission, that he expected payment from us beside commission, and that if the matter went to Court he would make considerably more out of it. He also told us at that time that he had thrown the whole of the weight on to the alleged damaged pier by loosening the shoring which supported the upper part of the building while the men were cutting out the adjoining pier and making the alterations. This was done before any attempt was made to underpin the work.

4177. Would you mind telling the Committee how the building was shored up? The shoring had no connection whatever with the underpinning; it was simply for the purpose of cutting out the pier.

4178. Where did the shoring go down to? The uprights—I think there were two uprights—inside, were shored up on the ground, and the uprights outside were on sill-pieces on top, where the excavation was on the footpath.

4179. Where the tunnel had been excavated and filled in? Yes.

4180. The foot of it was on a sill-piece over the top of the excavation that had been filled in after the tunnel was made? Yes; the sill-piece was laid on top, where the excavation was, and the uprights placed on that, and the needle-pieces, or putlocks, put through the top.

4181. Practically, the weight of the front of the building was on the footpath over the tunnel? If the shoring had the weight of the front upon it, then half the weight of that was on the top of the tunnel.

4182. *Mr. Cann.*] Were there any flags under the sill-piece? No; they had been taking them up.

4183. This was done on the soil? Yes. The extra weight was laid on to the pier, which he said was damaged, before it was underpinned at all.

4184. *Chairman.*] Did he state that? He stated to Mr. McCredie and me that he had loosened the shoring.

4185. *Mr. G. McCredie.*] That would throw the weight on the pier? Yes; it would, of course.

4186. *Mr. Cann.*] Under which the ground was soft? Well, if it had been soft, it would not have held the building up.

4187. It had been saturated with water prior to this? That was six months before this occurred.

4188. *Mr. G. McCredie.*] Your excavating had drawn the water out of the foundation of that building, I suppose? Yes; our excavation drains the ground all round. On the 11th July, Mr. Kethel called at my office, and told me that he was going up to Mr. Dawson's, and would bring him down. I am not sure whether Mr. McCredie was there at the time or came in afterwards; but when Mr. Kethel came back with a representative of Waldron and Dawson, Mr. Arthur McCredie was there with me. I think that both the Messrs. McCredie were there. We again offered to do the necessary repairs as soon as the consent of Mr. Thompson was given, but Mr. Kethel and Mr. Dawson's representative both stated that certain fees would have to be paid, and the amount of money demanded by them was £15 for the architect, and £10 for the solicitor, and we were to sign an agreement holding the Department responsible if any damage whatever occurred to the front of the building. We told them that if, in doing the work, we caused any further damage we would make it good, and they said they would not consent for us to do the work unless they had an agreement signed by the head of the Department, or under his authority. Both Mr. McCredie and I said that we declined to sign any agreement whatever, that we did not cause the damage—never considered we caused the damage—that we simply made the offer to do the repairs to save trouble, and in accordance with instructions that I had received from Mr. Walker, to settle the matter amicably if possible. There was another letter sent to me on 16th July, and I reported on it the same day. The letter was dated 14th July, and it was from Waldron and Dawson, making certain demands for payment to the architect and the solicitor, and also claiming damages for the loss of time and business caused through delaying the work that was then in progress in connection with the alterations to the building.

4189. *Mr. Cook.*] At what rate? £20 per week, I think, speaking from memory.

4190. *Chairman.*] That is in reference to loss of business? Yes.

4191. What was the total claim? I do not remember. Independently of that, they put in a claim for keeping the premises unoccupied, and also a claim for compensation to the lessee, and then I think a sum for damage to the building.

4192. *Mr. G. McCredie.*] That letter you reported upon was the last letter you received prior to Waldron and Dawson taking action against the Government? That is the last letter I saw.

4193. *Chairman.*] You reported on that letter? Yes.

4194. What was the nature of your report? I reported that the excavation for the tunnel did not cause the alleged damage; that we had tried to settle the matter amicably, and I had even offered to do the underpinning and repairs necessary; and that the demand made in the letter should not be entertained. On the same evening—that is, 16th July—I met Mr. Kethel accidentally, as he was coming out of his office. I said to him, "I see you have made capital out of the fact that I had asked you not to remove the shoring, and you need not leave it there any longer for us." He replied that he would get it removed if we wanted that to be done. I said, "I do not ask you to remove it, or to do anything with it, but you can set fire to it if you like." That ended the negotiations over that matter, so far as I was concerned, until the Court case came on.

4195. *Mr. G. McCredie.*] You were a witness in the case, were you not? Yes.

4196. Do you know whether the jury visited the place and inspected the excavation and the filling of the tunnel? Yes; I saw the jury there. I saw them taking measurements and inspecting the filling over the tunnel, and all along the tunnel, the width of the excavation.

4197. Can you tell the Committee also who were with them when they made that inspection? I would not

not be certain; but I think that Mr. Kethel was there, myself, and Mr. Arthur McCredie. I do not recollect who else was there, but I remember that Mr. McCredie handed his rule to one of the jury to measure the depth to the rock from the surface of the pavement. I saw two of the jury afterwards—I think on the following day—making a further examination of the work. G. Donald, 3 Nov., 1897.

4198. You consider that the jury made a careful inspection;—they inspected it one day carefully, and measured the distance from the rock, and two of the jury inspected it again afterwards? Yes. I saw four of the jury, and I stood there while they were there. I could not say what time they were there; but I think a considerable time—I think over a quarter of an hour.

4199. They were down in the excavation? Yes—that is, on the first day. When the two jurymen were there, they did not stay so long.

4200. Did you, when filling up this place, put any pine boards over the brickwork of the tunnel;—it was an open-cut, was it not? Yes; it was. We had no pine boards on the job. We did not put any boards over the tunnel where there was an open-cut, anywhere.

4201. It has been stated here by Mr. Kethel that pine boards, about 12 x $1\frac{1}{4}$ or $1\frac{1}{2}$, were thrown across the tunnel, and rubbish thrown loosely on top of them;—would that be correct? No; that is not correct.

4202. Had you any pine boards of that description in connection with the work? No; as I have said, we had no pine boards on the job. We had some pine boards in the carpenter's shop to make some shoots of; but a pine board never came on the job otherwise than made up into shoots.

4203. Did you see the excavation made for the purpose of underpinning that building? Yes; but before answering that question I might say that I saw the excavation in front of 156, Pitt-street filled in, with the exception of the last foot or so.

4204. It was under your supervision that that work was done? Yes; I paid special attention to the whole of the work along there, for the simple reason that we were blamed for causing that crack in that inside wall; and at any place where the building was old I used the same precautions, because I was not sure whether the foundation had been taken down to the rock or not.

4205. As a matter of fact, in carrying out this work you passed a good many old buildings—buildings that appeared to be on rotten foundations, or buildings that appeared to be not very substantial—and you took special precautions when you were passing those buildings to see there would be no danger of letting them down? Yes; we were always very careful in passing those buildings.

4206. And this was one of them? Yes.

4207. When they were underpinning this building, did they disturb the ground over the tunnel at all? Very little. I took notice of the excavation many times, and it was about 3 feet from the wall. Our tunnel was in every case 2 ft. 6 in. from the line of building. We had to keep that far from the wall, because of the numerous areas in connection with most of the buildings. So that their excavation was about 3 feet wide—it may have been a few inches more—and they would cut down part of the material over the tunnel that we had taken out previously and put in again.

4208. Could pine boards or any other boards be drawn out from across the tunnel without taking the earth from over the top of it—about 7 ft. 6 in. long—about the width of the tunnel? No; it is a matter of impossibility to do that. How could they do it with only 3 feet of room to do it in? Without getting the stuff from above, or lifting it up, it was impossible to do it.

4209. They would either have to lift the material up from the top or cut the boards in pieces? Yes; cut the boards in pieces, or take the material off the top, or at any rate disturb the material. It was impossible to take pine boards from there, because there were none there to take. If there were, they are there yet. There was no man—in fact, there were no two men—strong enough to draw out a board there without removing the material above.

4210. Did you take any notice of the excavations alongside of the adjoining buildings, as to whether the buildings were underpinned? I used to take notice of the excavations and the work that was being done in connection with underpinning every time that I passed, and I saw them building the brickwork on both sides without underpinning the work belonging to the adjoining buildings. There was no underpinning done there under the side walls near the street.

4211. Do you remember, when the building alongside Washington Soul's was taken away, and the new brick wall was built, and the foundation of Washington Soul's buildings was exposed—was any underpinning put under those walls? No underpinning was put there while they were building up the new brickwork.

4212. You saw the brickwork built up? Yes; I saw it built up against the face of the earth that was cut down, in line with the outside face of the old work.

4213. When you were excavating in front of 156, Pitt-street, did you come across an old well? We came across some loose material that apparently had been an old excavation, but I could not say whether it was a well or not, because we only touched the edge of it.

4214. If Mr. Kethel said there were cavities beeween the brickwork of the tunnel and the side of the excavation, and that that was the cause of the damage to the building, would that be correct? No; if our excavation had caused the damage to the building it would have been the front wall that would have moved, and the front wall did not move.

4215. Did you have any conversation with the contractor regarding the delay which may have been caused to the work on account of the negotiations in reference to this particular property? Yes; I spoke to the contractor for the alterations. After I had seen the letter of which I spoke last from Waldron and Dawson, I went to the contractor and asked him if he was delayed because of the negotiations between us and Mr. Kethel not being concluded, and he said no—that he was going on with another part of the work, and he delayed putting the windows in because of those negotiations, but it made no difference to him.

4216. Did you see the foundations when they were underpinning the old building at 156, Pitt-street? Yes.

4217. Do you know whether they were bonded together with iron cramps or not? I never saw a bit of iron in them at all. I took particular notice at the north end, especially while the men were doing the excavation, and I saw that the bottom course there was composed of small stones, and, in excavating underneath, one piece had fallen out at the corner, being simply a piece of rubble, and the work above projected something like 1 foot, over where it had fallen out.

4218. Now, passing on to Park-street, did you see the City Council's men open up Park-street—you remember when they opened up Park-street? Yes

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4219. I want you to tell the Committee what you know about that—where your men were working, and the position you were in in connection with that? We had worked along from Goulburn-street, in removing the timber, up to the corner of Park-street, and we were working at the corner of Park-street on the 12th July, and sometime on the 12th—I think it was in the morning—I had taken my foreman across to the other side of the street, and told him to put the men on there the following morning, to commence on that side, so as to do some of the work from that side while the men were doing the work from the south side. I said, "We will commence at 6 o'clock in the morning," so that we could get half of it done on that day, and do the other half on the next day.

4220. Your intention in opening up one-half first was not to block the traffic? We intended to do half at a time so that the traffic would not be interfered with at all.

4221. Those were your instructions? Yes.

4222. *Mr. Cook.*] Was that not the way you did all the crossings? Yes; from the time we commenced, where we had to go through any streets.

4223. You never blocked the street? No; we did not. In July, 1896, we cut through three streets at the Haymarket, and we never blocked a street.

4224. *Mr. G. McCredie.*] Will you tell us what occurred? My foreman, I understood from him afterwards, had told the representative of the City Council who was on the work near Park-street—Mr. Wadsworth—that we intended to commence to cut through Park-street on the following morning. About a quarter to 2 o'clock on the 12th July, I saw the Acting City Surveyor come, accompanied by Mr. Browne, the Inspector of Pavements, with some men, and they set the men to dig up some blocks in Park-street over the tunnel. I made no remark. I was standing about 20 yards, or less, from them at the time. I stayed there while they removed about a yard and a half of blocks, and then a messenger came and said that Mr. Walker wanted to see me. I went away. I came back afterwards and found that they had cut through the concrete and exposed a cavity underneath. I measured roughly the cavity, and found it to be from 6 to 9 inches at the sides, and about 16 inches in the middle. There was a crack showing, down which a rule could have been thrust perhaps 2 feet or more. The material appeared to have been excavated at a previous time and been filled in again. I may say that we subsequently discovered an old shaft there. I had an excavation made on the south side of Park-street, in front of the "Criterion Hotel," where my men were working at the time, and they continued working there until the following day, the 13th. On the 12th the men knocked off work at 5 o'clock. On the 13th I got to Park-street about a quarter to 8 o'clock in the morning, and I found the Mayor, the Acting City Surveyor, and the Inspector of Pavements, superintending a number of men excavating in Park-street. They were close to the timber over the tunnel, and I waited on the opposite side of the excavation until the timber had been removed. I saw the packing after the timber had been removed, and it was quite full, with the exception of a small space at the back of the cap-piece. As soon as the timber was taken up the representatives of the City Council went away. I remained there until the excavation was taken down to the brickwork of the arch. I then went away and came back again, and found one of the City Council's men digging the material out from the sides of the haunches—loosening it with a pick, and digging it out with a trowel. I continued there until he had dug down nearly as far as he could reach. There were no holes at the side, with the exception of a small space at the back of one of the uprights, where the uprights had been let into the side of the excavation. On making inquiries from my men who were working near, I was told that the City Council had started their men to work before 12 o'clock on the previous night, and that thirty or forty policemen had been brought down. I inquired of my watchman, when I saw him in the afternoon, about what had happened, and he said that about thirty policemen had been marched down, and either just before they came, or just after, the City Council's men had started work. I asked him if there was any disturbance. He said, "No." I asked him if there were any of our men about, and he said, "No;" that he was the only one representing the tunnel, and he neither spoke nor made any interference whatever.

4225. That watchman is a one-armed man, is he not? Yes. The excavation that we had on the south side of Park-street was not complete; but as the whole of Park-street between the kerbs was barricaded, and our fence round the hole interfered slightly with the traffic, I ordered the fence to be taken away, and the hole to be covered up with planks and made secure, so that no possibility of accidents should occur, or that there should be no obstruction of the foot traffic. I then had to send the men elsewhere to work.

4226. Have you any idea why the Police were sent for? I have not the slightest idea.

4227. Had any of your men given them any provocation at all in any shape or form? My men could not have done so, because they knocked off work at 5 o'clock the previous evening, and there certainly would be none on the work after that.

4228. *Chairman.*] Do you know whether in the evening, after the communication had been sent to the Police, there were any of your men there? If any evidence has been given on the point, I should like to know what the question and answer were.

4229. *Mr. Cook.*] At Question 1328 the Mayor was asked by me, "Will you tell the Committee what occurred on that day to cause the sensation which resulted in the bringing down of the Police?" and the answer that he made was, "Your Department, or someone representing it, sent down some men to fill in the excavation"—that is, the excavation that he had made in Park-street;—is that so? No; that is not true; no men had been sent to fill in the excavation.

4230. *Mr. G. McCredie.*] That is not a true statement? No.

4231. *Mr. Harris.*] Did you go back to the excavation after a quarter past 2? I said that I came back and found that they had cut through the concrete, and I saw there was a cavity underneath.

4232. Were your men still on the job then? They were working on the other side of Park-street.

4233. You heard of no threat thrown out that your men were going to fill up the excavation again? No threat at all in connection with it. My men would not do it unless I ordered them. But I may state that on that day Mr. McCredie and I had decided to go on with the work across Park-street, and I had told my foreman to commence excavating on the north side of Park-street, as we were already doing some excavating on the south side, just at the corner of the "Criterion Hotel." We had decided to go on with Park-street the next day.

4234. Did you leave the place at 5 o'clock in the evening? Yes; all the men knocked off at 5 o'clock. They carried their tools and put them in a box at the corner of Park-street, in front of the "Criterion Hotel."

4235. There were no policemen there at that time? No; the only man left in charge, who would be there through the night, was the watchman.
4236. *Chairman.*] The evidence that Mr. Ives gives is that he went to see Mr. Brunker between 5 and 6 o'clock in the evening. He says, "It was gas-light when I got to Mr. Brunker's office," and he says the men were in the street then? That is when he left—after 5 o'clock.
4237. Between 5 and 6 o'clock? They would be putting away their tools, which would take them ten minutes.
4238. If Mr. Ives states in his evidence that the men were there between 5 and 6 o'clock—is that likely to be correct or not? If he said the men were there between 5 and 6 o'clock, they were there between 5 and 6 o'clock, because they knocked off at 5, and it takes a few minutes to put the tools away; but if he said that the men came there with tools to fill up the excavation, that is not true.
4239. In reference to Question 1346, and the answer—"What reason had you for supposing that they were sent there; you said you had nothing to say to them; how did you form your conclusions? I saw the men there, and, as I have told you, I was told that they were sent there to fill in the excavation?"—is it correct to say that the men were there at that time, and that they were sent there to fill in the excavation, as the Mayor says he was told they were? The men were there a few minutes after 5 o'clock putting their tools away; they were not sent to fill in the excavation, or do any work whatever after 5 o'clock.
4240. At Question 1330, the Mayor was asked, "Did these men tell you that they were working there?" and he replied, "They were not working; they came there to work, and brought all their tools and other appliances with them"; and at Question 1331 the Mayor was asked, "Did they bring them there specially that day?" and he replied, "Undoubtedly; I was there";—is that correct? No; that is not correct. Some of the men were working—I think either two or three—excavating in front of the "Criterion Hotel"; the others were working between that and Bathurst-street, about 40 yards off; and the men were not sent specially to do any work in Park-street that day. They were working all day close by.
4241. In reference to Questions 1331 to 1335, which I have just read to you, is the statement made by the Mayor in answer to those questions correct? If the men were in Park-street at all on that day, it was simply in going to and from the tool-box, getting and putting away their tools. As to the Mayor poking an umbrella at a man, a messenger came to me about that the same day. That was on the evening of the 12th July. My foreman had told either the Acting City Surveyor or Mr. Wadsworth that we intended to cut through Park-street the next day. A messenger came to me from my foreman—I was in Mr. McCredie's office at the time—and said that the foreman had mentioned to the Acting City Surveyor that we intended to cut through Park-street the next day, and that the Mayor had flourished his umbrella, and said that if it were done it would be under the point of the bayonet. I told the messenger to tell the foreman not to do anything until he had seen me. This was in the evening after 4 o'clock. At 7 o'clock, after tea, I telephoned to Mr. Walker what I was informed the Mayor had said. He replied, "Don't do anything until you see me." Of course nothing was done in connection with Park-street after that, except to cover over the hole we had at the corner of the street in front of the "Criterion Hotel"—neither on that day nor for three weeks afterwards.
4242. *Mr. Cann.*] As a matter of fact, you could have gone right on with the work if the Mayor of Sydney had not interfered? If there had been no interference we would have gone on with Park-street the next day, and would have had it completed in two days, and would not have stopped the traffic at all. When we did get possession of Park-street to do the work, I had it open for traffic at 5 o'clock the same day, and completed it altogether the following day.
4243. *Mr. G. McCredie.*] Did the Mayor interfere with you at any other time, before what occurred at Park-street? Yes; that was at the corner of Goulburn-street, on the 19th June. About half-past 10 o'clock I received verbal instructions from Mr. Walker, the Engineer-in-Chief for Telegraphs, to take out the timber and fill up the holes that had been excavated at Goulburn-street, and between Goulburn and Liverpool streets. Mr. Walker told me that he had had a conversation with the Mayor—on that morning, I think—and the Mayor had consented to the timber being taken out where these excavations had been made, and the holes had been filled up and made good. I received written instructions from Mr. Walker about 11 o'clock. I started the men to work at half-past 11. At twenty-eight minutes to 1 o'clock Mr. Gordon, the Acting City Surveyor, came and ordered me to knock the men off. I refused to do so. At fifteen minutes to 1 o'clock Mr. Gordon came back with the Mayor, and the Mayor came up and peremptorally ordered me to knock the men off. I told him that I had Mr. Walker's written orders to do the work, and could not knock the men off. He ordered me again to knock the men off. I held Mr. Walker's instructions in my hand, and said, "There are Mr. Walker's written instructions, and I cannot knock the men off unless he orders me to do so." He said, "I do not want to see Mr. Walker's instructions, or anybody else's; you must knock the men off." I said, decidedly, "I shall not knock the men off." I also said, "I do not want to be disrespectful to you, sir; and if you like I will take a cab and go and see Mr. Walker, and tell him what you have said." I got a cab, and went to see Mr. Walker; but he had left the office. I came back again. The Mayor was not there, and I continued the work. Shortly after I got back, Mr. Gordon came down, and some man with him. I did not know who he was. Mr. Gordon said, "You will be sorry for this; I will make it warm for you; I will open up and expose all your bad work." I told him to go on opening up as far as Jericho if he liked; that when he opened the holes we would fill them up again. The other man said, "You will be sorry for this; we will make it hot for you." I did not answer him. I subsequently learnt that he was the Town Clerk. On the following Monday we were removing the material over the timber southward of Goulburn-street, where an excavation had been made. While we were doing so the Mayor came along and took some measurements, and he stooped down to look under a cavity. I said to him, "That cavity extends about 15 feet in, sir." He said, "I do not want to speak to you; I do not want to have any argument at all with you." I said no more at that time. Those are the only times that the Mayor interfered with or spoke to me about the work.
4244. *Mr. Cann.*] Can you give any reason why the cavity was 15 feet in? Yes. That was part of the space over the tunnel that I had ordered to be left vacant.
4245. No packing at all put in? No packing at all put in, because we intended to remove the timber. I had given that order from Bathurst-street, or just below Bathurst-street, to Goulburn-street. We had removed most of the timber, and were going on with that work when a number of men belonging to the

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Water and Sewerage Board were laying a ventilating pipe across the footpath, and I ordered my men away to some other part of the work, so that the other men should not be interfered with. It was subsequently forgotten for a time. I remembered it on several occasions afterwards, and we intended to take that out and another piece nearer Liverpool-street when we had got through the work on No. 5 section. But it was opened up by the men laying pipes for the Water and Sewerage Board before we had completed that section.

4246. *Chairman.*] You said in one part of your evidence to-day that one of the City Council's men was loosening the filling at the side of the arch with a pick, and digging out the stuff with a trowel;—do you know who that man was? Yes; James McClurkin.

4247. Have you had any conversation with him about it since? Oh, yes.

4248. Did he say that he was ordered to do that? Yes.

4249. And did he say to what extent he did it? I do not know that he said to what extent. I saw to what extent he did it.

4250. *Mr. G. McCredie.*] You saw him doing it? Yes.

4251. Did you speak to him at that time about it? No. I never interfered with the City Council's men or officers when they were doing anything. I simply stood and looked on.

4252. *Chairman.*] You did not make it quite clear to my mind, when you said you found the old excavation at Park-street, whether it was at the time when you made the tunnel, or whether it was when the disturbance took place between yourself and the City Council's people? In the reply that I gave to a question this morning I stated that the cavity that was under the concrete, and exposed by the City Council's men—on the 12th July, I think—appeared to have been excavated, and subsequently we found that an old shaft was there. We found it when we were cutting through Park-street, three weeks afterwards.

4253. *Mr. G. McCredie.*] There has been a statement made before this Committee as to some friction between you and the Acting City Surveyor and other officers of the Council;—do you know anything of that friction? There was no friction that I am aware of until the question about removing the timber cropped up.

4254. Do you think there was any vindictiveness on the part of the City Council's officers in dealing with these matters? I came to the conclusion that there was vindictiveness on the part of the City Council's officers from their manner while we were doing the work of taking the timber out. I cannot say that we had any friction previous to that, unless it was in connection with the pavement. We had some dispute in the matter of the pavement, but I did not consider that there was any friction. The disputes were simply friendly, as to whether certain things were to be done or not, and who should pay for them.

4255. You were the clerk of works who supervised No. 1 section, contract work? Yes.

4256. Did you have any trouble with the City Council's officers while that contract was being proceeded with? No; I did not have any trouble. But the contractor in excavating the tunnel past the Exchange building came on to some soft filling, and the miners who were doing the work were a little careless in putting up their timbers, and the surface fell in, bringing with it a loose rubble-wall that was built up to form part of the kitchen of the Exchange building. The following day the City Council's officers came down and inspected it, and spoke pretty severely to the contractor about allowing such a thing to happen. From what I could see before and after it occurred, I think it was a pure accident. The men had considered that the material upon which they set the timbers at the bottom was sufficiently hard to carry them, but it proved to be not hard enough, hence the collapse. That was on the contract work. Subsequently to that in carrying the work up Gresham-street where it was driven, the contractors came to the conclusion that they would remove the timber, as there was a slight disturbance of the flags of the pavement. They did so, without giving notice to the City Surveyor. The City Surveyor came down, and, as the contractor expressed it, "kicked up a row about it." I was not present at the time when the City Surveyor came. During the restoring of the pavement on the contract work, the Inspector of Pavements and the contractor had had a number of disputes as to the quality of the pavement, and as to whether broken flagging should be replaced with new or not, but there was nothing that might be called friction in their disputes.

4257. Was there any collapse—you know the difference between a subsidence and a collapse? Yes, I do. There were no collapses; and any subsidences that there were were very small—an odd flag here or there which was put right immediately it was known about, excepting one case where, as I stated when I was here last week, the bricklayers had knocked a strut away and allowed the pavement to come down.

4258. Has there been any collapse or settlement of the tunnel at any part of the works? There is no collapse or settlement in any part of the tunnel—in fact, there is not a settlement crack in the tunnel at all, so far as I am able to see, and I have been through it from one end to the other numbers of times since it was finished and during its construction.

4259. Do you know of any subsidence of the footpath in any other part of the street than that over the tunnel? Yes; I have seen numbers of subsidences of the pavement. During the heavy rain which occurred about four or five months ago I saw two subsidences in Pitt-street, on the opposite side of the tunnel, where the flags had gone down in one case 6 inches, and in the other case 4 inches. I saw the City Council's men taking material to them to put them right again.

4260. During the course of the excavations for the tunnel, did you come across any holes or vacancies in the ground? We came across scores of holes and cavities where excavations had been made for pipes and not filled up properly. Only recently, since we did the work in Kent-street, I sent a man up to refix a few paving-stones in one of the cartways, and in taking them up he came across a cavity 2 feet 6 inches deep.

4261. *Mr. Cook.*] Is that on the line of the tunnel? On the top of the tunnel; and it took three-fourths of a load of stuff to fill it in. That cavity and the subsidence of the blocks above it had been caused by some pipelayers putting earthenware drain-pipes in, and they had left the hole without filling it.

4262. *Mr. G. McCredie.*] That was where you had an open-cut? Yes; that was where we had an open-cut previously. Only last week I received a telephone message from the Town Hall saying there was a subsidence at 395, Kent-street. I went up to look at it, and I found that lately some new water-pipes had been laid in, and the excavation they made had not been properly filled. Part of the pavement had gone down about an inch, and one stone was loose and resting on the pipe, and you could see the cavity between the joints of the stones extending several inches below the bottom. I did not take the stone out to see what the depth was, but I sent word to Mr. Browne, the Inspector of Pavements, that, as that was the work of the plumber, I would have nothing to do with it.

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4263–4. When you made the excavation across George-street, going up Barrack-street, did you come across any hole there of any size? Yes. The timber fell into a hole, and pinned a man down. It might have killed him, but as it happened it did not. As he was fixing the timber on apparently sound ground at the bottom, the upright went through, and let the timber down, and after removing the timber to pull the upright out, we found the hole to be 5 feet in depth.
4265. In connection with the construction of this tunnel, were the lives of the men working on it insured against accident? Yes; there was an insurance policy taken out shortly after we started.
4266. Had you many accidents during the carrying out of the work? No accident, except a man pinching his finger, or sticking a pick into his shin, or something of that sort—nothing serious.
4267. With reference to the buildings that were passed, and the other structures that were passed, in excavating the tunnel, had you any claims at all, other than the one in connection with the lawsuit, of any magnitude? We had one in connection with the parsonage opposite Christ Church. They stated that the blasting shook the building. The building was situated about 80 feet from the tunnel.
4268. That is about the only one that you had? Yes.
4269. So that there have been no claims of any importance paid for any damage done to buildings in connection with the carrying out of the work? No. I put up a ceiling on the opposite side of Pitt-street, where a man said the blasting had shaken it down, but it was an old ceiling, ready to fall. I did not admit that the blasting shook it down, but rather than have any trouble about it I put it up.
4270. When you came across any holes in carrying out your excavations, old sewers, or anything of that description, did you fill them up and make them good? We filled them up, and made them good so far as we could reach.
4271. It has been stated here—by Mr. Browne, I believe, or Mr. Gordon, I am not sure which—that there was some trouble in connection with a strip of pavement next the building-line in Kent-street;—can you give particulars about that? Yes; I may state, first, that the City Council restored the tar pavement in Pitt-street. While we were carrying on the work we accumulated a considerable amount of tar pavement, and in doing the work in Clarence-street and Kent-street, I decided on utilising the old material for restoring the pavement, and had it broken up. Mr. Browne heard that I was going to do that, and came down to the yard one day and said that he objected to it. I asked him why he objected to it, for I considered it was better than new. "Well," he said, "we do not allow our contractors to use it." I asked, "Why do you not allow the contractors to use it?" He said, "We do not consider it good enough, and we have it carted into the depôt." I said, "You do not mean to tell me that you consider it is not as good as new, or better"? "Well," he said, "that does not matter." I said, "I am going to use it." He said, "If you do, you must have new material for the top dressing." I pointed to a heap of fine screenings that I had brought for that purpose, and said, "Is not that the kind of stuff you use"? He said, "Yes; I had not seen that." I said, "Did you ever know me to slum any work"? He said, "No." I said, "When you find me beginning to slum my work, it will be time for you to speak." With that, he went away, and some time afterwards we commenced to relay the tar pavement. We had got a considerable heap of the bottom, that is the coarse material, ready, and before we put it down complaints had come in from the Central Coffee Palace people about the footpath being dusty in dry weather and muddy in wet weather. I hurried the men up to get the pavement put down, and we had to use the top dressing rather newer than we otherwise would have used for it. It did not set as quickly as it might have done, and was sticky for a day or two, but after it set I had the top redressed, and it remains now as good as any other. We continued the tar pavement in Clarence-street and in Kent-street, but in Kent-street, in taking the pavement up, I took up only that which was immediately over our excavation, leaving a strip next the wall. I left a strip next the wall because through the whole of that pavement in Kent-street, with the exception, I think, of two or three pieces, the Hydraulic Power Company had laid their pipes, and a strip of pavement had been put in over the pipes, which showed two joints, and I came to the conclusion that, if that were permissible, then one joint would be permissible in our work. A letter was sent to the head of the Department about it, and I reported on it. In my report I stated the facts of the case, and I also stated that the pavement, or a greater part of the pavement, had been worn out and full of holes; that the Hydraulic Power Company's pipe had been cut through it, and a strip had been laid in; that I was restoring the pavement with new, both over the Hydraulic Power Company's pipe and up to the inner edge of the tunnel excavation, and that, as we were making it quite as neat on the top of the joining as the City Council did with their work, I considered that it was not the thing to expect us to restore the whole of the pavement. Some time subsequent to that I was rung up from the Town Hall, and asked to meet the Acting City Surveyor in Kent-street in reference to the tar pavement. I did so. Mr. Browne was with him. We went over the pravement, and the Acting City Surveyor pointed out several places where the pavement was not satisfactory. I told him that I would alter it and make it satisfactory. He also objected to the strip of pavement being left in. I told him that the strip of pavement was good, and as restored by us the pavement only showed one joint instead of two as we found it, besides which, we were making the pavement new in place of old worn-out pavement. All those faults that were pointed out by Mr. Gordon were rectified, with the exception of removing the strip of pavement next the building-line.
4272. With regard to the pavements throughout the city, did you leave them in a better condition than they were in before you started the excavations? As a whole, we left them much better than we found them. We replaced a considerable number of the old flags with new, and we paid the City Council part of the expense of putting in new pavement, where they wished to replace the old sandstone pavement, with Caithness.
4273. Did you ever hear an expression of opinion from the City Council's officers as to the manner in which the pavements were completed? Mr. Browne, the Inspector of Pavements, said the pavement was better than ever it was before, as a whole. He said there was some parts in places where we had not done it quite so well.
4274. A statement has been made here that the granolithic in front of the "Criterion Hotel" had subsided—will you tell the Committee what you know of that? The granolithic did not subside at all in front of the "Criterion Hotel" or Theatre. There were several cracks in it, but those cracks were there before we came to it. The only subsidence of granolithic was in front of the Imperial Arcade, which we restored as soon as we could get the man who did the work to do it. He was three months doing it.
4275. Whenever any of the officers of the City Council asked you to look into any matter they complained of, in connection with the pavement, did you do it at once—did you pay special attention to it? Any faults there were I had put right at once.

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4276. That was carrying out your instructions? Yes.
4277. In carrying out the excavations, did you come across many leaky pipes or bad drain-pipes? Yes; a considerable number of leaky pipes. We renewed, and repaired, and restored about seventy supply-pipes, and there were scores of leaky drains, connected either with our sub-duct, or repaired and left where they were—over the tunnel leading to the sewer.
4278. With regard to the excavations of the tunnel along the streets,—had you to alter the grades that were given you on account of meeting with obstacles? We had to alter the grades many times, and the line of the tunnel occasionally, owing to obstructions met with—sewers, water-pipes, gas-pipes—and for other reasons.
4279. With reference to the Hydraulic Power Company's main that was laid along Pitt-street while carrying on the excavations,—how did you support that main? The main, as a rule, came in a position just over the middle of the excavation, and we supported that with timber every 6 or 8 feet—sometimes more closely. We never had a support that was not under a length of pipe, and the pipe-lengths were 9 feet—as a rule, we had the supports closer than 9 feet. I may add that in putting in the sets of timber they were about 4 feet 6 inches apart. The cap-piece was kept tight up against the pipe in every instance, and if the cap-piece happened to be a little bit lower than the pipe where it deviated from the grade of the tunnel, we always supported the pipe from the cap-piece with blocks of timber.
4280. The Hydraulic Power Company's pipe, as you are aware, carries the water along at a very great pressure? Yes; I understood a pressure of about 700 lb. to the square inch.
4281. And if that pipe had not been supported properly a very serious accident might have occurred? If it had not been supported properly the pipe would have burst, considering the pressure of the water in it.
4282. What would probably have been the result? Any men close by might have been killed. The tunnel would have been flooded.
4283. You have had no accident at all with that pipe? No accident at all.
4284. And that pipe followed the top of the tunnel all the length of Pitt-street, up to Bathurst-street? Yes; in fact, since the tunnel has been completed, the engineer told me there was not a leak in the pipes at all, but in driving through we found a number of leaks.
4285. In carrying on excavations for the tunnel, did you meet with much wet ground? In places we had a good deal of wet ground.
4286. Was there any particular place that was more wet than others? On the south side of King-street was wet, and Park-street, and 156, Pitt-street was wet owing to the drain being choked. There were other wet places, owing to defective water-supply pipes. I may mention that at Hunter-street, on No. 2 section contract, there was much water coming in.
4287. When you took the timber out of all the crossings—quite a number of crossings—how did you find the packing. What I want to get at is the difference between the ground in filling and packing where the pipes crossed the road over the top of the tunnel and where there were no pipes? Where there were no pipes the ground was sound up to the bottom of the concrete; where the pipes were, there was in every case a cavity. In George-street there was no cavity, except alongside a gully, above an opening into an old drain.
4288. And no pipes? No pipes crossing there. In Martin-place the Hydraulic Company's pipe came across, and there was a slight cavity over it in places. At Hunter-street there were several pipes crossing at the top of the tunnel, and there was an old sewer across the tunnel, and when we came down to that we found it had been cut in two and blocked, and the water had been coming down, and had escaped into the tunnel workings. In Spring-street the pipe ran the whole length across the street, the same as before, and there were one or two pipes, besides an old brick sewer; and where the old sewer was, and where the pipes were there were cavities. There was one cavity something like 2 feet deep, and we found that there was an old brick sewer, with a pipe inside of it, at the side of the tunnel, where the material had got away into it.
4289. From the time that you started the day-labour portion of this work, did you ever hear any complaint or any disparaging remarks about the system under which you were carrying out the work—I mean from the contractors? Yes; I was told, about a fortnight after we had started, that the contractors had made some disparaging remarks; in fact, one of them, I was told by a man who was working on the job, said to him, "Hulloa, Jack, are you working here?" The man replied, "Yes." He then said, "I was told they were all Lithgow men working here." The man replied, "I do not know that there are any Lithgow men working here, so far as I am aware. I know there are a considerable number of Sydney men here."
4290. *Chairman.*] Did you hear him say that? This man told me. The other man also said, "Who is this fellow they have got carrying it on?" The man replied, "I do not know who he is, but he is carrying it on all right." I was told afterwards by the same man that the other man had made several remarks in reference to the way the work was being done.
4291. Who was it made those remarks? The Secretary of the Builders' and Contractors' Association; at least he used to be.
4292. What is his name? Mainer. I was told of other remarks made from time to time, and the names of the men who made them were given to me, but I do not recollect them. I recollect one man who made a remark to my foreman, but I will not say anything about it.
4293. *Mr. G. McCredie.*] Do you think that the fact of this work being carried on with day-labour has had a great deal to do with this trouble? Of course, I do think so. In my own mind, I am sure of it.
4294. You did not experience any trouble while you were supervising the work being carried on by contract? I never heard any remarks about that.
4295. *Mr. Robert Jones.*] If Mr. Kethel said that the jury did not visit and inspect the site where the building was about which there was a dispute and a lawsuit, would that be true or false? It is false.
4296. If the Mayor has said in his evidence generally on the particular point that your men were at Park-street on the evening of the 12th July to cause a disturbance, and to prevent his men from carrying out his orders, would that be true or false? False.
4297. In reference to a subsidence that took place in Kent-street, you have mentioned that the Inspector of Pavements, Mr. Browne, telephoned to you about it; I presume, from that, that he took it for granted that any subsidence that took place you would be to blame for; but, on inquiry, you found that the subsidence had been caused by an opening made by a plumber, and you, therefore, declined to interfere with it? Yes.

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4298. Did Mr. Browne take any further action in reference to you? Not with reference to me.
4299. He did not say any more about it? I was told by one of my men that Mr. Browne came there with somebody and took some measurements.
4300. You renewed a lot of pipes—were they earthenware pipes? They were water-supply pipes. We also renewed a considerable number of drain-pipes, replaced broken pipes with new, and recemented hundreds of joints.
4301. In supervising this work generally throughout, you did it to the best of your judgment, and in the interest of your employers so far as you could, in carrying out the work? Yes; I carried it out to the best of my ability, with both despatch and economy, and also avoided as much as possible inconveniencing any of the business people or the general public while doing so.
4302. You studied the interests of your employers as much as you could consistently with doing good work? Yes.
4303. *Mr. G. McCredie.*] Mr. David Davis, at a meeting of the Water and Sewerage Board, said that the water-pipes near Liverpool-street and Goulburn-street, at the time you were excavating down there, were let down some 3 inches while you were filling up—after the City Council interfered with the work, I believe it was—do you know anything about that? Yes; I remember the excavation there was just the length of one of our pieces of fencing, about 16 to 18 feet, and the pipe was exposed for the width of the opening, one full length of pipe, 9 feet, and a piece of the other pipes, at each end. It would be a matter of impossibility for that length of pipe to go down 3 inches without breaking one or more of the pipes, because the joint could not be drawn without breaking the pipe.
4304. Well, then, that statement is not true? That statement is not true. The pipes did not go down at all. They were laid on our timbers by the men belonging to the Water and Sewerage Board who were doing the work. The runners or poling-boards had been removed, and their pipes were laid hard down on our cross-pieces. Mr. A. L. McCredie and I had been there inspecting the work and instructing the men what to do, when Mr. Davis came along, and what he saw there was our timbers with the pipes lying on them, where their own men had laid the pipes, and the opening underneath was dug out by the instructions of Mr. Arthur McCredie and myself, and the men had supported the pipes between the timbers with stone, according to our orders, so that, in removing the timbers, the pipes should not be disturbed, and the pipes were not disturbed. They did not move from there a fraction of an inch.
4305. In fact, they could not go down? They could not go down. Even if we had taken the timbers out they could not have moved. One length of pipe was clear, but it was supported by the ends of the other two pipes, the biggest half of them being in sound ground, at each end. It was impossible for the pipes to move, even if we had taken the timbers out, considering the precautions we had taken in packing the pipes up with stone between the timbers.

Cornelius Toohey sworn and examined:—

C. Toohey. 3 Nov., 1897.

4306. *Chairman.*] Where are you working now? I am doing a little work for myself at present—superintending a job for myself at home.
4307. Where have you been working lately? I have been working at the telephone tunnel doing some timber work, but I met with an accident there, and I have not been doing anything since.
4308. Where were you working before that? At the Civil Service Co-operative Society's store in Pitt-street.
4309. What position did you hold there? The position of ganger.
4310. Had you anything to do with excavating for the foundation there? Yes.
4311. What building was it? The Civil Service Co-operative Society's new store.
4312. Did you have the ground excavated out towards where the tunnel was? We excavated right against the tunnel—on the face of it.
4313. Did you take away the earth from the tunnel in any way? Well, the men who were working under me removed the earth and stone.
4314. Where from? From the tunnel.
4315. You mean to say that you excavated the earth from the edge of the brickwork outside the tunnel? Yes.
4316. Did you do this yourself, or did you instruct others to do it? I was looking after the men. I placed them there to carry the work out under my instructions.
4317. For whom were you working? A Mr. Boyne.
4318. What is he? A contractor.
4319. Was the work being done under any engineers or architects? Yes; there were architects and clerks of works.
4320. Who were the architects? Mansfield and Sons.
4321. Have you seen any photographs of this place? No, I have not.
4322. Can you recognise the outside of the tunnel from this photograph [*photograph* No. 1]? I scarcely understand the photograph.
4323. This is a photograph taken from the outside of the tunnel at the point you are talking about? I do not understand plans or photographs very well.
4324. *Mr. Cook.*] You would not know it from that photograph, would you? I do not understand that photograph.
4325. *Chairman (having explained the photograph).*] You said just now that you had instructed the men to take the earth away;—can you recognise any of the points shown in this photograph as places from which you instructed the men to take the earth away? All I had to do was to get the men to work. I did not think that there was any tunnel at the back. We cut away the stuff, and the legs shown in the photograph were exposed. As shown in the photograph they seem to be going down into the brickwork. This photograph was not taken as we excavated first, because when we excavated first the legs were going right down to the very solid bottom, as low as we went, and seemingly they were in our road, and the carpenter had the legs which went down the full distance removed, and notched into the side of the brickwork, and put in these temporary legs, which I now recognise.
4326. You see there is a dark space underneath the poling-boards? Yes.
4327. Did you take all the earth from under there? The men under me shifted the earth away. When we took away the stuff the packing that was near the wall of the tunnel, and some of the stuff on top of the arch, had to fall out, because we had taken away the support, and it was so much more for us to excavate.

C. Toohey. 3 Nov., 1897.

4328. *Mr. Cook.*] Then those struts now showing in the photograph are not the uprights originally put in when the tunnel was being made? No.
4329. *Chairman.*] Have you ever seen No. 2 photograph before? No.
4330. Can you describe, from this photograph, where you took any earth away? This is seemingly the same face of the tunnel. I am not acquainted with plans or photographs, but when I am on the ground I can explain anything to you.
4331. It is very nearly the same place? I believe it is. If I am not mistaken, these are the stays we had against the old walls.
4332. *Mr. Cook.*] Who put the strut on the top of the brickwork? A carpenter who was working there.
4333. It was not there originally? No.
4334. Was the distance between the cap-piece and the pavement filled up with material originally? Yes; packing.
4335. You actually removed all that material in making your excavation? We removed all the muck and rock. We blasted the rock out as we came to it. We used powder there very freely.
4336. Then, blasting did take place there? Yes.
4337. And if anyone has stated here that there was no blasting there, would that be correct? No; it could not be correct, because I had to get the blasting done.
4338. *Chairman.*] Do you recognise No. 3 photograph? I can scarcely recognise the place on paper.
4339. You see that, in this photograph, as in the others, underneath what is called the poling-boards, the earth is all gone—the black space means a cavity; I want to know whether you took that out or not? It fell down.
4340. Did you take it out? No, we did not, because it fell down directly we took away the support from outside it.
4341. Did it fall down right over the centre of the tunnel, as shown there? We took away the stuff at the side of the tunnel, and when we took that away the packing fell out to us. The men were not very particular about the job; they were rushing and tearing it out as hard as they could go; they were not particular, and so they stuck a pick in and pulled it out, and anything they did not support inside could not stop, unless it was solid rock.
4342. *Mr. Cook.*] If there was blasting carried on there, would not that shake the whole packing, pavement, and everything else? I could not say that we did any damage with the blasting, although it is very likely the vibration may have done so. We blasted close on to the tunnel—as near as I can remember, within 3 feet. I took no notice of what was being done near the tunnel, but the "boss" said to me, "Be careful not to blow the bottom out of the tunnel." I said that I would look out for that. We risk all these things. I was put there to do the work the best I could for him, and so I did.
4343. How long were you at work on this job? I could not exactly say. I have a time-book, but I do not think the date when I started there and the date when I knocked off is in it. I think I was there about ten weeks, or something like that, as near as I can recollect.
4344. How long were you working on the woodwork of the tunnel afterwards? I could not say how many weeks; I do not know the day I started.
4345. How long do you think you were? I think I was four or five weeks, as near as I can recollect.
4346. *Mr. G. McCredie.*] Supposing that the filling at the side of the tunnel had not been taken away, would it have been possible for the top packing to have come down? No.
4347. There was a statement made here that you could shove a pick-handle into almost any of that packing? Not in front of that excavation. I never saw it. There may have been unavoidable holes. Most of it was packed up with ballast and sandy stuff, and there may have been a little finger-hole, or something like that. I took particular notice, and went along looking, and I made the remark to some of the men that it was well packed. I saw nothing that I could see any defects in.
4348. You have had a good deal of experience in that sort of work? I have done a lot of drives for contractors, but it is not for me to say anything about them, for I have to live amongst contractors, but I never packed any as good as that was done.

WEDNESDAY, 10 *NOVEMBER*, 1897.

Present:—

Mr. BAVISTER,	Mr. COOK,
Mr. CANN,	Mr. ROBERT JONES.

W. J. LYNE, Esq., in the Chair.

A. L. McCredie, Esq., and G. McCredie, Esq., appeared in person in their own behalf.

Wm. Mainer sworn and examined:—

W. Mainer. 10 Nov., 1897.

4349. *Chairman.*] What is your occupation? I follow the occupation of an architect now.
4350. Have you any other qualification? I have been a contractor for many years.
4351. Do you know anything about this telephone tunnel business? Yes; I have seen the work in progress.
4352. Which part of the work? Particularly the Pitt-street section.
4353. Any particular points in Pitt-street? No; along its entire length. I have had frequent opportunities of watching it—in fact, I have watched it.
4354. Have you watched it on behalf of anyone, or just simply from your own inclination? What led me to watch it in the first instance was a minute issued by Mr. Cook, the Postmaster-General. This occurred in the early part of last year—I think about May or June. The minute set forth that a considerable saving had been affected to the public. That directed my attention to the tunnelling, and led eventually to my watching the progress of the works in the Pitt-street section.
4355. A considerable saving had been made to the public from what? That minute led to my paying attention to the tunnelling in Pitt-street. Mr. Cook claimed that in connection with the day-work portion that had been executed, a considerable saving had been effected, as compared with the contract portion. That was all. I wrote an article in the *Herald* at that time.

W. Mainer. 10 Nov., 1897.

4356. *Mr. Cook.*] Was it a minute, or an answer to questions asked in the House? It was in answer to questions put by Mr. Watson—it was not a minute.
4357. *Chairman.*] You say that you wrote an article in the *Herald* about it? I did.
4358. Can you shortly tell us what impressions you formed in connection with your observations as to the quality of the work? The impression I formed in respect to the portion of the work in Pitt-street was that the materials, especially the bricks, were very indifferent, and the workmanship was not good.
4359. Had you any of the bricks tested? No; I picked them up and looked at them.
4360. But had you them tested in the ordinary way? No; I am a good judge of bricks. I was a brick-maker myself for seven years. I know a good brick; I know all classes of bricks.
4361. In what class would you put these bricks? There really are four classes of bricks that come from almost every kiln—that is, the hard-burnt brick, which comes from near the fire holes; the well-burnt brick, which was, I presume, the brick specified for this work; the callow brick; and what we call a shuffy brick, which is a brick that is put in the kiln before it is properly dried, a crumbly, cracky, brick.
4362. Of what class were the bricks you saw in connection with this work? I saw good, bad, and indifferent, all going down into the tunnelling at the same time. I am not saying that the bricks were not equal to the work for which they were required.
4363. Did you examine any of the other material? No; only the bricks.
4364. Are you a judge of concrete or cement? Yes.
4365. Did you examine that? No, I did not; I saw them mixing it.
4366. *Mr. Cook.*] You were never down below? No, I never was. My observations were made from the surface, passing along every day.
4367. *Chairman.*] Did you see the bricks going down at more than one place? Yes; I saw them being delivered into the cutting, in a way in which, in my judgment, they should not have been delivered.
4368. In what way? Certainly there was a plank used in some instances, and they were slided down the plank, but they pitched on to each other in such a way as may have broken off the arrises. In my judgment that would not have been allowed if the work had been carried on under contract. I have seen other bricks passed down into a cutting in that way, but with a heap of sand to receive them.
4369. *Mr. Robert Jones.*] Would that be more injurious than men carrying the bricks on a hod and throwing them off their shoulder? Men are not allowed to throw bricks off their shoulder; but I admit they do it sometimes.
4370. In your opinion is it more injurious to bricks to slide them down a plank 6 or 7 feet, as these were slung down, than to throw them off a man's shoulder out of the hod? It depends entirely on the way the man passes the bricks from the hod to the scaffolding, or from the surface to the pit into which he is pitching them.
4371. That would apply equally to the way they are slid down a plank? No, it would not.
4372. Will you explain why not? Supposing that a lot of bricks were at the bottom of the pit, and the other bricks were thrown down violently and struck those at the bottom, what would be the effect on the bricks?
4373. If a man puts the bricks violently off a hod on to a stack of bricks, would it not be equally as injurious to the bricks as sliding them down a plank? I have nothing to do with that question. In neither case would it be allowed, in my judgment, in works carried out under contract. No architect would permit bricks to be thrown violently from a hod or from a man's shoulder to the ground with the danger of the arrises being broken off.
4374. *Chairman.*] When Mr. Donald was under examination by this Committee, he was asked the following questions and gave the following answers:—

From the time that you started the day-labour portion of this work, did you ever hear any complaint or any disparaging remarks about the system under which you were carrying out the work—I mean from the contractors? Yes; I was told about a fortnight after we had started that the contractors had made some disparaging remarks—in fact, one of them, I was told by a man who was working on the job, said to him, "Hulloa Jack, are you working here?" The man replied, "Yes." He then said, "I was told they were all Lithgow men working here." The man replied, "I do not know that there are any Lithgow men working here, so far as I am aware. I know there are a considerable number of Sydney men here."

Did you hear him say that? This man told me. The other man also said, "Who is this fellow they have got carrying it on?" The man replied, "I do not know who he is, but he is carrying it on all right." I was told afterwards by the same man that the other man had made several remarks in reference to the way the work was being done.

Who was it made those remarks? The Secretary of the Builders' and Contractors' Association—at least he used to be.

What is his name? Mainer. I was told of other remarks made from time to time, and the names of the men who made them were given to me, but I do not recollect them. I recollect one man who made a remark to my foreman, but I will not say anything about it.

That cannot refer to me, because I never was the Secretary of the Builders' and Contractors' Association.
4375. Mr. Donald says you were once—"at least he used to be"—that is, Secretary of the Builders' and Contractors' Association? No, I never was.
4376. *Mr. Cann.*] But is it not a fact that you have given lectures on this and other Government works to the Builders' and Contractors' Association? I have given a public address in my private capacity. I am not a member of the Builders' and Contractors' Association.
4377. *Chairman.*] Do you know anything about the answers made by Mr. Donald in the remarks I have read to you? No. The first time that I referred to the circumstance of there being men from Lithgow employed in the tunnelling was in a newspaper article, following the answer given by Mr. Cook to Mr. Watson's questions.
4378. *Mr. Cook.*] What newspaper was it in? The *Herald.*
4379. *Chairman.*] You heard what I read as to questions put to a man, and this man telling Mr. Donald that certain questions had been put by you;—do you know anything in reference to those questions? No. The information was given to me. I never imparted the information; I received the information.
4380. Then is that statement by Mr. Donald correct or otherwise? It is incorrect so far as I am concerned, put in that way. I communicated the substance of that in an article in the *Sydney Morning Herald;* but I never communicated it in conversation with any members of the Builders' and Contractors' Association.
4381. These are not members of the association, but a man at work on the job, to whom Mr. Donald is referring

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referring, to whom you communicated it? That is quite incorrect, absolutely untrue. I never conversed with any of the men, never once.
4382. Did you examine any of those parts of the tunnel that were exposed for some time, in consequence of the subsidence? Yes, I did.
4383. Did you form any opinion as to the cause? I did.
4384. What in your opinion was the cause? Because the cavities were not properly filled and rammed into solidity. I am referring now to the portion that was opened up first in Pitt-street, near Liverpool-street. I went into that opening.
4385. That is on the other side of Park-street? Yes, between Park and Goulburn streets.
4386. What part was not properly filled and rammed? So far as it was opened out it was all left in a very bad condition indeed. I could not conceive of anything worse. The brickwork exposed at that part, so far as regards what was laid bare, suggested an abominable state of work. I merely looked at what was laid bare to my eyes; I did not know the condition of the other, but what I saw suggested everything.
4387. In what way do you mean to imply that it was badly done? The joints were open—I laid my hand edgeways between the joints; they were crooked. The bond was not broken, and what I saw was very imperfectly grouted.
4388. You cannot speak of anything but what you saw? No; but it suggested such a lot.
4389. Any other places that you saw? I saw the opening in the Park-street crossing.
4390. What impressions were left on your mind in regard to that? It was left very incomplete.
4391. Are you speaking now of having seen the Park-street crossing after it was opened and exposed to public view? I never noticed it particularly before. I went, of course, with the gadding crowd to look at it after the noise was made. I was in it in company with the City Engineer and one or two others.
4392. You saw a space underneath the concrete? Yes; I had previously noticed the vibration of the roadway several times, and had pointed it out to people standing on the footpaths. I thought that something was wrong.
4393. What spaces did you see underneath the concrete? The spaces varied, I suppose, from 12 inches to 18 inches.
4394. Are there any other places to which your attention was directed in any way? I suppose I noticed all the openings that were made.
4395. *Mr. Cook.*] You paid particular attention to it all through, did you? Yes, I did; naturally so.
4396. *Chairman.*] In other places? Yes. I witnessed an exhibition, I think, just below the City Bank. I do not think anybody else witnessed that except myself and the workmen. I witnessed an opening there. I communicated that: that is in print. I saw the timbers taken out there, and I thought for a moment it was an underground storage of timber. The planks were taken out three deep—I saw them taken out myself—lying one on top of the other.
4397. What in your opinion was the object in having so much timber there? God knows, I do not. It never occurred to me. I should think it was gross carelessness. Someone neglected their duty. I do not know who. It may have been the men; it may have been the inspectors. Perhaps nobody cared.
4398. Was there anything else that you saw at that point? No. That is about the last I noticed.
4399. Were there any other points, down the street further, that you noticed? No; I think I stopped at that. I had had enough of it. I think I stopped at the City Bank. I watched pretty closely the openings all the way through from Goulburn-street to just past the City Bank, and I thought then that I had seen sufficient.
4400. That is, what you did see you considered very inferior work? I considered there was great carelessness—a manifestation of indifference and carelessness such as I do not think I ever witnessed before. I canot see where the saving came in. I suppose that there were many thousands of feet of timber carted away out of Pitt-street. I do not know what has become of it. There was a great waste of timber.
4401. *Mr. Cook.*] You told the Committee a little time ago that the reason for your taking an interest in this matter, and making investigations, was on account of some questions put by Mr. Watson in the House, and my answers thereto? Yes.
4402. Up to that time you had taken no interest whatever in this work, I presume? Only very trifling. I simply knew the works were going on.
4403. You had made no investigation? This was the first time I knew any of the works were being done by day-labour, I think. I made investigations then.
4404. Up to that time you had not troubled yourself about the work at all? Not at all.
4405. You say that was in May, 1896? I am not certain of the month. It was in the early part of 1896. I published pretty well a column in the *Herald.* It may have been in June.
4406. It would not be earlier than May, 1896, would it? That can easily be ascertained. It followed immediately your answer to Mr. Watson's questions. I wrote on it immediately.
4407. In any case, your letter was written after those questions? Yes; following, very probably, two days afterwards.
4408. After the questions were answered? Yes; in the House.
4409. And, after that, you investigated the matter while the work was in progress in Pitt-street? Yes, I did.
4410. Will it surprise you to know that at the time those answers were given the whole of Pitt-street had been completed? Yes, it would, because it was not. The first letter I wrote—the first action I took respecting this tunnel work—was following the questions put by Mr. Watson to you in the House. I challenged you relative to the correctness of your answer, and that occurred fully eighteen months ago.
4411. It was a comparative statement, was it not, that I made in reply to Mr. Watson's questions? Yes.
4412. A comparison of the contract work with the day work up to the Railway Station? Yes.
4413. Therefore it must have been completed so far, must it not? How could it have been completed when it was not completed until this year?
4414. Did you pay attention to that portion which was done past Martin-place? Not enough to form any opinion at all. I just casually looked at it as I passed along. I never stopped.
4415. You are quite clear that you took no interest in the matter at all until those questions and the answer appeared? No particular interest.
4416. If it is stated to you that the work had been completed then—that is to say, that the tunnel had been

been made right up to the Railway Station—you say that is not correct? I do not quite gather what you mean. You made a comparative statement in respect to three portions of tunnelling, I think. I am going from memory. In the absence of my letter, I will not be bound as to the strict accuracy of my answer, because I have not looked at it for a long time. I have not a copy of the letter at home, and, therefore, have not had an opportunity of refreshing my memory. The Pitt-street portion that went by the Builders' Exchange certainly was not completed at that time. W. Mainer. 10 Nov., 1897.

4417. *Mr. Bavister.*] Was the tunnel completed, but not the relaying of the footpath;—are we confusing the matter? No, we are not confusing the matter; we are at cross purposes somewhere or other.

4418. *Mr. Cook.*] You say that at the time those figures were supplied to Mr. Watson the tunnel had not been completed to the Builders' Exchange? That is my impression.

4419. Are you quite sure about it? That is my impression. I am not going to swear.

4420. But you are here to swear? That is my impression.

4421. Are you certain? That is my impression. In the absence of my own writings and your answer to Mr. Watson I am going to be guarded in my reply. I cannot trust my memory. It is useless to try me in that way.

4422. You are quite clear that you did not take any interest in the matter until those figures appeared? Yes.

4423. You are certain about that, are you? Quite certain. Perhaps you made two statements of figures.

4424. The answers I gave to Mr. Watson included the section from the Post Office to the Railway Station, and I should like to know how you came to take an interest in the work and to watch its progress; and you have already told the Committee that you took no interest in the matter until after that which is shown here to have been done to the Railway Station? Will you produce the answer you gave to Mr. Watson and also produce my letter?

4425. You have said that naturally you have taken a very keen interest in this work all through? Yes, from that date.

4426. You do not believe in day-work, do you? I do not necessarily disbelieve in it. It depends. I am not an enemy of day-labour, but I am an enemy of the humbug and deceit that I think are probably made a part of it.

4427. By whom? I do not say by whom—I do not know by whom.

4428. Who carries on the humbug and deceit? How do I know; how should I know?

4429. Do you think that you have a right to throw out dirty insinuations in that way? I am not throwing out insinuations at all. You asked me if I objected to day-labour, and I said, not necessarily.

4430. You said that you objected to the humbug and deceit associated with it? Because I believe there has been.

4431. What ground have you for thinking so? Common experience. Do you think that I have passed fifty years of life, and many years as a builder and contractor, without knowing that as good results, generally, cannot be produced under the day-labour system as under the contract system.

4432. That is your opinion? Yes; and it is the opinion of everybody else.

4433. Is it? Yes, when they use their own money. They only vary in that opinion when they use the State's money.

4434. *Mr. Cann.*] What are you now? For the last five or six years I have been engaged in architectural work.

4435. Have you had any experience in tunnel work? No; I have never taken any tunnels under contract myself, but I have worked in tunnelling work weeks and weeks.

4436. Did you supervise the construction of tunnel work? No; I have never been in that position. My work was to make the centres and set them. I think that Mr. Bavister will agree with me that that will give a man a pretty considerable knowledge of tunnelling work, and how it should be carried out.

4437. Then you really have had no experience at all in the excavation for tunnel work? How do you define experience?

4438. Well, have you had any experience? Is it necessary for a man to have a contract? I have had plenty of experience in tunnel work.

4439. Will you kindly tell us where you have had experience in the excavation for tunnel work? Well, I have timbered up drives in mines.

4440. Where? In New Zealand; but I have never used the pick and shovel.

4441. Have there been any subsidences in connection with this work? There have been some. I tell you candidly when I took up this question in the first instance it was not to challenge the quality of the work at all, but only to challenge the statements made as to savings which Mr. Cook claimed had been effected between day-labour and contract work. I took up the public side of the question—what I considered the public side of the question. The defective work afterwards grew on to me from what I observed. I did not lay a very great deal of stress on it. Good, bad, and indifferent work is done probably under every kind of circumstance; so you must not misunderstand me. I would be a very foolish man indeed if I pretended that all work done under contractors would be well executed, and all work done under Government supervision by day-labour would be badly executed. I do not pretend anything so absurd. If the supervision is lax in either case, the work will be badly executed. There must have been some laxity of supervision, or there must have been some neglect, somewhere or other.

4442. Would you kindly tell us what grounds you have for saying that? There would be settlement, of course, in filling in excavated material, but I cannot conceive that there would be so much as was apparent in this case. The ground was opened up, and those large cavities told an experienced man at once that the material had not been properly rammed. There can be no doubt about that. I saw it while it was being rammed. At various places along Pitt-street I watched the ramming.

4443. *Chairman.*] What was your impression about the ramming? There were too many men shovelling in dirt to the rammers, and too much fell in before they commenced to ram, and they did not begin to ram at the bottom.

4444. *Mr. Cann.*] Is that the reason you assign for the settlement at Park-street? That contributed to it greatly. There was insufficient material placed in between the bottom and the surface. The looser it was rammed, and the smaller the quantity of stuff put in, the greater would be the subsidence.

4445. Was the timber removed in that instance? No, the timber was there.

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4446. Where was the cavity shown? In some cases between the underside of the timber and the top of the tunnelling, but in other cases I saw the barriers resting hard on the ring of the arch. At Goulburn-street the bricks had been chipped away.
4447. But where the cavity was between the arch and the timber, I suppose that was not a subsidence? Well, the loose dirt percolated between the joints of the boards, and that created a cavity on the top.
4448. But you would not account for the space between the timber and the arch as being the result of subsidence? Certainly I did.
4449. You say that the space between the timber and the arch would be the result of a subsidence? I dare say it was filled in at one time, but not rammed. There was a space, clearly demonstrating that insufficient material was put in the opening. There is no other way of accounting for it.
4450. Have you ever heard of a tunnel of this character being constructed before? No, not for telephone purposes.
4451. For any purpose, so near the surface? No; I do not remember any.
4452. I assume that you have had some experience in packing? Yes.
4453. Can you explain to the Committee any way by which the whole of the space between the arch and the timber could have been filled? It is a very difficult job, but every timber could have been removed.
4454. Would you have removed the timber in that instance? It depends on the specification.
4455. The question is whether the work was well or badly done;—would you have removed the timber to have made a good job of it? I think the timber should have been removed.
4456. But in carrying out the work would you have removed the timber, or would you have claimed that it would have to be removed to make a good job of it? I would not have minded the uprights remaining in the ground, but I would have removed the transverse pieces.
4457. Will you give the Committee some idea as to how you account for the space that existed between the ground and the concrete;—I am not referring to the space between the timber and the arch, but between the ground and the concrete, immediately under the wood blocks? You want to have a diagram here. When I gave my address at the Exchange I had a blackboard and showed everything. That is nearly six months ago, and I cannot remember all that occurred to me then. If you have a copy of *Liberty* you will, I think, find that I explained that pretty clearly.
4458. I ask you how you account for that space? Well, I account for it by its being left without being filled, and then covered up.
4459. You are aware that the tunnelling work never reached that far? No; it was a cutting.
4460. It was a drive? It is a tunnel all the way through, although some part is put in an open-cut, and and some is through tunnelling.
4461. How near to the surface did the top of the tunnel ever come? About 3 feet, I suppose.
4462. The nearest point to this cavity would be about 3 feet from it? I think the average was about 3 feet from the top of the tunnel to the surface. I find it difficult to answer the question after this lapse of time without having the thing before me. I cannot place it now in in my mind's eye just as it was six months ago.
4463. Did you account for that by the soil coming down? Yes. I have written somewhere that the cavity in one part occurred by reason of the planks being apart and the stuff percolating through. That is how I accounted for it, and as I accounted for it then I was correct. I can swear to anything I wrote at that time in reference to it, or what I said on the platform.
4464. You referred to Park-street in particular;—what is the space between the crown of the arch and the timber—I do not refer to the opening up, but to the space in putting the tunnel in and lining it with brick—the space between the timber and the brickwork of the arch? From 1 foot to 18 inches or 2 feet.
4465. Was it that? Yes. You could spread yourself out easily, and hump your back up on top of the arch.
4466. It would not be difficult to fill in that space? No.
4467. The timber was left in? Yes.
4468. How do you account for subsidence above the timber when the timber was left intact? Because as the tunnel was built up from the bottom it was not properly rammed, commencing from the bottom. This is only a theory, mind you; they filled up probably 3 or 4 feet before they began to ram at all, and it was just as loose at the bottom as when put in. It occurred through bad workmanship.
4469. But even after the filling the timber was still intact? Well, it rested on the uprights.
4470. It had not been removed? The uprights were still there.
4471. It still kept the ground up the same as it did before the brickwork was put in at all? The ground had fallen down between the joints.
4472. Can you tell us where you ever saw that the ground had fallen through between the joints of the planks—any portion of the tunnel in Pitt-street, in particular? That was plainly to be seen in Goulburn-street. I remember explaining that at my meeting.
4473. Would you be surprised to learn that at Goulburn-street no packing at all had been done between the arch and the timber, but they had left the work to go back and do it afterwards? I saw a public notice to that effect in the paper.
4474. Would that account for what you saw, if that was so? That statement was questioned. That statement was put forward to account for the manifestly bad work, and it was stated that that had been omitted for the time being, and it was the intention to go back again. It may have been the intention, but I do not credit it.
4475. I suppose that most of the agitation in reference to this work originated with yourself? I think the City Council has had a big slice of it.
4476. Were you not one of the first who wrote letters to the papers, and gave public addresses on it on the platform? I think I was the first in that respect.
4477. Did you ever interview any of the aldermen in reference to the work? No. An alderman interviewed me once. I did not run about after these people.
4478. Did an interview take place between you and some of the aldermen in reference to the work? No. I had an interview with one alderman, or rather he sought an interview with me with reference to the work. I never was in company with two aldermen with respect to it at one time.
4479. *Chairman.*] What alderman was that? Alderman Waine.

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4480. *Mr. Cann.*] Then, as a matter of fact, the agitation that took place on the information acquired by Mr. Alderman Waine was really on information obtained from you? No; that was not the case—in fact, Alderman Waine sprang something on me. I think that the honors should be divided in that respect between Jack Waine and myself.
4481. In both instances, it is a question of day-labour? Yes. I fought that, and I shall fight it, until at any rate you get rid of the minimum wage. You will always find me fighting against men being deprived of work simply because they are a little out of their prime.
4482. Was the minimum wage attached to this work at all? I was not referring to this work, especially when I made that interpolation. You asked me if I objected to day-work.
4483. I asked you if the agitation about this work had not originated with the day-labour question? It had a good deal to do with it. I must tell the truth, although, to do myself justice, I must say that I never intended to raise any question as to the quality of the work.
4484. *Chairman.*] Until I suppose you saw it? Yes; I saw it, and I had to take hold of it afterwards.
4485. *Mr. Cann.*] I suppose you are aware that there is a lot of this kind of work which it is impossible to do in any other way? I am.
4486. Do you know that a lot of unforeseen work has to be done which you cannot contract for? I do. I do not think there should be any Public Works Department at all. Corruption and favouritism will creep in, no matter whether the work is done under the contract system or the State carries it out by day-labour.
4487. How would you carry it out? I would have a Colonial Architect, and I would permit engineers and architects to be first of all seized with the requirements of various public works, and submit their own plans and estimates of cost, and I would have a Commission, and let these gentlemen carry out their work free of you gentlemen of the Assembly, and free of the Government—just as free as the Railway Service.
4488. Can you cite an instance where a Member of Parliament has ever interfered with any of the public works of the Colony? No, I cannot. You see work is done round corners.
4489. What do you mean by that? Nobody is responsible, and everybody is.
4490. You have been an employer of labour? So I have.
4491. You have had a lot of men working for you? I have.
4492. Did you make them all work piece-work? Very little sub-contracting have I had done.
4493. Then you do not make them work piece-work? I have had some work done under contract—I have had some plastering done under contract. Generally speaking, I have carried out my contracts purely on the day-labour principle. On the last contract that I carried out—a job in George-street, Sydney, representing about £4,000—every man was employed day-work, even the painters, everybody but the licensed plumbers.
4494. Then your workmen work for you on day-labour principally? Exactly.
4495. *Chairman.*] What is the reason then that you say that day-labour would not be judiciously carried out by the Government, if it could be carried out judiciously by yourself as a private contractor, in doing your work? Because I have the financial responsibility on my shoulders. I have everything that forces me to pay the closest attention to my contract all through. I have my banking account to consider, and my profits to get out of the contract—I am not dealing with the public purse, but my own; that makes all the difference.
4496. *Mr. Cann.*] Then the inference from your reply is that the Government do not pay any regard to the cost of a piece of work? I do not say that. My answer really is that you cannot infuse into a servant the same sense of responsibility that naturally pertains to the man who undertakes contracts at his own risk, who stands to win or lose large sums of money.
4497. I suppose in carrying out large contracts like the job you have just mentioned, you do not supervise the whole of the work yourself? No, I do not.
4498. You have gangers and foremen? Yes.
4499. Day-labour men are working under these gangers and foremen, are they not? Yes
4500. Then, in that instance, the gangers and foremen are supervising the day-labour? Yes; and I supervise them.
4501. Is it not possible for the same men to supervise work for the Government? You would not get the same results generally.
4502. Why not? Because the supervision on the part of the employer-in-chief would not be so close to their heels in the case of the Government.
4503. Suppose the Government wanted your services, would you refuse to work for the Government if they offered you a sufficient salary? I believe I would accept the position.
4504. And you would not work for the Government the same as you would for yourself? I would, but I am an exceptional person, you know.
4505. *Mr. Robert Jones.*] You said a little while ago that, looking at that work, you thought you had seen enough, and you stopped short there; was it from an educational standpoint that you thought you had seen enough, or otherwise? I got tired of it.
4506. But you must have had some reasons? I did not wish to spend any more time.
4507. You did not wish to waste your time, is that your answer? No, I will not say that. I did not wish to spend any more time.
4508. For what reason? There was no useful purpose to be served. I had abandoned the whole thing. I did not expect to be called here. I thought the whole thing was over, so far as I was concerned.
4509. But that is not an answer to my question. You said you thought you had seen enough; you first told us that you watched it carefully? I did.
4510. And then you said that you thought you had seen sufficient;—what made you think you had seen sufficient, was it that you had been educated sufficiently by what you had seen, or what? You have shaped the answer for me. From an educational point of view, I had seen sufficient.
4511. To benefit you in the future, or what? No; I did not see how it would benefit me.
4512. *Chairman.*] What Mr. Jones asks, is what caused you to say you had seen sufficient when you had seen the work up to a certain point? I was quite satisfied in my mind. I had got sufficient information.

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4513. *Mr. Robert Jones.*] What were you satisfied with? As to the way in which the work had been carried out.

4514. You watched it for the purpose, then, of satisfying yourself as to the manner in which it was carried out? Yes.

4515. You say there were three thicknesses of timber in one particular place? Yes.

4516. Do you think that would be a saving to the Department? No; I do not. I cannot understand it. I was bewildered by what I saw.

4517. You cannot say where the motive would come in for putting it in that way? I thought it was gross carelessness.

4518. If, in excavating a tunnel, a water-vein, as we sometimes call it, appeared, and caused a portion of the roof unexpectedly to give way which was not required to give way, how would you effect the filling up there without putting up extra timber? I do not think such a thing would occur there. It might occur in a mine.

4519. You do not think that such a thing would occur in that tunnel? No.

4520. *Mr. Cann.*] But, if it did occur, would that not account for the timber? I do not know. I account for the timber, as I have said, because of neglect, carelessness, or oversight perhaps.

4521. *Mr. Robert Jones.*] But, if such a thing did occur, would that not account for the timber being there? No; I do not think anything would account for the timber being there, except what I have said.

4522. You did not satisfy yourself as to the quality of any other portion of the material except the bricks? No. I have seen the concrete and cement being mixed on the surface, but I never studied it. Probably, I should not have noticed the bricks so much only I have been a brickmaker.

4523. According to your idea, the brickmaker brought the kiln of bricks just as set;—according to your statement, there were callow bricks, hard-burnt bricks, that were immediately exposed to the fire, well-burnt bricks that would be burnt specially, and bricks that never should have been put in the kiln—bricks that cracked up when they came out; consequently the whole of the kiln of bricks would be taken out to the drays and placed in the work? It is my opinion that the bricks were carted out of the kiln just as they occurred—as the drays were led up to the kiln.

4524. Would you be surprised to know that engineers who have given evidence here have brought several samples of bricks and have stated that they were fair bricks? So they were, a great many of them. The majority of them were thoroughly good bricks. I have no doubt for a moment that the majority of them were fairly good bricks, and for the purpose for which they were used they were as good as the best. It is only a question whether a contractor would be allowed to use them or not, that is all.

4525. *Mr. Bavister.*] Did I correctly understand you, in reply to Mr. Cann, to say that you are now practising as an architect? Yes.

4526. Are you a member of the Architects' Association? No, I am not.

4527. In relation to the sending of bricks down to the position they were to be used in, you referred to the fact that they were being slid down a plank, and so having the edges or arrises knocked off;—is that not the common practice? Yes; with a heap of sand at the bottom, and the bricks being quickly removed, to prevent others from falling on top of them.

4528. You desire the Committee to infer that less care was taken than is usually done? Yes.

4529. In regard to those three thicknesses of timber, you referred to them as planks;—can you tell us their dimensions? Yes; 3 inches thick, and 9 or 10 inches wide, I think. I did not measure them.

4530. Then the material was different from that used, and termed poling-boards, throughout the construction of the work? Yes; some of the boards were only $1\frac{1}{4}$ inch thick.

4531. Was it hardwood to which you referred? Yes; I believe so.

4532. Can you give us an idea of the length? I think about 7 feet long, and about the width of the span of the tunnel. They were carted away in tip-drays.

4533. That was not the material that was used for a covering throughout the tunnel, was it? The great bulk of the material that was removed from the tunnel was 3-inch planking. There was a lot of $1\frac{1}{4}$-inch planks.

4534. Having regard to the number of pieces, would there not be twice the number of $1\frac{1}{4}$-inch stuff as of 3-inch stuff, if it had been properly used; that is to say, each set of timber would have two uprights, a cross-piece, and sufficient covering-boards to cover the whole width of the tunnel; that could not have been done with less than six pieces, and therefore there should not have been at least twice as much in number of the $1\frac{1}{4}$-inch stuff as of the 3-inch stuff? If the $1\frac{1}{4}$-inch boards were meant to take the place of the 3-inch planking, undoubtedly.

4535. You have already explained to the Committee that you have had considerable experience in tunnel work, and can clearly distinguish between the upright supporting boards and the cross-pieces to carry the overhead timbers, which are 3 inches thick in each case, and the poling-boards, or covering-boards, which are only $1\frac{1}{4}$-inch? Yes.

4536. If the timber is only used as required, would there not be a much larger quantity of $1\frac{1}{4}$-inch pieces than of 3-inch pieces? How in the world should I know? I do not think I understand your question at all.

4537. Do you know what width the excavation was? I never measured it, but I should think the whole cutting would be about 7 feet 6 inches wide from out to out.

4538. Can you recollect what width that $1\frac{1}{4}$-inch stuff was, of which you saw such a lot removed? I did not see a great quantity of $1\frac{1}{4}$-inch stuff removed; in fact, the only place where I saw such stuff removed was in the opening at Goulburn-street; I do not remember any other part, but only 3-inch stuff.

4539. Can you tell us what was the width of the $1\frac{1}{4}$-inch stuff you did see removed from Goulburn-street, or any other place? Yes; from 6 to 12 inches.

4540. Taking it at the width you say, how many pieces would require to be placed side by side to cover that width of 7 feet 6 inches? Well, if they were 9 inches wide ——

4541. Did you see any 9-inch wide $1\frac{1}{4}$-inch stuff? I do not remember what width. I have said they were 6 to 12 inches in width. I am referring now to the opening in Goulburn-street.

4542. The whole of he poling-boards were of one size—6 inches wide? Very likely; I cannot remember six months back.

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4543. If the poling-boards were 6 inches wide, how many would be required to be placed side by side to cover that 7 feet 6 inches? Fifteen.
4544. And one set would require one additional set of uprights and cross-pieces in each case, would it not? It would not necessarily require it, because the uprights might be 12 inches wide. It all depends on the width of the uprights. The width of the one is dependent upon the width of the other.
4545. Well, taking it for granted that one set of uprights and a cross-piece, or a cap-piece, are used only at each joint, so serving for one end of each set, then would it not require an additional set of uprights and a cap-piece for each set of poling-boards? That depends entirely on the local circumstances.
4546. Can you inform the Committee how they would be supported in the absence of uprights and caps? The Committee does not want to know that. There must of necessity be uprights to support them. There must be a set of uprights for every poling-board; there is no doubt about that.
4547. Then, taking it that there must be three pieces of 9 x 3 and fifteen pieces of 6 x 1¼, the number of 1¼ pieces would much exceed that of 9 x 3? Yes; but I did not see many 1¼-inch pieces.
4548. If at any one place there were layers of 3-inch thick material taken out, would that not, in your opinion, show an improper use of the material? It would.
4549. Reference has been made all through the examination by this Committee as to the cavities existing where the work had taken place;—is it not customary to find cavities wherever excavation has taken place at a previous date? Yes, it is, undoubtedly.
4550. Have you seen in print any of the evidence taken before this Committee? Not a word of it, and I have never conversed with anyone even in reference to it.
4551. Do you know whether the specification as to the removal of timber was the same in regard to this portion of the telephone tunnels as it was in regard to that done by contract? I have no knowledge whatever.
4552. Do you know that the first section of the telephone tunnels was done by contract? I do.
4553. Do you know that considerable subsidences took place in connection with that? I have been told so.
4554. Of your own knowledge you do not know it? No.
4555. Your interest in the question was not at that time aroused? I do not think that question was raised, except since this inquiry has been on foot. I have been told that such was the case, but I have not gone to visit the site.
4556. Do you remember that portion near the Exchange being done? Yes, I remember it.
4557. Do you know there was an accident of considerable magnitude there? No.
4558. Were not some of the out-offices of the "Exchange Hotel" let down;—did they not fall in consequence of the excavation there being carried out by the contractor? I heard of it. I think there was an action, or a threatened action. I have nothing exact to bring to bear on it; but I heard there was something. However, I can give no evidence upon it.
4559. What associations were officially represented at, or took part in, that series of meetings at the Builders' Exchange, at which you delivered addresses on this subject? There were the Builders' and Contractors' Association, and the Chamber of Manufactures (they sent representatives), the Government contractors (there was a Mr. Angus, I think), and the National League. There were four.
4560. Were those addresses delivered in consequence of overtures made to you? No.
4561. They were volunteered by yourself? Yes. I addressed a letter to the secretary of two associations, offering to read a paper on the subject.
4562. To which two? To the Chamber of Manufactures and the Builders' and Contractors' Association, I not being a member of either association.
4563. Do you know how the National League came into the business? No; I really do not. I was not a member of it.
4564. Some members of the National League took rather an active part in the discussion that ensued, did they not? They did; they took the greater part, I think.
4565. Did they express any opinion as to the way in which they favoured work being carried out by the Government? They did.
4566. Did they state in whose interest it was they were actuated? The public interest.
4567. Not sympathy with the contractors only? I had no sympathy with the contractors myself.
4568. I am speaking of the National League? I do not know what was in their mind.
4569. But did they say anything as to whether it was sympathy with the contractors that prompted them to take up this matter? They did not say that.
4570. Did they say that there was anything as to opposition to the Government that induced them to do it? No, they did not. They took it up purely in the public interest, as they represented to me, and as their speeches gave colour to.
4571. Was I correct in understanding you to say, in reply to Mr. Cann, that there was sufficient room between the crown of the arch and the timber to allow a person to crawl in, and hump his back up there? In places.
4572. Did you see any such places? Yes.
4573. Where were they? In Park-street and Goulburn-street.
4574. As regards Park-street, did you see it before the earth had been removed from the surface? I think I was in the opening the day following, before it was canvassed over.
4575. But the timbers had been bared from the surface, had they not? Yes, of course they had been bared.
4576. Can you say whether the timbers, when you saw them, were the same distance from the crown of the arch as they were put in when the tunnel was driven to enable the arch to be turned? I cannot answer that question.
4577. They may have been lifted considerably, for anything you know to the contrary? Yes, I could not say. I can only give evidence as to what appeared to me.
4578. As a contractor and man of common sense, in carrying out such a work, would you excavate 18 inches higher than was necessary to enable you to carry out the work in such a position? No, I should leave as much above me as I could, no doubt; but, at the same time, I would leave as much room as possible to move my arms about and the timbers. But you would have to be governed entirely by local circumstances. What one man might do in a certain case another man might not do.

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4579. If you had 2 or 3 miles of such work to do would you not, in obtaining your timber, have it cut to a uniform length for uprights? I should.
4580. And that length would be governed by the amount of space necessary for the carrying on of the work only? I have no doubt I should do that; everybody would.
4581. If that were done, it would be difficult, if not impossible, to place the timber at the height necessary to enable a person to crawl between it and the arch when completed, would it not? I should leave room for that purpose. In this case in Park-street, they could have done so, because the timber really supported more than the earth. It included that and the concrete.
4582. Having your timbers all cut to the uniform length, which only allowed just sufficient room for working purposes, would it not be difficult, if not impossible, to so place them as to leave a surplus of 18 inches head room? Yes, it would be difficult, as I have said.
4583. You made some reference strongly objecting to the minimum wage? I did.
4584. What con nection hasthat with this work? It had no connection with the tunnelling, but principally with day-labour and the minimum wage that is incorporated with it. It had no special reference to this tunnelling.
4585. But, it having been introduced, I think it is the duty of this Committee, either individually or collectively, to put the matter as clearly as they can? Well, I am willing to answer any questions so far as I can. I do object to the minimum clause in the Government contracts, and am willing to give my reason for doing so.
4586. Was there any clause in the conditions of this work by which it was stated that a minimum wage was to be recognised? I never saw the conditions of the work, so I do not know what they contain.
4587. Do you know whether there was a varying wage paid to men in the same occupation on that work? I do not know.
4588. In regard to the minimum wage clause imposed on contractors carrying out works, compelling them to pay not less than a given wage to their workmen, does that not work in the interest of the men? No, it does not. It works against the men's interest.
4589. How? It shuts out men like Mr. Jones and myself, who are gray-headed probably. That is the effect of it.
4590. Does not that minimum wage clause also prevent a contractor from paying so low a wage, not only as he otherwise would, but as he has done in many instances? I do not know.
4591. Has it not come within your knowledge that contractors since that clause has been in operation, have succeeded in getting workmen to accept a wage lower than the minimum wage stated, of which information has been conveyed to the head of the Works Department, and the result has been that the whole of the back money has been stopped, and paid to the persons who were paid in opposition to that clause? Yes, I have heard it has been the case in one instance—one or two instances, I think.
4592. You said something in regard to the abolition of the Public Works Department? Yes.
4593. Your reason for that, I think, was that it is impossible to keep clear of corruption with State Departments? Yes; I said that.
4594. Is it possible to keep clear of corruption out of State Departments? Having regard to human nature, I suppose it is impossible to secure absolute purity entirely under all circumstances; but we get the nearest to it we can.
4595. What is your opinion as to the possibility of doing work for the State by day-labour as cheaply and as efficiently as by contract? I do not believe it can be done. It may be done in a few instances, but "one swallow does not make a summer."
4596. Is there a greater tendency to corruption under such a system than by having the same work done for the State by contract? Yes; unless the Department itself is corrupt.
4597. You referred to human nature, and the desire to make profit—is there not always a constant temptation for the contractor to put in a material different from that specified, but which, in his own words, "will answer the purpose," to enable him to make a profit by getting the material at less cost? Under his specification, he is not allowed to put in what he pleases. The temptation does not exist, because it is prohibited.
4598. In your experience has it been prohibitory? I have never attempted to put in inferior material; the specification I have worked under has been too strict. I am referring to contracts I have done under the Government. I never had a chance. I found it hard enough to get even good work and good material passed.
4599. Do you think it is possible for a contractor carrying out works, either for the State or for a private individual, to so ingratiate himself with the clerk of works, or whoever may be the authority over him, to pass his material, as to get improper material accepted? A lot of very grave things have been done.
4600. Have you ever known a contractor to do such a thing? I have known an inspector to ask a contractor for money.
4601. Could you say whether the contractor did give the money? I can say the contractor refused.
4602. If he had not refused, would not most men occupying his position consider that they were entitled in consequence of that to recoup themselves in some way out of the work? You may depend upon this, that when a contractor so far forgets himself as to give money to an inspector, there must be a consideration somewhere.
4603. We may take it, then, that if a contractor did give anything to a person occupying such a position, it would be with the view of recouping himself at the expense of their common employer? No. I have no doubt that if money were given in this way there would be an expected consideration somewhere. I know a contractor who was once asked for money by an inspector on the work. The contractor refused. The inspector said he would not give him a certificate. The contractor said, "There is nothing to object to, my work is good." The inspector turned round and said, "I can condemn work whether it is good, bad, or indifferent—that makes no difference—and there is no appeal." The inspector did not get that money; the contractor defied him.
4604. *Chairman.*] The contractor got payment from the Government? Yes.
4605. And the inspector did not get the money? No; the contractor told him to do his best, and said that he was not poor enough to be persecuted.

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4606. A question was asked in the House by Mr. Watson of Mr. Cook; I have the records of the House here, and I find that that question was asked on the 18th August, 1896, and the question was:—

Cost of tunnelling work in connection with the Postal Department:—Mr. Ashton, for Mr. Watson, asked the Postmaster-General,—Will he state the relative cost of the tunnelling work, in connection with his Department, under the day-labour and the contract systems respectively?

Mr. Cook answered,—Contract:—Moore-street to Exchange, £3 1s. 4d. per foot. Day-labour:—Pitt-street to Clarence-street, £1 19s. 8d. per foot; General Post Office to Railway Station, £2 8s. 10d. per foot. The saving by day-labour, on the basis of the last contract price, is:—Pitt-street to Clarence-street, £1,695 3s. 7d.; General Post Office to Railway Station, £4,312 0s. 8d. Total, £6,007 4s. 3d.

Therefore you can now fix the date? I wrote a letter to the *Herald* following that date—within a day or two.

4607. Was it after that that you saw bricks being put into the tunnel about Goulburn-street, or somewhere in that direction; Yes, after that date.

4608. Where you saw the bricks being put in, was it a place that had been open, or the ordinary construction of the tunnel—a section being continued along? One of the ordinary sections. I can locate one portion where I spent considerable time—that is, between Park and Bathurst streets.

4609. Was it a place that had not been completed, or was being completed at the end of two sections, or anything of that kind? I do not remember those particulars

4610. Mr. Jones asked you a question in reference to the bricks, in which he said a statement had been made by previous witnesses with reference to the bricks used; Mr J. Davis, of the Water and Sewerage Board, in answer to Mr. Clarke, gave the following replies:—

963. You mentioned in your evidence that there were wire-cut bricks used? Yes.

964. Would you mind telling the Committee what is the difference between wire-cut bricks and the other kind of bricks—superior class of bricks? The wire-cut bricks are made by machinery—in what is known as a semi-plastic machine. The brick is pressed out through an opening the size of the brick, and as it leaves the opening it is cut by a wire to the shape required; hence the term wire-cut. The bricks that have been used in the arch have been burnt without further pressing; in that condition they left the machine. A sewer brick—which is, I suppose, as good a brick as you could get—is not only plastic, but also pressed twice. A dry-pressed brick—what is commonly used in the buildings in and around Sydney—is a brick made from clay without treatment, except being ground and pressed under hydraulic power and then being burnt.

965. So that the other brick—what you call a double-pressed brick—is a superior brick? Certainly; you have to pay more money for it.

966. Do you consider that the bricks used are sufficiently good for the work of the tunnel? I believe that the tunnel as it stands will answer the purpose for which it is intended; but if I were going to carry out the work, I would not use those bricks.

967. Is the quality of the bricks up to the specification? No.

987. When you opened the tunnel, did the compo. adhere to the brick? Yes; there is no doubt about that. The brick, to begin with, is very absorbent and very rough. I hold in my hand a brick which I have taken out and referred to.

988. *Mr. Cook.*] Where was that taken out? Out of the side walls at the intersection of King-street and Pitt-street.

That was the evidence given to which Mr. Jones referred;—do you support that evidence, or do you consider the bricks were good enough for the tunnel work though they were not, as you say, good bricks? Yes, I do.

4611. You think that, with that evidence, they were good enough for the tunnel work though they were not good bricks? Yes; but then there is a reason for that. They would not be fit for any weight-supporting purposes. They support no weight—they only support their own weight.

4612. You have been asked some questions as to the excavation on the top of the arch in which you said that a man could bend his back? Yes.

4613. You have also been asked some questions as to the length of the uprights and cross-pieces to support the poling-boards, being uniform;—if poling-boards cannot be driven—if the earth is too hard—would it be a proper thing to excavate a portion of earth to put those poling-boards in to force them in? Yes, under those circumstances.

4614. Under those circumstances there would be a probability of a larger space being left above the poling-boards than if they were driven? Undoubtedly.

4615. Had you any idea in that respect of this work? No. Of course I did not know what led to these extra timbers being placed there; I simply saw they were there. There was nothing to disclose to me the reason why they were there.

4616. Were those boards you saw taken up placed one on top of the other, or how were they placed? I believe in this particular case it was a pure piece of carelessness on the part of the workmen. They were lifted off one board above the other—as many as three planks. I was astounded, but I never saw it but in one place. I am, however, free to admit it may have occurred by an oversight—by an accident. I only say what I saw, and I published it in the paper.

4617. *Mr. G. McCredie.*] Do you not think it would necessitate a great amount of energy being used to put three planks one on top of the other; it would not be carelessness putting them in there—it would be hard work? I do not know. There it was. I cannot account for the timber being there. It seems to me it was a waste of timber and money.

4618. *Mr. Robert Jones.*] You have stated that you knew of an inspector who asked a contractor for money;—will you give the Committee the name of that inspector and the name of that contractor? [*The Chairman declined to allow the witness to answer the question.*]

4619. *Mr. G. McCredie.*] You told the Committee that you were a builder and contractor previous to entering the profession? Yes.

4620. How long had you been practising as a builder and contractor in Sydney? Over fifteen years, I suppose.

4621. Will you tell the Committee what is the largest job you have carried out during those fifteen years? I think my largest contract was for a terrace of houses at the corner of Kent and Bathurst streets—I think about £7,000; but for years I paid £300 a week wages. Still, the works were not very large jobs. There were a number of them. £4,000 or £5,000 might average my best, largest jobs.

4622. Can you remember the names of the architects that supervised the carrying out of that work? Yes. The greater portion of my work was done under the supervision of old Mr. Reuss, now deceased. The great bulk of it was private; so is the great bulk of all contract work.

4623. Will you explain to the Committee the manner in which the architect dealt with you; before you got your final payment in connection with the work, was it inspected and passed, and did you get a final certificate? Yes; in all cases.

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4624. Did you at any time, while doing buildings, have anyone take possession of your work before it was completed? Never. I never gave anyone the ghost of a chance.
4625. Supposing you were putting up a place, and the building was not completed, and somebody came in and took possession of it, and passed remarks concerning it, do you think that would be fair to you as a builder? I, myself, have never done such a thing, and I say that it would be reprehensible.
4626. It would be unfair to the architect too, would it not? According to my code, it would be most improper.
4627. In your experience, since you have been in the profession, have you ever had any experience of that sort, anybody interfering with your work, and taking possession of it? No. But in my position as an architect, I have had other architects called in to examine my work.
4628. After it was completed? No; during its progress.
4629. You did not consider that a fair thing, did you? I considered it a most unfair thing.
4630. Do you know whether this work in Pitt-street, to which you have referred, was completed before you inspected it, and wrote those letters in the paper concerning it, and read a paper in the Association Rooms—whether it was out of the hands of the engineers? Of course I knew it was not completed. But my public address and letters had reference less to the work itself than to the method—by "method," I mean as between contract and day-labour. I took up the day-labour question in the public interest. The workmanship was merely something that crept in afterwards—grew out of it.
4631. Do you not think it is fair and reasonable to judge of the contract and day-labour alike, as regards whether it is or is not completed? My attention was never drawn to it until the contract portion from the Exchange to Clarence-street was completed. I have already explained that my attention was drawn to it from something that emanated in the House.
4632. As a matter of fact, you did not know whether the work was completed or not when you wrote these letters? It was held to be completed, but, as a matter of fact, it was not completed.
4633. Who would be the best judge as to whether the work was completed—an outside man who knew nothing about the circumstances connected with it, or the engineer connected with the work? The engineer should be the most competent to judge.
4634. I suppose you are aware that this work, before it is handed over as completed, has to be passed by the engineer-in-charge, in conjunction with the departmental engineer, and a certificate granted as to its completion? I presume so, but what difference would that make in the case of a day-labour job;—all the work would be paid for.
4635. You said in your evidence that you had opportunities for inspecting the work along Pitt-street whilst it was going on? Yes.
4636. Would you tell the Committee what part of the Pitt-street work you had an opportunity of seeing going on? Well, where I spent most time was in that part of Pitt-street immediately lying between Park-street and Bathurst-street, by reason of the fact that I had to go that way more frequently. I have an office at the corner of Park-street, and I happened to be there more frequently than anywhere else.
4637. Between Pitt-street and Liverpool-street? Between Park-street and Liverpool-street, we will say.
4638. Can you give me any idea what date that was? Very frequently indeed. I cannot give you the date. There were a number of dates. I rarely passed along but I looked down at the work wherever the openings were.
4639. Was it not when the timber was being taken out, in order to complete the work, that you had the best opportunity of judging or inspecting it, or that you did inspect it, and not when the brickwork was being done? Certainly the best opportunity was afforded during the removal of the timber, but there was abundant evidence afforded to enable a practical man to form an opinion while the work was going on—with respect to the handling of the material, and so on. Of course my attention was drawn to it more frequently after the footways were opened up and the timbers were removed, just the same as the attention of the general public was directed to it.
4640. Do you know the circumstances connected with the putting of the timbers in the tunnel, or constructing the brickwork of the tunnel, through tunnelling? I can only imagine the circumstances were to keep up the top crust for the protection of the men.
4641. Do you know who ordered it to be tunnelled? I presume the engineer-in-charge.
4642. Would you have tunnelled it? In the Park-street crossing, if I had got permission I should have made an open-cut there, and done the work night and day until it was finished.
4643. Very qualified that—having obtained permission;—but supposing the City Council insisted on your not opening up the street? Then you are held harmless in the matter. I should think the responsibility rested with the City Council if they arbitrarily interfered with your judgment as to how the work was to be done.
4644. Will you tell the Committee whether in your opinion, when the timber was being taken out, that would have been the best time to complete the work—that is, to render the brickwork and to fill up any vacancies in the brick-joints that may have occurred—or when the men were working underground in the dark; which would make the best job, when it was opened up from the top, or doing it underground? Of course it would be much easier to do it when you opened it from the top.
4645. Those joints to which you referred, and said you put your hand in, where the timber was taken out, could have been filled and flushed; as a matter of fact, they were? But there was room to grout them all on the top, with one or two exceptions.
4646. Which would make the best job, shoving it in by your hand in the dark, or getting it from the top in the daylight, when a man could work free and easy and see what he was doing? From the top, far and away—of course it would.
4647. I think you stated that you were not a member of the Builders' and Contractors' Association;—were you at any time a member of that Association? Yes, I was for a number of years.
4648. How long is it since you left the Association? I left it a little over three years ago. I continued in it two years after I began to practice as an architect, and then I considered I was not suitable to be a member after that, and that is how I retired, against the wishes of the members.
4649. Were you ever a member of the committee? Yes, nearly the whole time I was a member of the Association I was a member of the committee.
4650. And there was no other reason why you left, only you thought you were not fit to be a member when

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when you were an architect? Because I was practising in the professional branch of the business, I considered that I was not a suitable person any longer to be a member of the Association.

4651. Can you tell the Committee how much of the tunnel in Pitt-street was done open-cut, and how much was done tunnelling? I cannot.

4652. When you spoke about the bricks being slid down the boards, you said you never took notice of this until after those questions were asked in the House? I witnessed that very frequently. Although it did not strike me with any particular force, still I witnessed it, and I thought it ought not to be allowed. I wondered why it was allowed.

4653. That was after the 18th August, 1896, when those questions were asked? No. I observed that before I held my meeting. I noticed, nine or ten months ago, the way the bricks were being delivered into the cutting. All my investigation dates from after the questions asked by Mr. Watson in the House.

4654. With regard to the bricks, you state they appeared to be an inferior lot of bricks? No, I did not say that; I said the bricks were good, bad, and indifferent. The majority were good bricks, but there were a good many callow bricks. I saw them in the stacks outside. I took them up once and challenged them with the maker, Reuben Cook, and asked him how much a thousand he had for them, and he declined to tell me. I say there were bad bricks put in the tunnelling; but I say the majority of the bricks were good.

4655. Did you see the callow bricks built in? I cannot say that I saw them picked up, and laid in position. The men passed them down the tunnelling, and I presume they were used.

4656. I suppose that in your experience as a professional man and as a builder, you know that when the bricks are being built in, there is very often a number thrown out that are not allowed to be built in on account of their being callow bricks? Yes; I have known them taken out of the walls afterwards—many courses of bricks taken down and removed,—and these may have been removed, for all I know, after they were built in; but I do not think that is very likely.

4657. You were present at the meeting of the Builders' and Contractors' Association on 5th July when—

Mr. R. Cook, in referring to the construction of the telephone tunnels, said that he had tendered for the kind of bricks required by the Government for building the tunnels. There was not a brick in the tunnel that would not live for a thousand years, and nothing but a volcanic disturbance would vibrate them. He said this because certain insinuations had been cast, on the bricks he had supplied, by Mr. David Davis. Those reflections were unfair, and should be withdrawn.

Mr. Davis said that he was very sorry to think that anything he should have said was meant to damage Mr. Cook, or the goods he manufactured. He withdrew any reflections that might seem to have been cast on Mr. Cook's bricks.

At that meeting did Mr. Davis withdraw that statement? Yes, he did, and properly too. He used the words, "that they were not fit to build a dog's house with."

4658. And he withdrew that statement after? Yes, at the following meeting, and very properly so too.

4659. Do you think that you could tell whether a brick, outside a callow one, was a good or a bad brick by looking at it without testing it? Yes; I am a fair judge of bricks. I have had a good deal of experience. We test a brick by the ring, and the amount of water it will absorb, and so forth; but I would not require to test a good brick. The sight of a brick, looking at it in the stack, would satisfy me as to its quality.

4660. Have you ever tested a brick for the breaking-strain of it? Yes, very frequently.

4661. Will you explain to the Committee how it is tested? Our way of testing is to strike one brick against another of different quality.

4662. Do you think that is a fair way of testing bricks? I think that is a very fair way of making a comparative test.

4663. As a brickmaker, you would be satisfied with that test? Generally speaking; if you wanted a scientific test, pressure would be applied to it by resting it on two parts and applying pressure in the centre, as you would with a girder or any other material, but for ordinary purposes the other test would be sufficient.

4664. What pressure do you think these bricks would stand? I do not know. I have not made a calculation. I imagine that these bricks, taken one with another, were ample for what they were used for, more especially as superincumbent earth is supporting the arch.

4665. You imagine that these bricks were good enough for the work? Yes, I do; I have said that before.

4666. You made a statement in regard to Park-street, as to the ramming round the brickwork; do you know how the ramming was done in connection with the sides of the tunnel; you never were underground? No; all I could see was in looking from the rail on the surface.

4667. You are not aware that that was rammed for every course of bricks? It may have been in some instances. It ought to have been rammed as every course was built up, and if it had been, I am sure there would not have been any subsidence.

4668. When the tunnels were being built, and the side walls were being carried up, you would not be able to see that if you were not underground? You could see a portion of it, where you racked back.

4669. You would not be able to tell whether every course was or was not rammed? There could not have been the amount of settlement there was if it had been rammed, as it ought to have been.

4670. Where was the settlement to which you refer;—do you know of any settlement over the tunnels? Places in Goulburn-street, and the settlement that would have occurred in Park-street only the concrete above and the blocks prevented a subsidence. As a matter of fact, for weeks the 'buses were supported entirely by the concrete and the blocks.

4671. Do you think that that concrete and the blocks would have supported the roadway, not for months only, but for years? No; I believe there would have been a great disaster somewhere.

4672. Will you explain how the disaster would take place? Not immediately over the crown, for it would be stronger there, but as it approached towards the gutter, where it is softer, there would have been a caving in, a giving way some time or other.

4673. That concrete would not have supported the traffic very much longer—is that what you mean? It might have lasted for years, or for months—it is impossible to say when it might have given way; but it was, at any rate, left in such a condition as no work should be left in.

4674. Do you know whether it was left in that condition as finished work? My impression is that it was left in that condition as finished work.

4675. You are not in a position to know that it was left in that condition as finished work? Only you and the Department are in a position to know that absolutely.

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4676. How thick was the concrete? About 8 inches, I think.
4677. And what about was the span of the cutting, from one side to the other? About 8 feet, I should say.
4678. What weight do you think that thickness of concrete would support? That would depend entirely on how the weight was placed upon it. If the weight were distributed equally, it would probably bear an extraordinary weight; but with traffic going over it, and subjecting it at the same time to weight and to movement, it would not support one quarter of the same weight.
4679. I suppose there is a good deal of traffic over Park-street? Yes.
4680. Do you know that all the heavy stones for the new markets went over Park-street? I think the heavy stones were drawn before that was finished in Park-street—I think so, but will not be positive on that point.
4681. Do you think it would have lasted until the next day—until the men employed by the Government started to take up all the concrete, to take out all the timber;—do you think it would have lasted twenty-four hours longer? I have already said it was one of those things in connection with which nobody could tell when a disaster might have occurred. The work, I repeat, was left in a condition calculated to create a great deal of fear in the public mind when they had information of it.
4682. And, at the same time, you did not know it was wrong? I knew there was a cavity when I passed. I spoke to many people of the vibration of the road as I stood on the footpath, and I said, "There is something very wrong here."
4683. Can you tell me how long before you pointed this matter out to some people? Three or four weeks, I think, before it was opened up—two or three weeks, at any rate.
4684. Do you know whether there was a hollow sound there at all before the tunnel was built? I do not know, but there might have been.
4685. Have you any idea of the number of pipes that crossed there, between one side of the street and the other? No; I have no knowledge of that.
4686. Do you know of any other place besides the ground above the tunnels in Sydney where a similar settlement has taken place under the concrete? No; there has been more or less settlement under all the wood-blocks at times. I do not know of any other place, but there may have been other places.
4687. Of your own knowledge, do you know of any at all? No; I cannot say. I have not constituted myself a Sydney street and road inspector. I want you to understand that it was the intense interest I took in the question of day labour *versus* contract that led me to devote time and attention to this. I have simply inspected this work, and I have not inspected other works.
4688. Do you recollect one occasion when you were standing in Pitt-street looking at them taking the timbers out between Park-street and Bathurst-street, and you were speaking rather loudly, so that those standing round about could hear you, referring to the bad work that was done by the Government workmen, and you said that when a certain piece of timber was taken out they would see there was no packing underneath it? No.
4689. And when the men took that piece of timber out and there was packing underneath it, right up to the bottom, they bohooed you? That never occurred with respect to myself. There is not a shadow of truth in that. That must have been in regard to some other person, not with respect to myself. By those who knew me there was a good deal of antagonism showed towards me as I looked over, simply because working men have an objection to me, and they had a little bit of "Here is Mainer," and some boohooing, of which I took no notice.
4690. You were telling the Committee this morning that you took a great amount of interest in this work on account principally of your objection to day-labour? Yes.
4691. Can you tell the Committee why you lost all interest in it while the work was proceeding of taking out the timber when it got below Moore-street—you know the timber was taken out from Moore-street to the Exchange? I never went that far.
4692. After the work of taking the timber out came to the contract section you never took any interest in it, or examined the work? The contract portion was finished before I began to take any interest in the matter at all.
4693. *Mr. Cook.*] Are you aware that the timber has been taken out of the contract section? I have been told so.
4694. *Chairman.*] Mr. McCredie wants to know why you did not examine the timber being taken out of the contract part as well as the other part? I could not afford to spend any more time. I have spent time and money on this.
4695. *Mr. G. McCredie.*] Do you think it was a fair thing to judge only in connection with the day-work, if you were comparing it with the contract work? If I had the same knowledge of what, in my opinion, was defective work in connection with the contract work, I would express myself just as strongly as I would in regard to the day-work portion.
4696. Do you think it was fair for you to comment upon that day-labour work when the timber was being taken out, and you were comparing it with the contract work, and never go to look at the contract work when the timber was being taken out there? My answer to that is this: If it is, as you state, as I have no doubt it is, there was just the same neglect manifested by those in charge with regard to the contract work as with regard to the day-work.
4697. I want to know whether you consider it was fair? Well, if you ask me that question, I say that, strictly speaking, I ought to fairly judge between the two—of course I ought.
4698. Was your attention drawn to a hole in connection with the contract work, or did you hear of a vacancy around some pipes in connection with the contract work when they were taking the timber out, similar to Park-street? I only heard of it very incidentally. Had I been told of certain things, as I was in connection with the Pitt-street section, I should have gone to look at them. I witnessed what my attention was particularly directed to—not matters to which I was not particularly directed.
4699. Well, as a matter of fact, your attention, then, was particularly directed to the day-labour work only? Yes.
4700. Have you made any inquiries as regards the class of men who were working on this tunnel work at day-labour—I mean as regards their experience? I believe they were a good class of men. I am a good judge of men, and I saw them; I don't care where they came from, Lithgow or Sydney; I was favourably struck

struck with the men. I never saw a better class of men, judging from just looking at them. There was only one man I knew, who worked for me at one time. I know he was a thoroughly good man. He used to mix cement on the roadway, and pass it down below. I believe the men were thoroughly good. I have not a word to say against the men.

4701. Do you think the man referred to in Mr. Donald's evidence is that man? I do not know. He is a tall, thin man. He was a plasterer's labourer when he worked on my job. He went home with the Contingent.

4702. *Mr. Bavister.*] Jack Riley? Yes; that is the man. He is a thoroughly good man, and is the only man I knew intimately.

4703. *Mr. G. McCredie.*] You referred to the packing;—Mr. J. Davis, in giving evidence here in reply to Question 953, states that the packing was as good as you could expect under the circumstances; is that your opinion? No. I think the packing might have been a little better if they had taken more time and trouble.

4704. Do you think that Mr. Davis would have a better knowledge than you, considering he does a great amount of it? I should think he ought to have, but I cannot help my opinions; they are the result of conviction. I give way to Mr. Davis as having an opinion more valuable than mine; but, nevertheless, I cannot help it if I am in conflict with him in opinion.

4705. I suppose you never did any of the sewerage work under Mr. Davis in the Water and Sewerage Department by contract? No. The extent of my experience has been tendering for some of the sewerage works and never getting any of them.

4706. In packing round the sewer, do you think it should be better than packing round a tunnel of this description, which is only to carry cable wires? I think much better packing should be round a sewer; you want to keep the gases from escaping.

4707. Then if Mr. J. Davis says in his evidence that the packing in this case was of similar material to that used in the Works Department, do you not think it would be good enough packing? Then I should say the packing in the Works Department would not be good enough.

4708. Mr. Davis, in his evidence, says, in reply to Question 1145, with reference to the City Council insisting on the work not being done open-cut—

> If they had done so, I would have insisted on doing it in open-cut, and I would have told them that they did not know what they were writing about.

Do you think that it was a wise thing, or that the City Council understood what they were asking, when they asked for the work to be done underground—if they did demand that the work should be done by tunnel instead of open-cut, do you consider that was a judicious thing to do? No. I do not think anyone would have done it by tunnel if he had been allowed to do it open-cut.

4709. As regards the 3-inch hardwood you found near the City Bank, do you understand how the poling-boards and the supports for the purpose of building the tunnel are put in? Yes; the vertical uprights are placed in first.

4710. You say there were three thicknesses of 3-inch hardwood planks? Yes; they appeared not to have been regularly placed, but to have been thrown in. It appeared almost like a tip. It was something extraordinary. They were not lying properly on top of each other, but in a heterogeneous mass.

4711. How deep from the surface? Resting on the crown of the arch, which, I suppose, at that point is 4 ft. 6 in. or 5 ft. below the surface.

4712. Were they lifting them out, or do you think it was possible they could have been thrown down there while they were carrying on the work? That is how it appeared to me. It appeared to me just as I referred to it in the paper. I said it looked at the time as if it were an underground timber tip. That is an exaggerated way of putting it, but it expressed what I meant.

4713. Were they taking them out when you saw them? They were lifting them up, and there were cavities underneath, and the men were pushing the dirt in with their feet, and the planks were put into a dray at once.

4714. And there were three thicknesses? Yes; I watched three thicknesses being taken out.

4715. Three-inch hardwood—that size would take a considerable support, would it not; they are pretty heavy? Yes, they are pretty heavy.

4716. How many pieces were there? While I stood there I suppose there were a dozen or more pieces taken out, passed on to the bank, a dray was there at the side, and they were lifted into the dray at once.

4717. Was it in conjunction with the roadway where you saw it? No. One of your places opened up for the purpose of taking the timber up.

4718. *Chairman.*] Did you see the opening made? I saw a portion of the material—it was commenced.

4719. *Mr. Bavister.*] Was it possible it had been thrown there, waiting for the dray to come and take it away altogether? No, it was not.

4720. *Mr. G. McCredie.*] Referring back to the contract work, reference has been made here to the fact that an accident occurred where the side walls of the outhouses to the Exchange which formed a part and parcel of the kitchen tumbled in while the contractor was excavating; are you aware that at the time when that fell in, and the contractor was doing the work open-cut, to complete his work, the City Surveyor came down and objected to his carrying on his work with open-cut, and insisted on his finishing it at once? No, I am not aware of that.

4721. You were aware of the accident? I heard of it.

4722. And also that there was no comment in the paper about it? No, there was not.

4723. If you were the engineer carrying out that work and the City Surveyor complained of your having done it open-cut—that is, in making good the repairs after the accident happened—you would take that as evidence that he would insist upon your carrying out the work underground as instructed by the letters, would you not? I imagine that had I been engineer-in-charge, and was not allowed to carry out the work according to my own knowledge, I would want to know the reason why. Of course, I am aware that the city authorities have certain power over the streets, and it is difficult for a man to know what to do; but at the same time I think that those in charge are relieved of a good deal of responsibility for what has happened since if they were arbitrarily interfered with by unprofessional people belonging to the City Council.

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4724. Of course, the City Council, in insisting on the work being carried on by an underground method would no doubt consider that was the best means, so as not to interfere with the traffic to the shops, and thus interfere with the people's business? Well, they ought not to have insisted, considering what a small surface there was on the top of the tunnel. Of course, these are matters of which I know nothing; but I candidly say that if I had been putting in that tunnel, and had been ordered, I would have fought hard to have been permitted to do it open-cut.

4725. *Mr Robert Jones.*] I think you said that you were not invited to look at the contract portion of this work during its progress? That is right.

4726. Were you invited to look at the day-labour work? No.

4727. Why the difference? There was nothing for me to witness in connection with the contract work. I have explained that that work was completed before my attention was directed to the tunnelling.

4728. As a matter of a fact, you did not bother about looking at the contract work, but you did interest yourself and overhaul the portion done by day-labour? I did.

4729. Because it was being done by day-labour? No, not for that reason, but because I had made myself prominent in challenging the correctness of the words and figures used by Mr. Cook. Natural curiosity grew out of that starting-point.

4730. Had you any facts in your possession to dispute Mr. Cook's figures on that occasion? Well, I had my own experience and knowledge.

4731. But you said you wanted to dispute Mr. Cook's figures;—had you any facts in your possession that enabled you to dispute his figures on that occasion? I daresay you have read all I have published on that matter, and you will see how I met that view of the question. I have said that I laboured under the disadvantage of not having access to documentary evidence, and I relied chiefly on my knowledge and experience; and that is my answer to your question now.

4732. *Mr. Cook.*] Nothing will persuade you that day-labour is less expensive than contract? Generally, I hold the opinion that day-labour would be more costly to the persons who pay than contract work; but there may be exceptional circumstances where it would be otherwise.

4733. Your mind was made up in this case before you began your investigation,—is that not so? No, it was not. I have an objection to day-labour by State for another reason, which is that to the extent that the State employs workmen by day-labour the chances are not equal for the men, regardless of their special ability, to obtain employment.

4734. You had a prejudice against this work from the start, had you not—you naturally had a prejudice against day-labour? No; I had not a prejudice against day-labour.

4735. Well, say a bias? I have an objection to day-labour because of the evils and favouritism that are likely to grow out of it.

4736. Your mind was fully made up against the day-labour system when you entered upon that inquiry? I am prepared to be convinced if you can show me that you could have succeeded in procuring better results by substituting the day-labour for the contract system, wherever the case may be; but I am prepared to dispute at all times and in all cases as to the best results generally, from a pecuniary point of view, being obtainable by day-labour system. I put the whole experience of the world against the suggestion. You want to put me in the position of having an unreasonable prejudice against day-labour, but I decline to be placed in that position.

4737. *Mr. Bavister.*] You said something in regard to a clause respecting wages preventing contractors from employing men whom they chose—for instance, men getting into years;—do you prefer to employ men of years and experience when you are unhampered by conditions? I prefer to be free to employ any man I please; and if he is an elderly man, or a weakly man, and his output is not equal to that of the best man, though his work may be equally good, if he is willing to work for 7s., as against the current rate of 8s., I ought to be free to employ him. It is against the principles of humanity—human nature—to debar that man from employment; and that is the tendency of a minimum-wage clause.

4738. If you had two men offering for the one work of equal ability, but one being a man of greater years, and consequently of greater experience, and if you were unhampered by any conditions, which would you prefer to employ? I would prefer to employ an experienced man.

4739. But if you had to pay him the same rate as a younger man, you consider that does not give a contractor the freedom that he should possess;—is that so? If you mean would I employ a man, all things being equal, but one younger and the other older, and if I could get one for 1s. a day less ———

4740. The contractor wants the old man if he can get him more cheaply? Do you not want your boots, if you can can get them, more cheaply?

Turner Wadsworth sworn and examined:—

T. Wadsworth. 10 Nov., 1897.

4741. *Chairman.*] Are you employed by the City Corporation? Yes.

4742. Were you employed by the City Corporation in connection with opening up the road at Park-street? Yes.

4743. In what capacity were you employed there? I was sent there by the Acting City Surveyor to see the class of work that there was there.

4744. Was the street opened up at the time? No.

4745. Did you superintend the opening of it up? Yes, in one sense. I was there the night it was broken open.

4746. In what way was it opened? The blocks were taken up, and the concrete was broken through.

4747. The blocks were taken off first, and then you saw the concrete broken through? Yes.

4748. Did you see it broken through? Yes.

4749. How did they break it through? With a hammer and gads, I think.

4750. Did they cut a hole through first? Yes; I think about 2 feet or so in circumference It was not a square nor a round hole.

4751. It was an irregular hole? Yes.

4752. Were you there when they did that? Yes.

4753. Did you see all that was underneath it? Yes.

4754. Was there a space, or what was underneath? A space.

4755. What depth? I did not measure it. I should say that at the first place broken through there would be 18 inches or 1 foot 9 inches space.
4756. Was the earth taken out to create that space, or was the space there when the earth was being taken out? The space was there when the hole was made.
4757. And no earth was removed? Not at that time.
4758. Did you see other portions broken through? I saw all that broken through, I think.
4759. Until it was exposed, as seen by the Committee? Yes; I think I saw it opened and left for the Committee to inspect.
4760. Were you there when the Committee went down? Not at that place.
4761. Where you saw the concrete pierced, did you see any other place with a space underneath? Yes, but not so large as that one.
4762. Can you give us any idea of the average depth of the space underneath at that particular time—varying from what depth to what depth? I did not measure it.
4763. Can you give us an idea? I could not give you that satisfactorily.
4764. Was it 3, 4, 6, or 9 inches? It may have been 3 inches in some places.
4765. And what in other places? Some places 7, and some places 9. I cannot be accurate, because I never measured.
4766. Where you saw those spaces, were those spaces there when the concrete was removed? They would be there when the concrete was broken through.
4767. They were not made by the taking out of the earth underneath at that time? Not that I am aware of.
4768. Were you there to see if it was done? I was not there all the time. There was no earth removed that I am aware of.
4769. Not while you were there? Not while I saw it broken through.
4770. Was there any other place that you saw opened up? I was along the contract after that.
4771. Were there any other places in the street you saw opened up where there were any spaces underneath? Yes.
4772. Where? When I say holes, I mean under the boards—I do not mean above.
4773. Whereabouts did you see the boards removed? I saw them removed all the way along the road.
4774. Did you see spaces under the boards? In some cases.
4775. Any size or depth? I could not say accurately how deep.
4776. Can you give us an idea what space there was under the boards in some places? I did not measure it.
4777. But you saw spaces under the boards? Yes; I did.
4778. *Mr. Robert Jones.*] Were they spaces which, in your opinion, would be more than you might expect under the circumstances connected with the packing? Yes; I saw one opposite the City Bank.
4779. Were the spaces more than you might expect under the circumstances in doing the work as it had to be done? I say there was one at the City Bank.
4780. Was it more than an ordinary space that you would expect to see? Yes; in that certain place, opposite the City Bank.
4781. You are aware that in that class of work it would be a pretty difficult matter to do the packing without leaving less or more space? I do not understand what you mean.
4782. Under the poling-boards would be a difficult place to get at to pack? Yes.
4783. And one would reasonably expect to find such spaces? Not the one I am speaking of.
4784. Well, with that exception? I am only speaking of the City Bank.
4785. Well, with that exception? There was more than one.
4786. *Mr. Bavister.*] You are regularly employed by the City Corporation? Yes.
4787. You have a good deal to do with opening up streets and other places for the Corporation? Yes.
4788. Frequently you have to open up places where there have been excavations made before? I have not had the pleasure of seeing places opened up where there had been extensive excavations like this.
4789. But you have had to open up places where there have been some excavations made previously to your attending to it? Yes.
4790. In such cases have you found any spaces between the wood blocks and the concrete or the pavement? I have found them under the pavement, but I think they have been owing to leakage from the Water and Sewerage Board's pipes.
4791. Did you ever open up one that had been down two or three years and find it solid? I never opened up one and found it hollow to my knowledge.
4792. Did you ever open up a place that had been excavated two years or more previously, and found it perfectly solid? I never have opened one, that I can say, after that length of time. I could not state the length of time.
4793. If you have to make such an opening where there has been a previous excavation you expect to find it more or less hollow? I could not answer that.
4794. *Mr. Cook.*] What Mr. Bavister wants to know is if it is not customary to find these subsidences wherever there are water-pipes? I would not say there would not be hollows.
4795. *Mr. Bavister.*] As a practical man dealing with excavations on ground that has been previously disturbed, do you not expect to find it more or less unsolid? I do expect to find it shrunk a little.
4796. *Mr. G. McCredie.*] You have been present when all the timber was taken out of the ground, put in again, and the roadway made good? Yes.
4797. Are you satisfied that there are no hollows there now? I have walked over it many times since, and I cannot say of my own knowledge that I have seen a place that has gone down since we went there in that instance; that is, since the timber was taken away I have walked over a few times backwards and forwards to look for that sort of thing, and I cannot say that I have seen one place where it has shrunk in any way since it was excavated and filled in.
4798. You, as a practical man, consider that taking out the timber and filling in, as done by the Department, have made a good solid job of it—as good as it could be? I am satisfied as to that.
4799. There was a place at the Criterion Theatre that was opened? Yes, and left open for inspection.
4800. Were you there when that was opened? I saw it left opened.
4801. *Mr. Bavister.*] Did you see the hole that was made in the footpath near the "Criterion Hotel" on that face of the building parallel to Pitt-street, and close to the area wall of the "Criterion Hotel"? There was

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no hole there at all. It was packed with half-bricks and sand. There had been a hole, but it had been filled in with half-bricks and sand.
4802. Was the path broken into to enable you to see that? The path was broken by the Telephone Department, and this was in their excavation.
4803. Did you see the hole that had been made in the path near the area wall of the Criterion Theatre on the Pitt-street side? Yes.
4804. Did you see evidence, when you saw that hole in the footpath, that it had been at some time filled up with cement and sand? I did.
4805. *Chairman.*] Were you present when that hole, which has been referred to, was made at the Criterion? No, not when the first hole was made.
4806. Well, when you went to look at the excavation under the footpath was there any hole there under the footpath? They were excavating the footpath when I went there. The excavating was going on by the telephone tunnel people, and they were filling it up and taking away the timber.
4807. They were taking the timber out? Yes, and packing back solid.
4808. *Mr. G. McCredie.*] You said that there were broken bricks and sand round the area walls—that was a sort of French drain, was it not, for letting water out? No. It was unpacked, and filled in with sand. I suppose it was put there to keep the damp away from the wall.
4809. *Mr. Bavister.*] Where were you working on 12th July, 1897? I could not tell you.
4810. Do you remember the opening being made in the road at Park-street? Yes.
4811. Where were you working when they started to do that? Alongside of it.
4812. What were you doing? I was sent there to see what class of work it was.
4813. What class of work what was? Over the tunnel.
4814. *Mr. Cook.*] You were watching the timber being taken out? Yes.
4815. *Mr. Bavister.*] Whereabouts were you watching the timber being taken out? I suppose the place you are speaking of.
4816. It was on the 12th July when they broke through the roadway in Park-street, and on that date you were supervising the work being done opposite the Criterion? Well, I must have been if I was there.
4817. Then there is no doubt about your seeing that hole to which I referred? There cannot be.
4818. It was part of your business to see it? I was sent there to look after things.

WEDNESDAY, 17 *NOVEMBER*, 1897.

Present:—

MR. BAVISTER, | MR. HARRIS,
MR. COOK, | MR. ROBERT JONES.

W. J. LYNE, ESQ., IN THE CHAIR.

A. L. McCredie, Esq., and G. McCredie, Esq., appeared in person in their own behalf.

John Charles Waine sworn and examined:—

J. C. Waine. 17 Nov., 1897.

4819. *Chairman.*] Are you an alderman of the City Council? Yes.
4820. Are you a professional man of any kind? I have been a builder and contractor.
4821. You had something to do with the matter under inquiry—the construction of the telephone tunnels—had you not; at least, you made some reports or statements in connection therewith? I brought the matter before the Finance Committee of the City Council.
4822. What matter did you bring before that Committee? It was with regard to the timbering that I saw left in in Pitt-street, opposite the Civil Service Co-operative Society's new stores.
4823. Above the tunnel? Yes.
4824. Was that the first time you noticed anything that caused you to report to the Finance Committee of the City Council? Yes.
4825. What was it you saw? I may explain that I had tendered for the erection of the Civil Service Co-operative Society's new building, and I just went to have a look at the excavation that the contractor's men were making, and I walked in along the roadway a little way, and then turned round and looked, and wondered what the big drum of brickwork was. It struck me that it was the telephone tunnel. Then I saw the timbering above it—the uprights and the sheeting over it.
4826. What do you mean by the sheeting? The planking—the sheeting that runs from pudlock to pudlock—the sheeting which is holding the soil up above it.
4827. You mean the poling-boards? We do not call it that.
4828. "Sheeting" is the same thing as poling-boards? It is like scaffolding; it may be called "poling-boards" in tunnel-work.
4829. What did you report to the Finance Committee of the City Council? I reported what I saw.
4830. What was that? That the timbering had been left in, and I thought it was a danger to the footpath—that eventually the timber would rot, and the footpath would collapse and go down. I thought there was a danger to the citizens, or to the Council, who, perhaps, later on, would become liable.
4831. Was that the substance of what you reported? Yes.
4832. Did you examine the sheeting minutely? Not at that time.
4833. Did the Finance Committee take any action? If I recollect rightly, I think that I made a request to the Mayor, through the Finance Committee, that he would ask the Acting City Surveyor to inspect it and report at once, and I know he did so.
4834. *Mr. Bavister.*] Can you fix the date when that was done? No, I cannot. I did not take any notes in connection with it all through. I simply saw it and brought it forward.
4835. *Chairman.*] Did you see the work again at this particular spot? Yes.
4836. Was that after the Acting City Surveyor had reported? I think it was, but I would not be sure. I think we had a Council meeting, and there was a luncheon, after which the aldermen, including Mr. Matthew Harris and his brother John, went down and went into the trench, right to the bottom of it, and had a look at it.

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4837. That was in front of the Civil Service Co-operative Society's new stores? Yes.
4838. What did you see on the second occasion? I saw what I saw on the first occasion—pretty well the same thing. My memory is rather defective, but I think that some of the timbers had been removed—I am not quite sure—and some of the packing done.
4839. Did you notice anything in reference to the packing on the first occasion? Yes; there was a little packing.
4840. Did you examine the packing? Not on the first occasion. I did not go down to it at all. I simply stood on the incline roadway, where they were going down into the excavation.
4841. On the second occasion you say you thought some of the timber had been removed? Yes.
4842. Did you examine the packing or the timbering minutely on the second occasion? Not very minutely—only to the extent of noticing the thickness of the boards, and the uprights and the cross-pieces. Of course, from my point of view, it was not packed as I should say it ought to have been packed.
4843. What defects did you see? There were interstices between the brickwork and the sheeting—the under side of the sheeting.
4844. That is between the top of the tunnel and the sheeting? Yes.
4845. By interstices you mean spaces? Yes.
4846. Of any size? Well, that would depend a very great deal on the size of the packing that was in. Of course, if you pack with large stuff it must necessarily leave spaces in between.
4847. Well, what was it packed with? A kind of shale or blasted rock, and in some cases brickbats. I did not notice it very particularly, but I know it was not packed as it should have been packed—at least that was my idea.
4848. Did you see any considerable spaces? Not so much there as I did subsequently.
4849. Will you tell us at what spots you examined the tunnel-work afterwards? I examined it at the corner of Liverpool-street and Pitt-street. I went down there with the aldermen. We all went down to a place between Goulburn and Liverpool streets, and also in front of the Natatorium, and at Park-street.
4850. What did you see at those places? I saw large cavities.
4851. Which spot are you describing now? More particularly at the corner of Park and Pitt streets.
4852. Are you referring to those cavities that were exposed by the removal of the concrete? Yes; by the removal of a portion of the concrete, to show where the concrete was hanging by itself.
4853. You saw them, I suppose, after the removal of the concrete had taken place? Yes.
4854. Had you anything to do with making the report which caused the breaking through of the concrete? No, I had not.
4855. Then all you saw, I presume, was what has been described in evidence already—the spaces beneath the concrete as exposed? Quite so.
4856. At any of the other spots you have described in your evidence, did you see what you considered to be bad work? Yes. The day when the aldermen all went down in a body, I think it was, at the corner of Liverpool-street and Pitt-street, and further down Pitt-street as far as Goulburn-street.
4857. What did you see at these places? I saw that there was no packing at all in some cases between the crown of the arch and the timber.
4858. Did you make any report in reference to these matters to the Finance Committee, the City Council, or anyone? No; except in regard to what I saw the first time in Pitt-street, when I brought the matter before the Council. After the Mayor had obtained a report from the Acting City Surveyor, he, and I think a majority of the aldermen, saw that it was a serious matter in regard to the footpaths, and then the whole matter was taken in hand, and dealt with, and there was no necessity for any further reports or comments upon it so far as I was concerned.
4859. Mr. Mainer, in giving evidence, was examined by Mr. Cann, as follows:—

4477. Did you ever interview any of the aldermen in reference to the work? No. An alderman interviewed me first. I did not run about after these people.
4478. Did an interview take place between you and some of the aldermen in reference to the work? No. I had an interview with one alderman, or rather, he sought an interview with me, with reference to the work. I never was in company with two aldermen at one time with respect to it.
4479. *Chairman.*] What alderman was that? Alderman Waine.
4480. *Mr. Cann.*] Then, as a matter of fact, the agitation that took place on the information acquired by Mr. Alderman Waine was really on information obtained from you? No; that was not the case—in fact, Alderman Waine sprang something on me. I think that the honors should be divided in this respect between Jack Waine and myself.

That is the evidence given by Mr. Mainer;—did you have an interview with Mr. Mainer? It was not an interview actually, or it was a promiscuous one, if you put it in that way. Mr. Mainer met me at the corner of Park and Pitt streets, whilst the excavation in Park-street was open. There were lots of people standing about there, as you are aware, and naturally I passed there on my way to the Town Hall, and as I had had something to do with the matter I was very much interviewed by all sorts of people.
4860. Did you seek an interview with Mr. Mainer? Oh, dear, no.
4861. He says that you sprang something upon him;—do you recollect what it was? I do not recollect anything.
4862. You and he had a conversation in reference to this telephone tunnel? Yes; we were talking about it, of course.
4863. But, so far as you can recollect, it was not of an important character? No; nothing further than it might be with anyone else that might come along and speak to me.
4864. Did you make any report to any officer of the Water and Sewerage Board? No.
4865. Nor to any member of the Board? I do not know that I did. I have no recollection of it. Of course, it would be some time ago.
4866. Did you see the footpaths in any part of the city over this tunnel injured in any way, or which had given way? Oh, yes.
4867. Where? In front of Richardson and Wrench's. I saw it where a strip had been cut out and repaired.
4868. Did you see it opened? They did not go right down to the tunnel, if I recollect rightly.
4869. How far did they uncover it, then? They simply cut a strip, if my memory serves me rightly, out of the centre. It had deflected from the kerb to the centre a little bit, and also from the building-line to the centre a little bit, and it had cracked, and they cut a strip out. The sides were raised, and then a piece was put in in the centre.
4870. Was it put in with concrete? The same material that was cut away. 4871

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4871. Was there any other place that you saw? Not particularly, but I noticed that the footpath generally in Pitt-street from Moore-street to Hunter-street was in rather a dilapidated condition. That may or may not have arisen from the tunnel underneath.
4872. Are you a judge as to the life of timber placed in a position like that? Well, it would make a great difference what class of timber it was.
4873. Do you know what class of timber it was? No; I would not like to express an opinion on that, but there are many classes of hardwood. I know there was a piece taken up in Pitt-street—one of the sheeting-boards—between Liverpool-street and Goulburn-street, and that the dry-rot had set in. I took it out myself.
4874. *Mr. Cook.*] Is that the piece you dragged across to the City Council? I did not drag it across to the City Council.
4875. It was taken there? Yes, it was.
4876. *Chairman.*] Can you form an estimate of the life of the timber you saw there? It is difficult to say. Under certain conditions it might last a number of years, but under other conditions it might not. I would not be prepared to pass an opinion with regard to that.
4877. Are you a member of the Builders and Contractors' Association? I have been a member of the association, but I think it was only the other day I got a letter in which they threatened to sue me if I did not pay up two or three years' fees. I have not been in the association's place for twelve months. I never go near them.
4878. Had you any conversation with any members of the association, as members of the association, or in any way, about this matter? No—well, not as members of the association. You can naturally understand that the association, being so close to where the place was kept open such a long time in Park-street, and I walking down and standing there to have a look, I would necessarily come in contact with a good many of them. Having been a member of the association for nearly twenty years, I know a good many of them, and they would speak to me.
4879. Did you in any way act in concert with members of the Builders' and Contractors' Association in this matter? Decidedly not.
4880. Did you ever attend any meeting? No, never. All I did was as an alderman of the City of Sydney, and, as I thought, in the interests of the people I represented.
4881. Did you think, from what you saw, that the interests of the City Council were likely to be jeopardised in any way? Undoubtedly; otherwise I would not have brought the matter forward. I think that subsequent action proves that it was so.
4882. Do you know anything about some photographs that were taken? Yes; I saw them.
4883. Were you there when they were taken? No.
4884. Are these the photographs? I believe so. They look similar.
4885. Did you see the spot where they were taken? Yes. No. 1 photograph, I think, represents the spot where I first saw it. It was what I saw there that caused me to make the complaint. That photograph represents it as it was when I first saw it.
4886. Do you know whether this photograph represents the state of the packing when you first saw it? Yes; that is just about the same.
4887. When you saw it had the men who uncovered it, or exposed it, done all the work they were going to do, or did they do any work there afterwards? I can hardly tell; but if my memory serves me rightly, I believe that that photograph was taken thirty or forty hours after I made the complaint in the City Council.
4888. Well, can you tell us whether, when you saw the work, it looked as though any of the packing or the earth over the top of the tunnel, as shown in that photograph, had been removed? No, it did not show so; but I can readily understand that it would give way when they were excavating down—if there were any there it would give way.
4889. *Mr. Cook.*] Do you not know that there was some? I do not know if there was. The excavation had been done then.
4890. *Chairman.*] When you saw it were you aware whether any packing had given way or had been taken away? No; I was not aware of it.
4891. *Mr. Bavister.*] You say that when you left the Civil Service Co-operative Society's new stores you all went down to Liverpool-street? We did not go to the Civil Service Co-operative Society's new stores the same day. We left the Town Hall after the Council meeting.
4892. Is that the occasion when the whole Council went? Yes.
4893. You have made reference to one piece of sheeting-timber or poling-board having been found which showed evidence of dry-rot? Yes.
4894. Would you consider it a strange thing for one piece of such a quantity of timber to show dry-rot? Oh, dear, no; I would not.
4895. If you had been doing that work yourself, or it was being done for you as a contractor, would you have given instructions to throw that piece of timber out, and not to use it? Oh, dear, no. One might not have noticed it, possibly. It was the only piece I saw.
4896. To what extent was it affected by dry-rot? I suppose 2 or 3 inches from the end.
4897. So that, unless it were being specially looked for, 100 different persons well acquainted with such work might have seen that piece of timber, and not have detected the dry-rot? I would not say that.
4898. Was it so slight that a considerable number of persons might have seen it without detecting it? Yes; that may be so.
4899. For instance, you, with your experience, might have passed that piece of timber, and, unless it had been laid in one, particular position it would hardly be possible for you to see the dry-rot, I suppose? Well, I do not know; it would have been quite possible—in fact, quite probable.
4900. It would have had to be laid with the particular portion affected exposed to view? Undoubtedly; you could not have seen it otherwise.
4901. Without there being any attempt to conceal it, you might have passed it a number of times without its attracting your attention? Yes, that is true.
4902. In speaking of the excavation made for the Civil Service Co-operative Society's new stores, was that excavation down to its depth on the occasion of your first visit? On one side I think it was—on the northern or north-western corner.

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4903. That is next to Hagon's? Yes. I think it was very nearly down there, for the underpinning had been done under their corner, and, of course, the underpinning would start from the bottom.
4904. The excavation was continued right up to the side wall at the foot of the tunnel, was it not? Yes, I believe it was.
4905. So that, no matter how it had been packed, would not the fact of the earth being removed at the foot make it impossible for any packing to remain on the haunch of the tunnel? Yes, I believe so; yes, it could not stay there—in fact, the haunch would have been removed.
4906. Do you know whether the area walls of that building extend right up to and actually touch the tunnel? I think they do, but I am not sure. I am, of course, speaking only from memory.
4907. Is Alderman David Davis a member of the City Council? No, he is not.
4908. Was he present at any of the visits of inspection to which you have referred? I do not think so; not with the City Council.
4909. You made reference to some visit paid to Liverpool-street, near the swimming baths;—was not Alderman Davis present on that occasion? No. The Acting City Surveyor was with me on that occasion.
4910. Alderman Davis and you have had some conversation about this business, have you not? Yes; we have met, and naturally have had conversations, as I have with many other people—scores of them.
4911. One of the witnesses, Mr. Mainer, wishes to divide with yourself the credit of attracting public attention to this matter;—do you consider that either yourself or Mr. Mainer displayed more interest in the matter than Alderman David Davis has done? I do not know. I do not take a great deal of notice of other people's actions. It is quite enough for me to steer my own line of conduct and course in this world.
4912. But I think you told us that Alderman Davis and yourself have had conversations about this business? As I say, also twenty or thirty others.
4913. Do you consider, so far as you can judge from the conversations you had with him, that he displayed as great an interest in this business as you yourself have done? Possibly more.
4914. I want your opinion—not the possibility;—do you think that he displayed as great an interest as you yourself did? I really took no notice of Mr. Davis as to whether he displayed a great interest in this kind of thing. I know that personally I was actuated by what I thought was the public danger, and I brought the matter forward in my capacity as an alderman.
4915. *Mr. Cook.*] From purely patriotic motives? You may smile, but that is a fact.
9416. *Mr. Bavister.*] Feeling that the public interest was affected in this matter, would you not naturally discuss the affair with those whom you saw were also taking an interest in it? No, I did not—at least, not to a very great extent. I think that I spoke to Alderman David Davis about it once, and once only. Until yesterday, at the cricket match, I do not think I have seen him to speak to for four months.
4917. Is it more than four months since this subject first came under public notice? Oh, yes; I think it is six months.
4918. To gain anything like a fair impression, would it not be better for this Committee to know whether you have spoken to him on more than one occasion during the last eight months? On one occasion, and one occasion only, during the last eight months; and that will cover the whole period.
4919. Had you any communication with any of the city officials or workmen about this matter? Not at the time, but subsequently.
4920. Who were those persons? The Acting City Surveyor and the Inspector of Pavements.
4921. Was the statement of the Inspector of Pavements correct when he informed this Committee that he owed his position to your recommendation? Not exactly; it was half correct and half otherwise. Sir Wm. Manning was in the chair when this new Pavement Department was started, and as I was just completing the Lands Office he asked me if I knew of a good man for the new position he was having created, and I and Alderman Dean recommended Mr. Browne, and I think it was on our recommendation that he got the position.
4922. Did Mr. Browne work for you on the Lands Office? Never. He never worked for me in his life.
4923. You knew him as a member of the association? Yes; and as a contractor, who had done stonework and foundations.
4924. Had you any conversation with him as to watching this work while the timber was being taken out? No; I cannot say that I had, but I may have done so. He would not require to receive instructions from me—in fact, he would not receive any instructions from me; they would be from the Mayor.
4925. I am not speaking in the sense of your giving him instructions, but any official of the Council would be bound to pay civil attention to the remarks of any of the aldermen, would he not? I suppose he would.
4926. He would have to hear what he said, but would not necessarily take instructions from him? Quite true.
4927. Still it would be something rather strange if, for instance, the Inspector of Pavements refused to carry out any suggestion made by yourself? I do not think he would carry out any suggestions made by me without the sanction of the executive head—the Mayor—or his superior officer, who would then be the Acting City Surveyor.
4628. Was the packing to which you have referred done in as good a manner as you would have similar work packed if you were doing it by contract for the Government or any other client? That is a peculiar question to ask.
4629. We are investigating a peculiar business? You know that there are contractors and contractors, and there are workmen and workmen.
4630. Would you discharge a workman for doing such packing for you? If I knew of it, yes, I would.
4631. Why? Because I consider that what I saw was not packed at all;—there could not be any packing.
4632. Do you refer to the spot opposite the Civil Service Co-operative Society's new stores? I refer more particularly to Park-street, and that portion down below Liverpool-street in Pitt-street.
4633. *Mr. Cook.*] Do you tell the Committee that Park-street was not packed at all? No; I do not say that.
4634. But you did? I do not wish you to understand that, because there was packing in a sense; but I want to convey that there were spaces between the packing and the underside of the concrete.
4635. *Mr. Bavister.*] I want to get an answer as to the packing itself, not as to any subsidence above that, and I should like first to deal with the position opposite the Civil Service Co-operative Society's

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new stores;—was the packing that you saw left in, done in such a manner as you would have considered satisfactory if you had been executing the work? No; I would not have considered it satisfactory.
4936. And are we still to understand that if a workman in your employ had been found by yourself putting in packing in such a manner as that was put in, you would have discharged him? I did not say that I would have discharged him, but I would have reprimanded him, and would have wanted the work done properly.
4937. It was not so bad as to induce you to discharge a man for doing it in that manner? You know it is very peculiar how an employer will act sometimes. If his liver is a little bit bad he will sometimes sack a man without rhyme or reason.
4938. You have done a large amount of work, have you not? Yes, I have.
4939. Has much of it been work underground where excavations had to be filled in over the work completed? No; not a great deal. There was a good bit of it round the Lands Office. There is a rocky spot under a great portion of the footway near the Lands Office.
4940. Was that done by open-cut or by tunnelling? By open-cut.
4941. In your opinion, can work done in open-cut be finished in a more satisfactory manner, with less liability to subsidence or settlement, than work done in tunnel? Undoubtedly. That is where I cannot for the life of me understand why this work was ever done in tunnel.
4942. In the work you have done by open-cut, a great deal of drain-work would come under your notice;—have you ever known packing to be so tightly rammed as to show no indication of settlement afterwards? It would all depend how far it was from the surface.
4943. Have you ever known it to be so tightly rammed as to show no settlement? Oh, dear, no; it will show settlement—it must.
4944. Having regard to the answers given by you to the last few questions, do you think that this work was done in an ordinarily passable manner;—was it up to the standard of such work as is usually done, say, under contract? No; I do not think it was.
4945. Do you think there was a very great margin of difference between the way it was done and the general standard of contract work? I will not pass an opinion on that; but I do think there was a big difference between the way it was done and the way it should have been done.
4946. Are you in favour of the Government doing such works without the assistance of a contractor? It does not trouble me whether they do or do not. I may point out that, to a very great extent, my answer to that question is that I advocated and voted for day-labour on a portion of the excavation for the George-street Markets.
4947. With the experience gained since that vote was given, the Markets, or a very large portion of the work in connection with them, having been done by day-labour, and you, as an alderman, having had an opportunity of watching it, would you again give such a vote? I would for that class of work.
4948. Are you of opinion that some large works can be done as cheaply and as efficiently by day-labour as by contract? Yes; I believe that.
4949. *Mr. Harris.*] You say that after you went to the Civil Service Co-operative Society's new stores, and saw this work, you came to a Committee meeting of the Council? No; it was not a Committee meeting, but a monthly or a quarterly meeting.
4950. Did you introduce a resolution that a letter be sent to the Postmaster-General, calling his attention to the state of the tunnel? Yes.
4951. Are you aware whether any answer to that letter was received? I believe that a letter was sent, and that a reply to it was received.
4952. And it was stated that everything would be put in proper order? Yes.
4953. What time after did you see the Park-street–Pitt-street opening? It must have been pretty well a fortnight afterwards, I think—at least some days afterwards—possibly weeks.
4954. Do you know at whose instigation that was opened? No, I do not.
4955. Who told the Mayor to open the street? I do not know that anybody particularly told him. I am not aware that anyone told him to open the street. I think that I asked him to go up with me, and stand on the blocks when vehicles were going over it.
4956. That was because there was a rumbling noise where the street was afterwards opened? Perhaps that was the cause of its being opened.
4957. How long had the opening been made when you saw it? I did not see it until the next day.
4958. Then you could not say whether the packing was there or not? Oh, yes; it had never been touched. I am speaking of the cavity between the top and whatever the packing was.
4959. Were you there when the timber was pulled out? No; I was not there when the timber was pulled out of Park-street.
4960. Then you could not tell how the packing was under the timber? Oh, no. I did not see the timber pulled out.
4961. You do not know whether any packing was there or not? I did not refer to packing in Park-street at all, but only to filling. I did not see the packing at Park-street.
4962. Then in regard to the packing opposite the Civil Service Co-operative Society's new stores, what state was that in when you went down to see it first? As I have said, I had tendered for the erection of that building, and I simply would walk casually along, and I stepped on to the gangway going down into the excavation to have a look round. That was about a quarter to 12 midday on Thursday, and there was a Finance meeting that afternoon at half-past 2, and what I saw then I thought quite sufficient for me to bring the matter before the Council as one of urgency. You were there and heard what I had to say about it.
4963. Do you know if any blasting was going on there? Yes; no doubt there was, for there was rock there.
4964. Would that have shifted any packing at all? The tendency of the vibration would be to shift it.
4965. And if rock was taken away, the whole thing would come down? Of course it would come down; there was nothing for it to stay to; the haunch would be taken away.
4966. Did you ever tell the Acting City Surveyor anything about the telephone tunnels;—did you ever complain to him that the tunnels were not constructed properly? No; not that I know of. I may have said that the timbers should not have been left in, but should have been withdrawn, and I still think and say so.
4967. Did you ever hear that the timber was going to be taken out when the work was finished? I did hear something about it some time afterwards—when the trouble had arisen. 4968.

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4968. *Mr. Robert Jones.*] You say that a bad piece of planking was in position? Yes; that is right.
4969. Will you tell the Committee whether in your opinion the dry-rot was in that plank before it was ever placed there;—was it a doze in the tree before the tree was cut, or was there a doze in it before it was placed there? I am not sufficiently an expert in timber to pass an opinion upon that.
4970. But I want your opinion? Well, my opinion is that it was not in the plank when the plank was put there.
4971. You mean that the doze or rot came after the plank was placed there? I think so.
4972. You say that you saw the timber outside the Civil Service Co-operative Society's new stores, and you also said that the timber ought not to have been left there? I think that.
4973. Would you tell the Committee how you would have done that work by tunnelling without leaving the timber there? I would not have tunnelled at all.
4974. But if it had to be tunnelled, how would you have done it? I should have done it the same as the Government had to do it subsequently.
4975. How would you have done it, and left it without the boards? The same as it is done now.
4976. In view of the fact of its being done by tunnelling, how would you have done the work in any other way than by leaving the boards in? The depth was so slight between the pavement and the top of the tunnel that I would have done it the same as they have done it now, and taken the timber out and covered it up.
4977. Well, considering the fact that it was done by tunnelling—we will say that it was compulsorily done by tunnelling;—how would you have avoided leaving the timber in: how would you have done the work in any other way than it was done in this respect? In putting the tunnel in, the Department wanted to obviate as much as possible inconvenience to the traffic, and I say that I would have withdrawn the timber by opening the top and afterwards filling it in.
4978. Well, then, where would have been the necessity of doing it by open-cut? They did the work by open-cut in Castlereagh-street.
4979. Do you think it was a cheaper system by tunnelling? No.
4980. You think it would have been much cheaper and easier, to make a better job of it, to have done it open-cut all through? I do.
4981. Have you ever seen a tunnel constructed with so little depth of ground above the crown of the tunnel to the surface as that has? No.
4982. In reference to the packing opposite the Civil Service Co-operative Society's new stores, if a witness has already sworn here that he saw the packing removed from there, and he himself removed a portion of it, would that be correct? I would not contradict him. I say distinctly that, with the haunch coming down, it could not stop there, but must also come down.
4983. As a matter of fact, the work that was being carried on by the contractor for the new stores, being in very close proximity to the work of the tunnel, was it possible for him to leave the packing in and do his work? No; I do not think it was.
4984. You think, then, as a matter of fact, he must have removed that packing to carry out his work? If there was any there, yes; but I would not say whether there was any or not.
4985. As a matter of fact, when you saw it you could not tell whether there had or had not been any any packing there? That is quite true.
4986. So your statement that you saw no packing there would be of no effect at all? I am not going to say anything about that.
4987. In reference to Park-street, do you think that the fact of the packing underneath the poling-boards being badly done, or there being no packing at all, would have had anything to do with the earth giving way from the bottom of the concrete slabs? No; I do not think it would. Only it must have been taken out before the boards were put in.
4988. In view of the fact of there being about 3 feet of earth between the poling-boards over the excavation and the subsidence under the concrete slabs, how could those who did the excavation have taken out that top piece? It might have been taken out before the boards were put in.
4989. How could the men underneath there interfere with the stuff above? It is possible they may have excavated too high for the height of the uprights that carry the ledges that the sheeting goes on, and there may have been a cavity between the top of the sheeting and the amount of excavation that was done, and this may have come down on the sheeting.
4990. Did you notice the earth round a quantity of pipes or water-mains that were there? Yes; I saw the water-mains on the side.
4991. Did you notice how the earth was packed round them? Not particularly.
4992. Did you give it enough attention to be able to say whether it was well or badly packed? I did not put my rule to it, or take any measurements; but only took a casual glance at it.
4993. Did you give it sufficient attention to notice whether it was well or badly packed round the mains, or whether there was any packing at all there? I did not notice them particularly. They may have been badly packed or very well packed.
4994. For all you know, around those mains may have been badly packed? Yes; may have been.
4995. Did you arrange at any time to meet Mr. Mainer specially in reference to this work? No.
4996. He says he thinks that the honours between him and you were about equally divided in regard to your watchfulness of this work? I did not make any arrangement to meet him.
4997. Is Mr. Mainer right in saying that he and you were very vigilant in your watchfulness of it? Mr. Mainer is a very peculiar individual, you know. Of course, as I said before, as an alderman I naturally thought that it was my duty in the interest of the ratepayers whom I represent; I had no other motive.
4998. Would there be any truth in Mr. Mainer's statement that he and you had arranged to very carefully watch this particular work? Not in the way he puts it. There was nothing special. I no doubt did meet him, as I did scores of others at the inception of the thing, and no doubt we may have said that we would watch the thing and follow it up, but there was nothing special about it.
4999. You told the Committee you saw it in a very bad condition between Moore-street and Hunter-street? Yes, the footpath.
5000. It had dropped considerably, and left the footpath in a very bad condition? Yes.
5001. Do you know if that portion was done by contract, or by day-labour? I believe it was done by contract, but that fact did not actuate me.

5002.

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5002. Did that portion specially take your eye as being badly done? Yes, it did. Of course I do not know whether the timber was left in, or whether the packing was done. It merely took my eye that it was badly done, on account of the way the footpath was giving way.
5003. Have you been in the habit of visiting the quarters of the Builders' and Contractors' Association at all? No; I have not been there for fully twelve months. I have hardly ever gone there since I started the Lands Office. I do not suppose that I have been there half a dozen times during the last six years.
5004. *Chairman.*] Can you tell the Committee what large works you have done? I did the Lands Office.
5005. *Mr. Bavister.*] Had you a partner associated with you then? Yes.
5006. *Chairman.*] What other large works have you done? I did the Central Wharf wool stores; I did the brick and stone work in Dickson's Tobacco Factory; I did the brick and stone work in the Equitable Building, at the corner of Park and Pitt streets; I did the brick work in the new wing of the Deaf and Dumb Institute, Newtown-road; I did the first half of Mark Foy's, Oxford-street; and I did Fletcher's, in Oxford-street. I have been carrying out works for about twenty-one years on my own account, and I have been at the trade since 1866.
5007. Did you ever hear, in connection with the City Council and this work, that the Council required the work to be done by tunnelling? Not that I am aware of.
5008. Did you ever hear it spoken of at any Council meeting? Never.
5009. Was any resolution to that effect ever passed? Not while I have been there, and I have been there for six years—at least I never heard of it. I was away, when I went Home, in 1893.
5010. Do you know anything of it? No; I know nothing of it. I will not say it is not so, but I do not know of my own knowledge.
5011. In reference to your replies concerning the packing opposite the Civil Service Co-operative Society's new stores, do you refer to the packing down the side of the tunnel? Yes; of course I do.
5012. Do you, or do you not, refer to the packing between the poling-boards and the surface as what might possibly have been partly taken away;—you said it was possible that when the men were excavating that on the spring of the arch the packing or ramming would come down? That is true.
5013. What I want to know is, whether that would take place between the sheeting and the surface? It would, to a certain extent; but not to the same extent, for one has a shelving surface, which would have a tendency to bring it away.
5014. How would it affect the filling between the poling-boards and the surface, by taking the side away? That would slope off from the top of the poling-boards up to the surface of the pavement.
5015. Then do I understand you to say that the effect of moving the earth that was alongside, that would be to let down a portion of that packing or filling? Undoubtedly. It would go back until it came to a certain angle.
5016. You said that if you had been doing the work you would have done as the Department has finally done, that is to remove the timber? Undoubtedly.
5017. Would you have drawn the timber when the work was completed up to a point where you could have drawn the timber? Yes.
5018. That is what you meant? Yes. Because you could have used the timber over again.
5019. How would you have drawn the timber;—what method would you have adopted? I should have adopted the same method as I explained to Mr. Jones; it is the quickest method. I mean the method that has been adopted since the completion of the work. I mean taking the timber out, whether it is called drawing or lifting it.
5020. Do I understand that with such a small distance between the boards and the surface of the ground, you would have opened above the boards, and taken the boards out in that way? I would.
5021. And that is what has been done? Exactly.
5022. *Mr. G. McCredie.*] You stated to the Committee just now that you had had several large jobs in Sydney;—have you ever been interfered with while carrying on those jobs before they were completed—had them taken possession of or adversely criticised? I do not think so.
5023. Is it a usual thing to interfere with work before it is completed? No; it is a very unusual proceeding, unless there is some reason for it. There must be some good reason for it, or it would not occur.
5024. Do you know whether this work was or was not completed when the City Council took the steps they did take which you explained? I could not pass an opinion upon that; but from my point of view it looked as though it was completed, from the fact that in certain places they had made the footpath good where there had been subsidences—for instance, in front of Richardson and Wrench's.
5025. With reference to the place in front of Richardson and Wrench's, are you aware that the City Surveyor took possession of that from the contractor, and the contractor was liable for any sinking that might take place within a certain time? I do not know that as a fact, but I imagine it would be so.
5026. It is a customary thing for the Council to do, is it not? Yes, that is quite true.
5027. Hence there will be no loss, as far as regards the Council or the Government, in making good any settlement under a contract? That depends, for it only extends over a certain time.
5028. The responsibility ceases with the Government when the City Council take it, on that ground? Yes.
5029. *Chairman.*] Supposing the City Surveyor took possession of that defective work in front of Richardson and Wrench's, and if that was within the time during which the contractor was liable, the contractor would pay for the work done by the City Surveyor—or would the Corporation pay for it? The contractor would pay for it.
5030. *Mr. Bavister.*] It is asserted that all repairs to a footpath necessitated by the proceedings of a contractor in executing his work—any failure after the completion of the building, and when the street has been taken over by the authorities, would be made good at his expense;—if the contractor, is, however, not resident in New South Wales, how do they provide for that condition being carried out? I really could not tell you; but I am of opinion that the architect or the engineer, as the case may be, would have the contractor under his control, and before the contractor received his final certificate for payment, he would have to produce all the necessary vouchers, &c., and the architect or engineer would see that the contractor left the footpath the same as it was when he took possession.
5031. But it has been stated by you that the contractor incurs the responsibility of maintaining it in repair for a certain period? No, not in regard to all the footways. I was speaking more particularly of the

the particular contract by Chambers and Grocock, which was all under the footpath from end to end. With a building contract, where you are using the footpath, you have to leave it the same as you found it—that is, to the satisfaction of the Inspector of Pavements. J. C. Waine. 17 Nov., 1897.

5032. *Mr. G. McCredie.*] Dealing with the matter of the footpath, I understood you to say that if you had had your way in carrying out that work you would not have tunnelled it? I would not.

5033. You would have worked it open-cut? I would.

5034. You are not aware the Council insisted on tunnelling? I do not know it; I know nothing at all about it.

5035. You would take it that the engineer in charge of the work is best able to judge as to whether the work is completed or not? Undoubtedly.

5036. And in carrying out your contracts under different architects, before the work was handed over, you received a final certificate? Quite true.

5037. In bringing this matter before the City Council, did it ever strike you that it would have been a fair and legitimate thing to inquire if the work was completed and handed over to the Government? It looked to me as though it were completed so far as Pitt-street was concerned.

5038. At the same time, you admit you could not tell without being conversant with the work? No, I could not tell. But the portion near the Civil Service Society's new stores had been done ten or twelve months.

5039. The brickwork had been completed so long;—perhaps you are aware the brickwork was completed, so far as it could be done, in order to get the cables in? I do not know anything about that.

5040. As a builder, you will be able to tell the Committee whether it was absolutely necessary to start immediately the brickwork was completed to open up the street and make good the filling;—could the work of putting the cables in the tunnel go on without opening up the street and making the filling good? I have no doubt it could.

5041. That is work that could be done afterwards? Yes.

5042. You also stated that there was no serious settlement in the footpath except in front of Richardson and Wrench's? That is about the only one that I noticed.

5043. And when you first took an active part in connection with this matter was, I think, in regard to the work opposite the Civil Service Co-operative Society's new stores? Yes.

5044. Are you aware whether at that time the Department were or were not removing the timber with the object of completing the work? I did not know they were taking it out.

5045. In connection with the packing by the side of the tunnel and over the haunch, we have had evidence given to us by the foreman who had charge of the excavation for the Civil Service Co-operative Society's new stores, and I suppose you would admit that that man would know exactly what was done while he was excavating for the contractor for that building? He ought to, undoubtedly.

5046. And if he stated that he ordered not only the ballast packing to be removed but also the timber to be taken away, and that the timber struts were removed to let them get on with their building, you would take that as being a correct statement? But the timber is there now.

5047. He says the contractor put that timber there—the uprights? I expect they were too far over on the building line, and he had to shift them back to the tunnel.

5048. You think that would be a fair and reasonable statement? Yes, I can understand that.

5049. So that if your inspection took place after this was taken away, as the foreman states in his evidence—he says he took the packing away, and that the timber was removed by their carpenter—your opinion would not be a fair one as regards the work that was carried out by the Department? No. There is no doubt that it would make it look a great deal worse than it was previously. It would not improve the look of it.

5050. This man, in giving evidence, makes a statement in reference to it before he removed it, which would have been the proper time to have seen it and formed a correct opinion. At Question 4248 he was asked:—"You have had a good deal of experience in that sort of work?" and he said, "I have done a lot of drives for contractors, but it is not for me to say anything about them, for I have to live amongst contractors; but I never packed any as good as that was done." That is, prior to his taking it out. You would take it that if that man were appointed ganger by the contractor, to look after the excavation for the Civil Service Co-operative Society's new stores, he would be a capable man or he would not have been appointed to that position? I think so.

5051. And he ought to understand what he is talking about? He ought to.

5052. You are a member of the Builders' and Contractors' Association, are you not? I suppose I am, but I have not been there for a long time.

5053. Here is an article which appeared in a paper called *Liberty*:—

> As announced in the last issue of *Liberty*, the general council of the National League recently determined to take active steps to oppose the extension of the day-labour system introduced by the Minister for Works, and appointed delegates to co-operate in the matter with other organisations which might be interested. The result was that the Builders' and Contractors' Association and the Chamber of Manufactures extended invitations to the league to join them in the matter, and it was decided to hold a meeting under the joint auspices of these bodies and the Government Contractors' Association, at which a paper on the subject should be read.

You will understand from that that there has been a sort of combination of those three bodies for the purpose of upsetting the system of day-labour as carried out by the Government;—do you know anything about that combination, or were you one of the delegates? I was not one of the delegates, and I know nothing whatever about it.

5054. *Liberty* is the recognised organ of the league? I am not a member of the league, and I know nothing about it.

5055. Do you know who were the delegates appointed to upset this system of day-labour? I do not. I took such little interest in it. Virtually, I have been out of the trade for nearly five years.

5056. In connection with the vacancy that you say occurred under the concrete in Park-street, you did not examine the packing round the hydraulic pipes? Only cursorily from the surface.

5057. Do you know how many pipes went through that? No, I could not say. I thought there was a water pipe, a Hydraulic Power Co.'s pipe, and I am not quite sure as to whether there was also a gas pipe.

5058. You were not there when it was opened up for the purpose of filling in? No, I was not.

5059. You would not be surprised to know that there were fourteen pipes there? I do not know.

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5060. Do you know whether it was tunnelled, or whether it was opened up from the top, to put those pipes in? I could not tell you whether it was tunnelled, or opened up from the top, or how it was done.
5061. Do you think it was possible that those pipes could have caused the settlement under the concrete? Not right across as far as this went. It might have done so in the immediate neighbourhood where the pipe was.
5062. I suppose you know that the Hydraulic Power Co's. pipe runs right across? I thought that the Hydraulic Power Co's. pipe and the pipes I have spoken of were on one side of the tunnel, and not over the centre.
5063. Do you know of any other holes that have occurred in Sydney where pipes have crossed the street, where a similar depression has taken place under the concrete, where there was no tunnel at all? No, I do not know of any such place.
5064. You never heard of any? No.
5065. Did you hear of a big hole being discovered on Monday, the 8th of the present month, of a similar nature to that underneath the concrete, where there was no tunnel, and pipes went across? No.
5066. You would not be surprised? No.
5067. You think it is possible, if these pipes leaked, for them to have caused a depression there? Oh, yes; there is no argument against that. It will break it away somewhere unless you surround it with concrete entirely.
5068. It is a matter, I suppose, that cannot be guarded against; you could not guarantee that no settlement would take place with tunnelling of any description? No; unless, of course, you are tunnelling through rock, and even then it will give way sometimes.
5069. Have you ever been in this telephone tunnel? Never.
5070. You never inspected it? No; I got so sick of it at the beginning that I was very glad to keep away from it. I got nearly badgered to death about it.
5071. Do you think that if the City Council sent a letter to the Department insisting on the work being done underground? I did not know that there was such a letter.
5072. At Question 1302, Mr. Cook asked the Mayor of Sydney the following question:—

I have here a letter, under date 13th May, 1895, from the Town Clerk to the Deputy Postmaster-General; it is in these terms: "Sir,—In reply to yours of 3rd inst., *re* the construction of the second section of the underground tunnel for telegraph and telephone wires along Pitt-street, I have the honor to inform you that permission is granted for the street to be opened up without prejudice to the rights or the future requirements of the City Council, and conditionally that the work be proceeded with as may be directed by the Corporation, and all operations carried on underground, and disturbed surfaces made good to the satisfaction of the City Surveyor";—do you know anything of that letter? No; that is the first I have heard of it.

? This is the first I ever heard of it.
5073. If the City Council sent that letter, and if you had been the engineer in charge of the work, would you not have thought they intended all the work should be carried on underground? To my mind, that letter is rather ambiguous, for it says something about making good disturbed surfaces.
5074. If that letter were followed up in connection with that particular contract, by the contractor having to make arrangements with the City Surveyor as to where his man-holes were to go down, that would convince you, as the engineer, that it was intended that all the work was to be done underground? Yes, of course. The subsequent action of the City Surveyor or his deputy would, as you say, confirm the letter.
5075. Do you think that the City Council did right in insisting upon that work being done underground? No, I do not; I say it should have been done open-cut.
5076. And you think that the method that has been adopted for taking the timber out, under the conditions of that letter from the City Council, has resulted in a very good substantial job? I do.
5077. The best possible job that could be made under the circumstances? Yes, now it is.
5078. With reference to Park-street, do you know that when the Park-street opening was made, the Department's men were taking out the timber;—do you know that prior to the Corporation taking possession of the work and opening up Park-street, the Department's men were proceeding to take out the timber? I believe they were further down.
5079. Do you know they were working in front of the Criterion Theatre? I believe they had been, but I do not think they were at that time. They came up to there and stopped there, I think.
5080. Were you there when Park-street was opened up? No; I saw it the next day.
5081. You have had a good deal of experience in connection with concrete work;—you saw the thickness of the concrete spanning over the tunnel? Yes.
5082. What thickness was it? I should say from 10 to 12 inches.
5083. Did you think there was any immediate danger of a collapse in Park-street? Well, that is a question that it is very hard to answer. One man might be of a nervous temperament, and he might say, "Yes," whilst others might say, "You can take all the packing out, and the concrete will form an arch that will carry all the street traffic."
5084. You, as a practical man, knew the strength of that concrete, and as a practical man do you think there was any immediate danger? It all depends on the weight of the loads going over.
5085. You know there had been considerable loads passing over Park-street, was there any crack in that concrete that indicated that it was going to collapse? I did not see any.
5086. If you had that concrete as a bridge or arch to cross over, what weight would you think it would be safe to carry over it? It is very problematical what it would carry. The curve of the road is not a very great deal from the crown of the road to the gutter, and I could not pass any opinion as to the carrying capacity of it. It has evidently carried some very heavy loads.
5087. Do you think it would have lasted until next day when the Department's officers would have had their men working at it? Yes, I believe it would.
5088. Do you know the weight of the heaviest blocks of stone taken to the new markets? No, I do not. I know some of them are very heavy.
5089. I suppose you are aware that most of the stone from Phippards' quarry was taken over Park-street to the new markets? I believe it was.
5090. Then there would be a considerable weight going over it? Yes.
5091. In spite of all this weight, you never saw any crack or settlement, nor anything to indicate there was an immediate danger of a collapse? No.

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5092. I suppose you could not tell us what was the object of the Mayor in opening up Park-street? No; I do not know what it was.
5093. Do you think it was necessary to block that street for three weeks for the purpose of making good that filling, and packing over the top of the tunnel? You mean, while it was under canvas. I do not know that it was absolutely necessary. I do not know why it should not have been filled in, but I suppose that the Mayor had some object in view.
5094. As a builder, do you not think you could have taken up that portion of the street, and made good the work over the tunnel without blocking the street at all—by doing half of it at a time? There can be no doubt about that. You proved that by the system you adopted in Market-street.
5095. There is nothing to prevent that system from being adopted without interfering with traffic? That is true.
5096. *Mr. Bavister.*] You stated that you had a partner at the Lands Office; what was his name? Mr. Baldwin.
5097. What was the style of the firm? Waine and Baldwin.
5098. You yourself being the senior partner? Yes.
5099. *Chairman.*] If Park-street could have been mended without interfering with the traffic, could the whole of the tunnel have been made open-cut without seriously interfering with traffic? Yes, I think so, undoubtedly. It did not seriously interfere with the traffic when they subsequently opened up and removed the timber; that was done expeditiously.
5100. *Mr. Robert Jones.*] But that could have been done much more expeditiously than by tunnelling in the first instance—opening that out afterwards could have been done in one-tenth of the time? I would not say in a tenth of the time, but undoubtedly it could have been done more quickly.
5101. Taking into consideration the tunnelling being done as it has been, and the whole of the time that has necessarily been taken up in the excavation and in the building of the tunnel afterwards, and the whole of the work in putting in the foundation as it was left before they came back to it to take out the timber;—in your opinion, how much less time would it take to do what they did afterwards in opening up and taking out the timber, than would have been taken in opening it up in the first instance, and carrying it through in that way? Taking into consideration the stuff that I saw which was removed, it is a very difficult question to answer, but drawing those timbers out and filling up about 7 feet by 8 would possibly take about one-third of the time.
5102. Your opinion is, that the opening up of the cutting, and the taking out of the timber and refilling it again, would take one-third of the time actually occupied in doing the whole of the tunnel excavation, building the brickwork, and finishing it up to the point at which it was finished before? Yes.
5103. And necessarily at one-third of the cost? Yes, for labour.
5104. One-third of the time and of the cost? That is my opinion. I believe I could do it myself.
5105. *Mr. Bavister.*] Can you give us an idea as to how long it would take to excavate, construct the brickwork, and complete the same, refill and ram the earth, and reinstate the pavement, for each 100 feet run? No; I could not do it now right off the reel. It is only a question of the number of men you work in the excavation—how closely you can put them together in excavating and getting the stuff out, and following up along the foot of the work.
5106. Assuming it is 10 ft. deep, 7 ft. 6 in. wide, and there is a 100-foot run, and you excavate that, put in your tunnel, and ram, and reinstate the pavement? I could not tell you right off the reel.
5107. Do you think it could be done by men, put as closely as they could work, in less than six days? Yes, I think it could.
5108. Do you think it could be done in three days? That is an abstract question, and it is very difficult to say. I could not absolutely say that it could be done in three days.
5109. Have you any idea as to the shortest time in which it would be practicable to do it? No, I have not; but, of course, I could calculate it if I had to do the work. I could not give you an opinion without figuring out the amount of work to be done.
5110. With men spread over 100 feet, how many men would you require to complete that excavation;—do you not think it would be fairly expeditious to do the excavation and reinstate the pavement in four days? Yes; I suppose it could be done in three or four days possibly.
5111. It would be fairly expeditious work in four days? In three or four days.
5112. How long would it take to remove the timber, at an average depth of 3 feet, over the same area, the width of the tunnel, and with 100 feet run? There would be other work to be done in connection with it—the filling up of holes, &c.
5113. *Mr. Cook.*] Looking at this work under ordinary circumstances? Every effort should be made to minimise nuisance to shopkeepers and others, even by spending a little more money to get the work done as expeditiously as possible.
5114. Is that always done? I do not think it is.
5115. Have you ever complained about Park-street being kept open so long as it was;—did you make any public complaints about that? It was not my business; my "boss" was dealing with that.
5116. Your "boss"? Yes; His Worship the Mayor.
5117. Whatever he does is right, I suppose? As a rule the aldermen support him.

David Davis sworn and examined:—

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5118. *Chairman.*] Are you a member of the Water and Sewerage Board? Yes.
5119. Are you a contractor? Yes.
5120. Have you carried out any sewerage contracts? Yes.
5121. Which? Under the City Council I built the sewer in Blackwattle Swamp, down through Union-street, Pyrmont, and Forbes-street, Woolloomooloo. I have not done any sewerage contracts under the present Sewerage Branch; it was under the old City Council that I did the work.
5122. Are you a member of the Builders' and Contractors' Association? Not just now. I have been a member for many years, but the last few years I have dropped out of it. I have practically been out of business as a contractor. I am not really a member of the Builders' and Contractors' Association.
5123. You know something, do you not, about the telephone tunnels that this inquiry is about? Yes.
5124. Did you make any reports to the Water and Sewerage Board? Yes. 5125.

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5125. Upon what part of the tunnel? At the corner of Liverpool-street and Pitt-street.
5126. Any other place? That was the part I spoke about first, and later on I spoke about a portion of the filling in near the corner of Bathurst and Pitt streets. That was the second time I drew attention to the state of the crown of the tunnel and the water-mains that were above it.
5127. What caused you to make a report? From something I read in the papers. I took an interest in this work, in the first place, I being a contractor, and taking an interest in public works. I have been a public works contractor for fifteen or sixteen years, and from what I saw in the Press, I understood that this telephone tunnel work was to be carried out under a new system, and naturally I took an interest in it, and from time to time I had a look at the work, just from the street; from the time the work started down at about Moore-street until it reached the railway station I had a look at the work just from the street. I never went into the works, not even inside the enclosures.
5128. You saw the work as it was progressing? Yes, from time to time, looking at it from the footpath.
5129 What was the cause of your making this particular report;—what date was it? On June 30th, 1897. I went down about half-past 10 or a quarter to 11.
5130. What was it that you observed? What first attracted my attention was, after some heavy rain, near the corner of Goulburn-street and Pitt-street. That was a few days previous to June 30th. The footpath had gone down and the water seemed to have found its way in over the tunnel, exposing the water-main and exposing the crown of the arch and the brickwork, showing a very large cavity between the pavement and the crown of the tunnel. That was a few yards from the corner of Goulburn-street and Pitt-street. Then on the morning of the Water and Sewerage Board's meeting on June 30th, together with another contractor—Mr. Henry Briggs, of Concord, a friend of mine—I was driving up Pitt-street in my own trap. He, also, has been a public works contractor for a number of years. We got out of the trap, and went over to and looked at the part I have spoken about. I saw the water-main strutted with pieces of timber, and the labourers driving them with great power, hammering them up to keep the water-main strutted.
5131. What labourers? Men working in the excavation there. Five or six of them were at that particular part. From the appearance of the water-main and the manner in which they were strutting it up, I thought it was likely to collapse. There was no earth under it—it was just hanging there, and there appeared to me to be a kink in the joint, showing that it was not cut out in a direct line and had a tendency to subside, and under one side struts were placed in. The main was a little above and to one side of the crown of the arch, just inside the kerbstone, and it was strutted from the crown of the arch with pieces of timber. There was earth round the top of the arch where they were filling in.
5132. Do you know who laid that main? I believe Mr. Robertson, under the Water and Sewerage Board. I told my friend Mr. Briggs that I would bring the matter before the Water and Sewerage Board.
5133. Which you did, I suppose? Yes. But before going to the Water and Sewerage Board meeting, I went to the *Star* office and asked for a reporter to be sent to have a look at it. I did not get a reporter from the *Star* office to go with me, but he promised to meet me there at 11 o'clock. I then went round to *Truth* office. I got a reporter there, a gentleman named Mr. Corlette. I drove him down in my own buggy to the work, and pointed out the struts and the means that were being adopted to keep the main in position. I then went over to the Water and Sewerage Board Offices, just after the clock had struck 11; I was a few minutes late. I then brought the matter up at the Water and Sewerage Board meeting.
5134. Had the Water and Sewerage Board obtained a report? There was, I believe, a report coming up about it that day. I was not aware that there was a report coming up, but when I spoke about the matter the Secretary said, "We have a report dealing with that matter, Mr. Davis." The President then said, "Why is this report brought up? It has nothing to do with us. We had best keep to our own business." I resented the remark, and told him that I thought it had a great deal to do with us; that our water-main was in danger along that street, and that, as the works were being carried out, it was likely that they would collapse at any moment. The matter dropped after some little discussion. About a week or so afterwards, I think about the following Board meeting, I had a look at the work in front of Walder's, and along there at the corner of Bathurst-street. Here the same method was adopted in strutting the water-main. I spoke to Mr. Smail about it, and he said, "It is all right; we have a man in charge who is superintending the whole of that work along there."
5135. Who is Mr. Smail? The Engineer for the Water and Sewerage Board. He said, "We have more than one man who is watching that work to see there is no fear of a collapse of the main. We are looking after the whole of that work, so there is no danger." Therefore, I never troubled any further about it.
5136. Did you make any other reports? No. There was nothing further in regard to the matter until a discussion took place at the Builders' Exchange, and I had something to say on the question with regard to the job.
5137. What was the discussion about? The discussion was more a discussion about the day-work system of carrying out works by the Government.
5138. Had you anything at all to do with calling that meeting? No. It was a joint matter, I now remember, of the Builders' and Contractors' Association, the Chamber of Manufactures, the National League, and the Public Works Contractors' Association. Mr. Angus represented the public works contractors. I had something to say about the day-work system, and, among other things, I said something about the bricks that were used in the tunnels, and, much to my surprise, a day or two afterwards I received a letter threatening me with a Supreme Court action, for what I had said, from the brickmaker, Mr. Cook. I did not know him. The discussion was not concluded on the one evening, and it was adjourned till about a week or fortnight later.
5139. What did you know about the bricks? I passed a remark about the bricks at the time, which it appeared to me, from the way that Mr. Cook spoke, would injure his business, and take the bread and butter out of the mouths of his wife and family.
5140. That is what he said? Yes, that what I said about the bricks would take the bread out of the mouths of his wife and family.
5141. Did you see the bricks? Yes; from time to time I saw them.
5142. Do you know anything about bricks? I should think so. I was almost born in a brickyard, and my father was one of the largest brickmakers in Victoria.
5143. Was it having seen the bricks that caused you to make a remark about them? Yes; I had seen them from time to time, and said something about them. 5144.

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5144. Would you say they were good bricks? For a certain class of work there is no fault to be found with them; but to put underground, with subsoil and wet ground, I thought they were not the class of bricks that I had been in the habit of using.
5145. What would you call the bricks? I do not care to answer that question, as I do not wish to enter into a Supreme Court action and waste my money on lawyers.
5146. You are protected here just in the same way as you would be protected if you gave evidence before Parliament? It is of no benefit to me to injure a man's business, and I would apologise fifty times rather than do injury to a man in a matter of that kind, for I have nothing to gain by it, and I would be very sorry to do him an injury.
5147. What kind of bricks do you consider them? Mr. Cook, the brickmaker, answered the question in the presence of a large gathering at the adjourned meeting. In the meantime, I had heard that Mr. Cook felt very much injured about something I had said about the bricks, and I got up as soon as the adjourned meeting had started, and asked the President for permission to make an explanation with regard to what I had said. I told him that I had no wish to decry Mr. Cook's bricks, or to injure his business, or to ruin him in any way whatever, and that if I had said anything offensive I would withdraw the remarks and apologise fifty times rather than injure anybody. What I said about the bricks was that, for the class of work they were used in, I did not consider them the class of bricks that had always been specified by the Government for underground work. The bricks that I have generally used for tunnel or underground work are a special kind of brick, much more costly in manufacture. I have paid as much as between £5 and £6 a thousand for double-pressed sewer bricks obtained from Goodsell, and I explained it to Mr. Cook and the meeting that for warehouse walls or ordinary house-building, where the bricks were to receive plastering and cement, or even without struck-joint, these bricks were very good bricks, but being of wire-cut construction, they were very much more porous than the class of bricks that had always been specified, so far as I could remember, in Government works. I put a question to Mr. Cook—"You know the class of bricks that have always been used for this underground work?" He said, "I do very well, and have made plenty of them." I said, "If it is a fair question, what have you been in the habit of receiving per thousand for these bricks?" He said, "I have had as much as £6 a thousand, but I believe you could get them now for £4 a thousand." I said, "As an honorable man, what did you receive per thousand for the bricks that were used in the Post Office tunnels?" He said, "31s. per thousand." I said, "That answers my question exactly," and I apologised to Mr. Cook. The old gentleman seemed to take it so much to heart that I was sorry I had had anything to do with it.
5148. Was there anything more in reference to the bricks? Not that I am aware of.
5149. Did you make any report upon, or did you examine, the cement? No.
5150. Will you describe what sort of a hole, or imperfection, there was at the place you named which caused you to make a report to the Water and Sewerage Board? When the timber was being removed, I could see it had not been very well packed. It is a very difficult matter to pack tunnel work, especially with soft material such as was used there. In railway tunnels they usually use solid hard material or sand, if they can get it.
5151. What do you refer to by packing? Packing under the sheeting in the spandrils over the side of the walls.
5152. Just tell us as shortly as you can what the imperfections were you saw there? I noticed large cavities in the side, where the stuff seemed to have consolidated, and with a little moisture had gone down the sides and left open spaces there.
5153. What size spaces? I suppose in some places 6 inches, and in other places 9 inches.
5154. The space would be under the poling-boards? Yes; that was at the corner of Liverpool-street. It was even much more open at the corner of Goulburn-street. I suppose it was down 18 inches or 2 feet in one spot.
5155. Did you see that at the corner of Goulburn-street? Yes; but the water got in there, and had a good deal to do with that. In some places, just under the sheeting, there might, perhaps, be only 3 or 4 inches. In Liverpool-street I noticed a plank raised, and the earth was pretty close to the plank—there was not much space there. At several places where they were in the act of removing the timber the longitudinal boards were taken out, and I saw large cavities underneath.
5156. Do you consider that in making a tunnel, as this tunnel was made, with porous bricks, such as you have described, they are likely to absorb a large quantity of moisture? I would not think they were suitable bricks for the work at all. I understand these tunnels are built for the purpose of carrying wires inside, and if they use porous bricks only inside, the water will find its way there, and percolate through the crown, and inside, and will cause an accumulation of slime and the growth of a kind of vegetable matter there, which will be very objectionable. It could be cleared off from time to time, but if double-pressed plastic bricks were used, with a good cement joint, I am sure the water would not have the same effect upon it. It is an easy matter to keep water in a tunnel, but very difficult to keep it out, for there is a pressure outside that will force water through the walls, and brackish water will raise itself in spite of you.
5157. I suppose that from that answer the Committee are to conclude that as good a brick should be used to keep water out as to keep water in? Decidedly; better, for this reason: You can cement the face of the inside of a tank, if you put a coating on it, that will make it water-tight; but I have known underground tanks where cement inside would not keep out water with great pressure. There was a very large tank built at a bakery at one time in a mining district. While the mines were at work pumping the water out of the ground the tank answered all right, but the moment they stopped, and the brackish water came to within 6 or 8 feet of the surface, it raised itself in the tank in spite of all efforts to prevent it. I was employed to build an inner rim of brickwork and cement it, and then we had to give it up as a bad job, and fill up the tank with gravel to the level of the brackish water, and put in a brick bottom, making the tank about half its original size.
5158. Were there any other places on this work which you saw, and can give any evidence about? I have seen other places, but I did not pay very much attention to them. I noticed up at the Railway Station that there was a depression in the road. The tramline had gone down underneath, and the road was cut off for some days and made up again. I thought that was from a settlement over this tunnel.

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5159. But you did not see it yourself? No; I have not been on the work at all—I had no right there—except just in walking along the street.
5160. Is there anything else you desire to say in reference to the construction of the tunnels? No, I do not think so. I have seen the system of sewers in Paris, where a lady can go down with a silk dress on, and go through and come back again without soiling her clothes. The pipes are fixed on iron brackets along the inside of the tunnel.
5161. Is that a telephone tunnel? No, for carrying sewer and water pipes. If the arches and the walls of that tunnel were leaky, or if the water were to soak through, I think it would be very injurious to the work, and it would not answer in the way it does now, because it is comparatively dry.
5162. *Mr. Bavister.*] Was that tunnel constructed for the conveyance of sewage matter? No, it is for carrying sewer-pipes on brackets.
5163. *Chairman.*] The sewage matter does not get into the centre of the tunnel? No.
5164. *Mr. Robert Jones.*] You may call that a tunnel of tunnels? Yes; there are so many mains fixed on brackets. If the walls and arches of this tunnel were ever to allow the water to leak through, I do not think it would be very substantial. Visitors could not go down into it, and there would be an injury to the wires. I should say from practical experience it would be necessary to keep such a tunnel as dry as possible, otherwise the soakage would be very injurious to the wires in the tunnel.
5165. Do you know the portion of this tunnel which was constructed by contract? No. I know there was a portion constructed by contract.
5166. Did you see anything of it? No.
5167. You know nothing about it? No.
5168. You do not know if the bricks were the same as those used in the day-labour portion? I have been told they were the same. I think that either Chambers or Grocock told me they were the same sort of bricks, but I never examined that work. I never took any interest in it.
5169. Some of the tunnels to which you have referred are built expressly to convey sewage and water, are they not;—you draw no comparison between this tunnel and the ones you have spoken of? They are not exactly the same sort, but what I call a subway, for the purpose of carrying pipes fixed on brackets.
5170. But it would be necessary to have them constructed so as to be perfectly water-tight? Yes. That is what made me notice so much. They were practically dry. They might show a slight soakage from dampness, but I know that ladies go down well dressed and never seem to soil their clothes.
5171. Have you been in this tunnel? No.
5172. Do you know whether it is wet or dry? I do not know.
5173. Would you be surprised to know that it is perfectly dry? I would not be surprised at all, neither would I be surprised to hear it is wet.
5174. You do not know whether this tunnel is wet or dry at present? I do not.
5175. You do not know whether it has been? No.
5176. Nor whether it was intended in the first instance when the specifications were prepared to have it dry or wet? No.
5177. Whether it was immaterial that such should be the case or not? I do not know anything about that.
5178. You referred to Goulburn-street where you saw a large cavity, perhaps 2 feet, and you qualified that by saying that the water had gone down there? Yes, there were tressels and lamps round it.
5179. Is it a usual thing for water in the city—with a climate such as we have, with storms at times—to interfere with our sewers? It does not usually go down a sewer like that.
5180. But you have seen instances where it has done so? No, I have not. I have never seen water go down from a street into a sewer.
5181. You have never seen damage done by water to a sewer? Not exactly on all-fours with that.
5182. Well, somewhat similar? No.
5183. Still, the construction of that tunnel with whatever bricks you like—double or treble pressed—and no matter how constructed, would not have prevented the water you saw acting as it did act? I did not see the water act upon it, but merely saw where the water had gone in over the crown of the tunnel, and it looked as if there had been a subsidence, and the water had gone down.
5184. And had made the depression you saw? Yes. If the tunnel had been packed with good material it would not have gone down. I have built several sewers, and the ground has never gone down.
5185. With what material would you have packed to prevent what actually did occur? If the packing had been of pug-clay, or fairly-moistened clay and rammed, it would not have gone down like that.
5186. If the packing had been pug or moistened clay, the water would not have had the effect of scouring it out? It would not have gone down like that.
5187. If the side of the tunnel had been packed with pug or rammed clay, the water would not have taken it out as you saw it? I do not think it would.
5188. *Mr. Harris.*] I think you said that these bricks were not the class of bricks you would put in this kind of tunnel? No; I said that the class of bricks that have always been used for underground work were a different and a more costly brick than those used in this tunnel.
5189. Is it usual to put double-pressed bricks in tunnels? I rarely ever see anything else used.
5190. Where have you seen tunnels with double-pressed bricks put in? Bondi sewer.
5191. But we are not talking of sewers? Well, take the Otford tunnel on the Illawarra railway line. The bricks are specially-moulded plastic bricks. They are not the ordinary common wire-cut bricks—the cheapest ever made in the market.
5192. Do you not think that wire-cut bricks will last as long as double-pressed bricks in a tunnel? If they were well enough burnt I suppose they would. If burnt hard enough they would last long enough, if even only a piece of clay taken out of the ground.
5193. You say that you saw nothing under the timber which was removed;—who was removing it? Some workmen were removing it.
5194. What would be the space between the top of the crown of the arch and the poling-boards? At the corner of Liverpool-street it may have been 2, 3, or 4 inches at the crown, but at the spandril there was more space.
5195. Who drew your attention to it at the corner of Liverpool-street? I got out of the buggy and had a look at it.

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5196. Had you been old that it was bad work? No. I kept my eye on the job all along, as I have been a contractor.
5197. If there is any other job going on in the city do you always keep your eye on it? I have watched others I could say a good deal about if I had a chance.
5198. Have you watched the day-work carried out under the Town Hall? I did not know that any day-work was done there.
5199. Yes; all the foundations were taken out by day-work? But that is very different from putting in.
5200. *Mr. Cook.*] You say you thought these bricks would be good enough to put in the wall of a warehouse where they were going to cement it? I have explained that for ordinary walling they would be right enough, but that for this class of work I do not think they were the most suitable bricks.
5201. What did you mean when you said you would not put these bricks in a dog's house? Well, comparatively speaking, I would not use them for a dog's house.
5202. That was a little piece of rhetoric, I suppose? Very likely.
5203. You withdrew all that at the next meeting, and apologised for having said it? Well, Mr. Cook was in such a state about it that I thought it was a pity that any man should lose his bread and butter. I explained it, and put a question to him, and he replied, as I have said, that the class of bricks had been used for underground work, and he always got £6 per 1,000 for them.
5204. You did not make public the reason you have now given to us as to why you withdrew the statement? No.
5205. Would you not think it very damaging to your own character for veracity to make such a statement, and withdraw it without explaining why you did so? I have already explained, and I explained to the meeting.
5206. It did not go forth to the world? I did not pay to put an advertisement in.
5207. And so far as we can judge from the papers, there was an unconditional surrender on your part? You may think so.
5208. We take the papers? Well take the papers.
5209. You say that when you discovered the first defect you went to get a reporter from the *Star* office? Yes.
5210. Why did you want a reporter from the *Star* office? I have been to other newspaper offices in this city—I will not name them,—and have asked them to publish things—I do not mean on this occasion,—and they have declined to do it. They have declined to publish letters.
5211. The *Star* never declined to do anything of that sort for you? Yes, they have.
5212. They did not on this occasion? They did not have a man to send with me, but there was a man representing them at the Board's Office at 11 o'clock.
5213. Failing the *Star* you went to *Truth* office? Yes.
5214. You say you got a man there? Yes.
5215. Did you ever make any complaint to the Post Office about this defective work? No.
5216. You did not make any complaint to the Government in any way? No.
5217. Your only desire was to make it public? I brought it before the Water and Sewerage Board meeting, and, to back up what I had to say there, I was determined to call in a pressman to see it, and I did so. There was nothing to screen in the matter.
5218. Your object all through was to concentrate public attention on this matter? I do not think so.
5219. Was it not? No. If I had not been a member of the Water and Sewerage Board I would not have done what I did.
5220. You would not have done anything? I do not think so. I would not have done what I did. I should think I would be wanting in my duty as a representative of municipal councils if I thought the Board's property was in danger, as I thought it was, and did not do anything.
5221. But concerning this danger, it appears that the President did not agree with you? No; the President tried to squelch the report. He asked why the report was to be brought up there, and I resented it.
5222. Why do you think he did that? I do not know.
5223. Might he not have been acting in the public interest, in trying to squelch such a report, as much as you were? I cannot say. I know he tried to keep the report back. He said, "Why is this report brought up?" He did not want it to be read.
5224. He did not want to concentrate public attention on this matter in the same way as you did? I could not say.
5225. He did not agree, as a matter of fact, with what you were doing? I could not say.
5226. I think you said you applied to Mr. Smail? Yes.
5227. He told you generally that the work was all being looked after, did he not? He said that he had a man looking after the matter. I called his attention to the strutting.
5228. Altogether, taking the President's statement and the Engineer's statement in conjunction, would you regard that somewhat as a snub for you? No, I do not think so. I have never been snubbed there yet that I am aware of, and I had no desire to snub the President, but I spoke pretty plainly when he asked why the report was brought up at the meeting.
5229. *Mr. Bavister.*] I understood you to say that you had constructed several sewer works for the Council? Yes.
5230. Were not all of these open sewers, similar to the Blackwattle one? No. Pyrmont sewer is a big sewer built with double-pressed bricks, right down into the harbour.
5231. Was that constructed by open cutting or by tunnelling? By open cutting.
5232. Through streets and under footpaths? Yes. It crosses a street branching off Union-street.
5233. I suppose it is some time since that was done? Yes.
5234. Does your recollection serve to remind you whether any subsidence took place there? I have never heard of any.
5235. I do not mean such a subsidence as would be a danger to traffic;—in you own practice have you seen material so solidly rammed as for no settlement to take place? It very often occurs that there is a settlement with made ground.
5236. Do you always expect a settlement to occur where earth has been disturbed and filled in again? We are always prepared for it; even on railway banks they allow for it.

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5237. So it is not an unusual occurrence? No. We make provision for it; on railway banks they look for so much subsidence.
5238. In referring to the Builders' and Contractors' Association, you stated that you were not a member of the association; but are we to understand that, while not being a member of the association, you are what is known as an "Exchange" member? No, I am not.
5239. You understand the difference between the terms, as used in connection with the association—some are members of the association, having a right to the use of the Exchange, whilst others are termed "Exchange" members only, who have a right to the use of the Exchange, but are not called members of the association? I am neither.
5240. I understand that your interest was first aroused in this matter by the statement that the work was going to be done under a different system—by day-labour instead of by contract? That first attracted my attention to this particular work.
5241. Do you know that, as a matter of fact, that earlier work was done under this system? I have heard so since.
5242. In connection with the Sydney markets, not only the excavation, but the putting in of the brick-work up to the completion of the basement? I do not know anything about that.
5243. If you had known that, you would have taken as keen an interest in that as in this? It is quite likely.
5244. So that things of great importance may go on without your knowledge;—at the time of this matter attracting your attention in Liverpool-street, had there been a heavy storm causing the rain you have referred to? Not at the Liverpool-street corner, but at Goulburn-street there had been heavy rain.
5245. Do you know whether any packing and filling at all had been done on that section by the employees carrying out the tunnel construction work;—do you know whether that particular portion of the work had been packed during its progress, or whether it had been intentionally left without any packing at all? I do not know anything about that. When I saw it I spoke to our pipe-layer, Mr. Robertson, and he said that he had put twelve or thirteen loads of dirt down there to support the pipes.
5246. In how great a length? I do not know. I did not see it. I only saw trossels and lamps around it.
5247. If, as I suggest, the packing had been left out there, when once the water after heavy rain broke its way into the cavity, it would speedily wash away a large quantity of earth? It would scarcely wash it away. It would go down somewhere into the cavity.
5248. I mean wash it from its position on the surface? Yes; if there were a vacant place there, it would be sure to go in.
5249. Do you know anything of some accident that occurred to the sewer along Abercrombie-street, some time since? Yes.
5250. Can you give the Committee any information as to what was the cause of that, and the extent of the damage done? I do not know exactly the extent of the damage. I was building the Blackwattle Swamp sewer myself at one time, and the sewer broke up. We know the cause of it. When there is a heavy thunderstorm, or a sudden downfall of rain at high tide, the tide naturally backs the water up, and the result is that the storm-water coming down compresses the air, and bursts away the top of the sewer. The Wattle-street sewer is not very much below the surface of the road—the crown of the sewer is not. In similar places in Woolloomooloo, in constructing a sewer they had to put a large bed of concrete over the crown of the sewer to strengthen it, and prevent its blowing up.
5251. You said just now that such bursts are caused by the high tide, and the sudden rush of water compelling the confined air to find a means of escape? Yes, or I suppose that a pressure of water will do it.
5252. If it were the confined air, would it not be reasonable to put in escape pipes of a larger size than those that have been used as escape vents by the Water and Sewerage Board during the last few years? Yes; vent-pipes would obviate something like that.
5253. Does your experience cause you to arrive at the opinion that public agitation frequently arises without foundation? Very often I daresay it does.
5254. Was it not in your opinion an entire misconception, the agitation that took place against the ventilation pipes of your Board during the last three years;—has that not been largely due to want of understanding? No, I do not think so, for although a member of the Board, I do not agree with the system of ventilating we have here, and we are adopting a different system, instead of having the stove-pipe system in a hilly district like Sydney, where you find a ventilating pipe over the roof of a cottage, whilst on a hillside above it you find a two-storied house with a bedroom window almost on a level with the top of a ventilator, which naturally must be very objectionable when the foul gases escape from the lower level, almost on a level with and within a short distance of the bedroom windows of private dwellings. At Belle View Hill we are building a large shaft 90 feet in height, some 250 feet above the sewer, and a tender was accepted a few days ago to build one in the University grounds for the Glebe. Where you get a hilly district, such as Darling Point or Rushcutters' Bay valley, under Paddington heights, the system of ventilation that has been mentioned by Mr. Bavister I consider is very objectionable. I have always spoken against it.
5255. You do not always attach unqualified importance to, or have unbounded confidence in, scientific evidence, do you? No, not always.
5256. On the same occasion as we have just been speaking of, as to sewage matter, were not some assertions made by scientific or quasi-scientific men that air taken from your sewers was in a more pure state than that obtained in the open atmosphere outside? There may have been such a statement made, but I would not like to swallow it.
5257. You would not believe it if it were so stated? I should not say so.
5258. Do you know whether that main pipe of the Water and Sewerage Board was put into position before the construction of the tunnel? That I could not say.
5259. Do you know whether it was known that some alteration was going to be made in that main at or near Goulburn-street? I do not know; I never asked Robertson anything about it.
5260. I think you stated that at that time the water-main had gone down 3 inches? It appeared to me to have a kink in it, and seeing the struts under it I thought naturally it would give way.
5261. Was that opinion at any time borne out by the Board's engineer? I could not say; I have never asked him,

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5262. Do you know whether it has ever been confirmed or contradicted by him? I could not say.
5263. Then did the Board attach so little importance to this matter as not to refer it to him? If I remember rightly the matter was left to Mr. Smail to keep men on the work and see that the Board's main was not jeopardised in any way, but was quite safe; and when I called Mr. Smail's attention to it he said, "It is alright; I have men along there who are looking after it." If it was strutted well there would be no danger, but otherwise it would be likely to collapse.
5264. Would it be fair for any person to arrive at the conclusion that, because you went first to a newspaper office instead of to the Board's officials you were more desirous of raising public excitement than of protecting public safety? They could scarcely say that. I did not want to hide anything. I was determined that whatever was wrong I would let out.
5265. Did you look upon it as being a danger to the public? I have already stated that I considered the water-main was a danger.
5266. Supposing your own house were on fire, would you think that the most effectual means of protecting your property would be to go first to a newspaper office and then to a fire station? I do not think anything of the kind. That is quite a different case altogether.
5267. You did not look upon the danger as being so important as requiring the attention of the Board's officials and workmen first? I was going to bring the matter before the Board twenty minutes from the time when I saw the pipes strutted up, and it was the first thing I did in speaking at the meeting.
5268. If you thought that a pipe was likely to collapse and create public danger at any moment, would you, if the case occurred now, go first to the Board's office to get their workmen to see to it, or would you go first to a newspaper office to inform the public that they should be sure to keep out of the locality? I do not know why I should have rushed off to get the Board's men to look after it. It was within twenty minutes of that that the Board meeting took place. Very often we have a Board meeting when we have no reporters present—I do not know why—and on this occasion I had a contractor with me, and I saw the danger of the work, and I was determined that I would bring a pressman to see it, and I told them I was going to bring it up at the Board meeting, which I did the first thing after going into the room.
5269. Do you recognise now that people might take that view of the question—that you were more anxious to direct public attention to the matter than to provide for their safety? That is a matter of choice.
5270. Would you look upon a man as being foolish if he held such a view of the case? No; I would not like to look upon anybody as being a fool.
5271. You referred to the Chamber of Manufactures as taking part at that meeting at which Mr. Mainer's address was delivered, and the subsequent meeting—is that not a recently formed organisation? Over two years.
5272. I believe you are a member of it? Yes.
5273. It is a non-political body, is it not? So I believe. We have never touched on politics at our meetings; we never discuss a political matter, except as regards Government contracts.
5274. Was it not decided when the association was formed that it should be for the purposes of trade, and the protection of manfacturers' interests, and not a political organisation? Yes, the matter was discussed; but I should like to say that it is a very difficult matter to separate a discussion in the Chamber of Manufactures from politics when Government contracts and supplies naturally come within the scope of the members of the Chamber. The Factories Act was a very important matter, and the Chamber waited on the Minister for Labour as a deputation to point out several flaws.
5275. But that organisation is formed not for political purposes? Yes.
5276. And political purposes are supposed to be outside its operation? Yes; but it is impossible to conduct the business of the Chamber without touching on political subjects.
5277. But it is not an organisation for the purpose of assisting or preventing the return of any person or party to Parliament? No; our rules distinctly state that it is non-political.
5278. You have referred to the fact of a writ being received by you in consequence of some remarks made with reference to the bricks; after the second meeting at which you obtained an opportunity of making an explanation, were any further proceedings taken under that writ? No.
5279. Has it been withdrawn? Not that I am aware of. I have never heard any more about it.
5280. You are not aware it is still pending against you? I am not aware of that.
5281. Is that in consequence of your withdrawal of the assertions made at the preceding meeting? Yes. I did not want to have a Supreme Court action about the bricks, or the tunnel either.
5282. Having referred to these bricks as not being fit for underground work ——— ? I did not use that term.
5283. You used that term here to-day? I do not think so. If I have, it was unintentional. I would not say that the bricks are not fit for anything. Any kind of bricks are fit, if you like to use them.
5284. You have been largely engaged in building construction in and around the city? Yes.
5285. And it has been your practice, has it not, to consider that bricks were fit for anything; you have put that into practice? I have done nothing of the kind. I have always had a specification when I took out a contract. Bricks will do to fill up Sydney Harbour, if it comes to that.
5286. You quoted some bricks at from £5 to £6 per thousand—some of those bricks were used on works done by yourself, were they not? Yes.
5287. Were they double-pressed bricks made by the Plastic process? Yes, with a stamp on them.
5288. They were special sewer bricks? Yes.
5289. Would you consider it necessary to use such bricks for this tunnel, which is not intended for the conveyance of water? I would prefer to use them if I had anything to do with it, for a substantial job.
5290. Are we to assume that contractors' profits are in proportion to the amount of the contract? I do not know anything at all about contractors' profits.
5291. You have, I think, built some first-class buildings for residential purposes? Yes.
5292. Have any of those been faced with double-pressed bricks? The Government Printing Office.
5293. Did you put double-pressed bricks through the foundation of that building? No; there were no double-pressed bricks used in it, but I put enamelled bricks, which cost £14 per thousand, into the basement.
5294. Were they buried? No.
5295. Were they for the purpose of reflecting light from the areas, or in the basement? No; it was for the purpose of making the walls dry, and the lavatories and urinals.

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5296. Have you seen enamelled bricks used under such circumstances when there was a pressure behind them similar to that to which you referred as existing in a water-tank? Yes; all over London, and in Doulton's and Jennings' urinals.
5297. Is that glaze attached more firmly to the brick and capable of greater resistance of water from the back than cement is? I should say it would be better than cement; of course the joints are cement; with a putty-joint and an enamelled brick you can keep almost anything back; the underground line between the Monument and Camberwell Green is built with enamelled bricks.
5298. Are enamelled bricks used for the purpose of keeping back water? No; generally for face-work.
5299. Those enamelled bricks to which you referred as costing from £14 to £15 per thousand, were they not made of very porous material? No; as close as an ink-bottle almost.
5300. Do you know what locality they came from? Stoke-on-Trent.
5301. Is it not a fact that a slight blow causes the enamel to leave those bricks? Very rarely, I think, if they are good bricks; of course you can get firsts, seconds, and thirds, but first-class bricks would not peel much at the face.
5302. Have you seen those bricks made? Yes; Bakewell Brothers are making them out here now.
5303. Is not the process of making the brick to dry it, and before it is burnt paint the surface which is to be enamelled? Yes.
5304. Does not the fact of painting that surface make it impossible for the enamel to get so firm an adherence to it as cement would do to a wire-cut brick? Not more than you would on a china cup, and I have seen them made in the porcelain works in France. In their first state they are porous, and then are dipped into a liquid which gives them a coating, and, as I have said, it all depends on the burning; all this would flake off if passed through some process of enamel, bu not through some process of firing; that causes the enamel to adhere to the surface of the brick.
5305. Are the glazed bricks only dipped? It is laid on.
5306. Is not the material laid on to a china cup? No, it is dipped; but it is of finer quality.
5307. The fact of the article being painted previous to the laying on of the enamel, does that not have the effect of filling-up all the pores in the brick and prevent a proper adherence of the material subsequently laid on? All I can say in reply to your question is that I have used thousands of these enamelled bricks, and have split them with a hammer and bolster, and very rarely has the face peeled off. Bricks passing through the same process you can get firsts, seconds, and thirds, and it is just as likely that the face of even the firsts would peel off if there had been some little difference in laying on the enamel.
5308. In coating the bricks to which you have referred with the enamel, would not the face of the brick always have a tendency to peel off? Yes, it has always a tendency to shell off, but not very largely in good bricks.
5309. You admit that it is not customary to put double-pressed bricks into a foundation? I have very rarely seen it. A clinker brick is generally used for that work.
5310. A brick may be a good brick for the purpose of carrying weight without necessarily being an expensive one? Yes.
5311. And your reference just now to a clinker brick as the cheapest brick obtainable in the brick-yard was to a brick twisted in shape from excessive burning? It is the clinker making them hard which makes them cheaper for putting in foundations.
5312. Are they specified by architects to go into foundations? I could not say. I believe that architects do specify clinkers to be put in, but I have not had such a specification.
5313. You have never had clinkers specified to be used in a foundation by an architect under whom you have been? For sixteen or seventeen years I have not worked under architects in Sydney, but under the Government.
5314. Who is an architect under whom you have worked who has specified clinker bricks to be put in the foundation of a job you have carried out? I believe that architects are now specifying clinker bricks.
5315. Has any architect specified for clinker bricks to be put in the foundation of any job you have carried out? No.
5316. Are not clinker bricks obtained at a lower rate than the other bricks that come out of the brick-yard? I do not think so. I am building a terrace of houses, and I am paying a little more for clinker bricks for the foundation.
5317. There are some clays in this district you could not make a clinker out of? Yes.
5318. Is it not a fact that when the Hoffmann kilns first started in this district, many more clinkers were produced than were required, and that class of material was selling cheaper than the ordinary machine-made brick? I never bought any cheaper.
5319. Do you know whether that was so? I do not think so.
5320. Do you know? I know that Goodlet was the first who started the Hoffmann kilns at Waterloo and Surry Hills, and that bricks burnt out of shape were sold by him at so much a load. They were chiefly broken up for concrete.
5321. Do you know what the price of clinkers was at that time? I am speaking of sixteen or eighteen years ago. The price was about £2 15s. or £3 a thousand for ordinary bricks then.
5322. What was the price of clinkers? About 10s. a load.
5323. And about three loads would go to the thousand—not of clinkers? Four loads go to the thousand generally, but it all depends on the size of the cart.
5324. The same cart that takes three loads of ordinary bricks to the thousand would take four loads of clinkers? Perhaps so.
5325. Which you state were 10s. a load, making the price £2 per thousand, when ordinary bricks were £3, and, consequently, admitting that the clinkers were 33 per cent. cheaper than the ordinary bricks—I thought that if we struck to it we would get it? I do not think you have got it.
5326. They were your own assertions? I did not say that I had ever brought any clinker bricks; and I do not know what they cost, but I believe they cost about 10s. a load.
5327. Do you know what material the Paris subway, making provision for carrying sewers and other pipes, is constructed of? Bricks.
5328. Of what quality? I could not say. I have seen them building some with stone.
5329. Double-pressed bricks are made under two processes? Not that I am aware of.
5330. You know the process described in the trade as the semi-plastic? Yes.
5331. And also that described as dry-pressed? Yes.

5332.

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5332. Are double-pressed bricks made under both those systems? No.
5333. Are they made under either? The double-pressed brick is a plastic brick, moulded first, and then pressed.
5334. Are no double-pressed bricks made except under the plastic process? Not that I am aware of.
5335. You are acquainted with the process of manufacturing bricks for the trade, are you not? Yes; I know something about it.
5336. Do you know the steam brick-works, at Croydon? I have not been inside it.
5337. You know Bakewells'? Yes.
5338. Are all their double-pressed bricks made under the plastic process? I do not know.
5339. Supposing that double-pressed bricks were made under the semi-plastic process as well as under the plastic, would not the semi-plastic be a much cheaper method of making them? That I could not say.
5340. Can you say how much longer a time a plastic brick would have to remain on the floors of the shed before it could be submitted to the second pressure, converting it into a double-pressed brick, than that made under the semi-plastic process? It would have to remain on the floor sometime to get the water out of it.
5341. Would not remaining on the floor a longer period, necessitating extra handling, incur a larger expense in production? Yes, I suppose it would; if you kept on handling it long enough, it would cost a lot of money.
5342. Is it not a fact that double-pressed plastic bricks are only made specially for and used in sewer construction and sewer works? No. I have used them in the fronts of buildings.
5343. Double-pressed, not plastic? Plastic.
5344. The double-pressed plastic brick to which you refer is a hand-made brick, afterwards pressed by a machine, is it not? Yes.
5345. Have Bakewell Brothers any hand-making stands on their field now? I could not say; I have not been there lately.
5346. You have made some reference to the bricks used in the construction of the Otford tunnel, do you know what bricks they were? Yes.
5347. What process they were manufactured under? Yes.
5348. Were they hand-made bricks? Yes, some of them; I think most of them.
5349. Were they made by Rowe & Smith's workmen? Yes; they built the yards.
5350. Were they not machine yards? Machines were put in afterwards. They were a pipeclay brick—a very good brick—and they are being used for the sewers now—a good pipeclay material. There is a very good arris on them.
5351. Were the bricks used in the tunnel double-pressed? I am not quite sure about the whole of them. I think they started with hand-made first, and got some Fawcett machines afterwards.
5352. And still continued making under the plastic process by Fawcett machines? You could not make plastic bricks by a Fawcett machine, nor by a Kennedy, nor by a Platts.
5353. Referring to the contract work and the day-work, I think you have formed the opinion, or there has been a tendency in your evidence to show, that contract work is better than day-work? No, I would not like to say that; I have never said it.
5354. There have been serious mistakes made in contract work, have there not? Decidedly.
5355. Whilst you have had no work condemned, there has been a very serious condemning of work done by contract in and around Sydney, has there not? Yes.
5356. I think you have been sufficiently long in Sydney to recollect that in Sydney, some years ago, there was much public excitement as to the foundations of the Sydney Town Hall? Yes.
5357. And it was discovered to be not creditable work? Yes.
5358. That was done by contract? Yes.
5359. By one of the largest contracting firms, I suppose? No. I think it was the only large contract the man ever had.
5360. You have of more recent years heard something as to a trouble that occurred in Government contract work at Bear Island, have you not? Yes.
5361. Was not that done by a large contractor? Yes.
5362. One of the firms of contractors looked upon as ranking among Sydney's best? Yes. He pulled the Town Hall foundations up and rebuilt them. The same contractor rebuilt the foundations you referred to, and the Centennial Hall is now built upon them.
5363. Were there not serious defects found in the Bear Island work? Yes.
5364. If the best of the contractors will make such mistakes, it is only reasonable to suppose that smaller ones will make worse mistakes? I do not think they could make worse mistakes; they could make mistakes.
5365. In a report of the *Daily Telegraph* of the 1st July—a report of a meeting of the Water and Sewerage Board—I suppose the one at which you first called attention to this matter—it is stated:

> Alderman Davis said he had kept his eye on the tunnel matter, and he had inspected the work going on in Pitt-street, at the corner of Liverpool-street. He had seen there men putting in timber struts to support the main, which had gone down about 3 inches below the line. He was only surprised that it had not collapsed and flooded the place with water. The main was simply hanging to the surface. The tunnels had subsided.

Is that so? The earthwork had subsided.
5366. Can you point to any place where the tunnels had subsided? No.
5367. Then are you misreported there;—did you intend to convey the meaning that the earth over the tunnels had subsided? The earthwork of the tunnels I have never seen much, except where it was exposed at Goulburn-street.
5368. Are you aware of any subsidence having occurred in the tunnels at any point? Not in the brick-work—in the filling, in the earthwork. The tunnel would be the cause of it, no doubt.
5369. Do you know of any point at which the brickwork of the tunnel has collapsed or failed?———
5370. *Chairman.*] Questions have been asked about the Bear Island contract work, do you know whether the money was paid for that work to the contractor, or whether the action taken by the Government compelled him to make good the work, or to pay back the money to the Government? I do not know much about that, but I think there has been a refund for the defective work.
5371. What I want to know is whether the Government were at a loss, or whether the contractor was? I think the contractor.

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5372. Was he M'Leod? Yes.
5373. *Mr. Bavister.*] Is it not a fact that M'Leod died before the investigation was completed? That I could not say.
5374. *Chairman.*] Did he or the Department bear the expense of making good the work? I could not say. I fancy there was a refund for the defective work.
5375. In answer to one question, you referred to the bricks sold from Goodlet's brickyard some eighteen years ago, by the load? Yes; they were used for breaking up generally for concrete.
5376. Were those bricks sold in a promiscuous way—bricks that had burnt out of shape? They were really not bricks at all, but unshaped pieces of stuff, and they were cracked up for concrete. They were not clinker bricks, but simply bats that were broken up, the same as you would break up sandstone for concrete.
5377. *Mr. Bavister.*] At the meeting at the Builders' Exchange, when this subject was under discussion, did you not say something as to a quantity of cement that had been condemned on some other work being taken over and used in this work? I know nothing about that. I understood the Government had taken over a large quantity of cement—I heard so. I do not know anything about the price of it.
5378. When it was referred to at the meeting at which I was present, did you not make an interjection, which was followed up by a rambling statement made by some member as to the number of casks so condemned and afterwards taken over by the men in charge of this work;—did you not interject that the number was 500 casks? I heard something about 500 bags, I think it was, or casks of cement that had been taken over by the Government, but I did not know what work it was used in.
5379. *Mr. G. McCredie.*] Did not Mr. Arthur McCredie speak to you in the street about the cement, and you said that you would bring a man forward at the right time; that there was no mistake in the paper about the 5,000 casks; and that you told Mr. Arthur McCredie to mind his own business? I do not think we had anything to say about cement that day.

WEDNESDAY, 24 NOVEMBER, 1897.

Present:—

MR. BAVISTER, MR. CANN, | MR. COOK, MR. McGOWEN.

W. J. LYNE, ESQ., IN THE CHAIR.

A. L. McCredie, Esq., and G. McCredie, Esq., appeared in person in their own behalf.

Charles Rhodes sworn and examined:—

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5380. *Chairman.*] What are you? Chief Inspector of Sewerage under the Water and Sewerage Board.
5381. You did some work in Castlereagh-street the other day—did you not? We did; but I explained to your clerk a day or two ago that Mr. Robertson was the proper officer to be asked to come here to explain with reference to a holei n Castlereagh-street—that is, a subsidence. I may tell you that about the 1st of this month, I had occasion to lift off a manhole cover over the sewer in Castlereagh-street, about opposite No. 4, and I found an earthenware pipe connecting into it, and there was a tremendous run of clear water through that pipe, so I reported the matter to the leak-man—that is, the man who goes round attending to broken service-pipes, or broken mains, or anything of that sort. They lifted the wood-blocks, cut a hole through the concrete, and found that there was a disused service-pipe that had been cut off by some plumber and not properly made good. It appears that they had put a wooden plug into the pipe, and that it had become rotten and had blown out, which caused a tremendous run of water.
5382. Where did the water come from? From a water service-pipe. Rushing out in the manner it did, it percolated through the earth into an old sewer, which ran into the manhole. That accounted for the subsidence.
5383. Is the old sewer a disused sewer? No; there are some connections into it—I think very likely from houses fronting Castlereagh-street; perhaps Nos. 2 and 4.
5384. What does that old sewer connect with? It runs down into the harbour at Circular Quay.
5385. Is that the one that runs down near to the German Wharf? Yes.
5386. You say that there was a subsidence? Yes; under the concrete. I did not measure it; but, looking at it, it seemed to me about 4 feet x 4 feet x 2 feet deep. It took a load and a half of stuff to fill it.
5387. In your estimation, that subsidence was caused entirely by the water that was coming from the service-pipe? Yes.
5388. And, according to what you say, that water was percolating out of the earthenware pipe through the soil, was it not? The water percolated from the service-pipe to the earthenware-pipe which is connecting into the sewer.
5889. It percolated through the soil? Yes, and carried the soil with it into the joints of the pipe right down into the big sewer. Subsidences do occur occasionally in different parts of the city, either through a defective main—that is, a crack in the main or a lead joint blown out—or through a defective service-pipe.
5390. *Mr. G. McCredie.*] How deep a space was there from the underside of the concrete to the bottom of the sinking? About 2 feet.
5391. It is about 4 feet square, you say? Yes, about that.
5392. You did not measure it? No; but I think it was about that.
5393. You have had a good deal of experience in connection with sewer work in the city;—can you tell the Committee whether you often meet with sinkings of that description underneath the concrete and wood-blocking? Not particularly underneath the wood-blocking; but in different parts of the city there are such cases. There was one some three months ago at the bottom end of Bourke-street, near Cowper Wharf, similar to that, but it was not a wood-blocked street.
5394. Was there water there, too? Yes; it was a damaged service-pipe that caused the subsidence.
5395. Did you ever find any difficulty in connection with the soakage water;—is it ever the cause of any of these sinkings? No; I have not noticed that causing any sinkings—not in the sewerage works.

5396.

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5396. If there are a number of pipes crossing a road there is always a likelihood of some of them leaking, especially if any of them are under high pressure, and a leak in any pipe would cause a sinking of that description? Especially if there was a sewer anywhere close handy.
5397. Or a shaft? Yes, or a shaft of any description.
5398. Do you know of any old sewers in Pitt-street which you come across in carrying out your work for the Water and Sewerage Board? Yes; there are a number of old sewers in Pitt-street. There is one between King-street and Market-street, a very old brick sewer, just outside the footpath.
5399. Have you had any sinking over it? No, not for many years.
5400. You had at one time? Yes, some years ago we had a sinking over it; but that occurred a great many years ago—sixteen or eighteen years ago, I should think, at least.

William Matheson Gordon recalled and further examined:—

W. M. Gordon. 24 Nov., 1897.

5401. *Chairman.*] I want to ask you a question with reference to the photographs that you produced when you were giving your evidence before;—are you aware that photographs Nos. 1, 2, and 3 represent the state of the outside of the tunnel opposite the Civil Service Co-operative Society's new stores, as it was left by the workmen who constructed the tunnel? No, that could not possibly be.
5402. Well, what do they represent? They simply represent the way in which it was found after the excavations had been made by the contractor for the Civil Service Co-operative Society's new stores.
5403. Are you aware whether the hollows or spaces under the poling boards, and round the top of the arch, were caused through the packing or the ramming slipping away when the men were engaged in taking that face away? No. Before they took the stuff away there was a slight hollow at the sides under the boards, and once the stuff was removed from the side, of course everything fell away that could.
5404. As to the uprights shown in photograph No. 1, were those the original uprights supporting the poling-boards? No. I believe those have been put in since. The old ones were taken away; at least, I presume so. I am not positive on that point.
5405. What was the object of getting those photographs taken? I do not know exactly. I was instructed to do it. I have no doubt that the object was to show the way it was to be left.
5406. By whom? By the contractor for the Civil Service Co-operative Society's new stores. He evidently put them in like that.
5407. Then these photographs were not intended, according to what you say, to show the defects of packing round the tunnel? No, they could not show all the defective packing; they are more for the purpose of showing the sag in the timber than anything else and supports to same.
5408. Which do you call the sag in the timber? The sag in the poling-boards are shown in photo. No. 1.
5409. Did you ever understand whether the City Council had given an instruction to have this telephone tunnel work done by tunnelling and not by open cutting? No; I did not know anything of that. That has come to my knowledge since.
5410. *Mr. Cook.*] You now know that such instructions were given? Only from hearsay.
5411. *Chairman.*] Do you know what the intention of that letter which has been produced was;—you have seen a certain letter that was produced from the Corporation? I have not seen it.
5412. Well, you have heard of it? I have heard of such a letter being in existence. I do not know what the contents are, except that it had something to do with open cutting and tunnelling.
5413. What I want to know is whether you were aware that that letter was intended to compel the work to be done by tunnelling. [*The Chairman read the letter from the Town Clerk to the Deputy Postmaster-General, dated 13th May, 1895, vide page 40.*] Do you, or do you not, know whether that letter was intended to give a definite instruction to do the work by tunnelling, and not by open cutting? I could not say; I could not put a construction upon another man's letter.
5414. You are not aware? No.
5415. *Mr. Cook.*] But you say that you have heard that that was so regarded? I have heard since that there was such a letter in existence.
5416. *Chairman.*] You have just heard that letter read? Yes.
5417. Do I understand you to say, in answer to Mr. Cook's question now, that that letter is an instruction to carry out the work by tunnelling? No; I did not say so.
5418. But your answer to Mr. Cook would make you say so? No; I said I knew that such a letter was in existence.
5419. Such a letter as has been read? Yes.
5420. *Mr. McGowen.*] The photographs that you produced to the Committee when last giving evidence—Nos. 1, 2, and 3—showed the state of the packing over the tunnel in front of the Civil Service Co-operative Society's new stores? Yes—that is, the larger photographs.
5421. And it was with regard to those photographs that you said you could put the handle of a long-handled shovel, or a pick-handle, in in some places? Yes.
5422. Were those photographs taken by the officers of the Municipal Council? No.
5423. By whom were they taken? A man named Hall, of Hunter-street.
5424. By whose instructions? On instructions received from me, for the Mayor.
5425. As a matter of fact, the Municipal authorities instructed you to point out this defective work, and get photographs taken, so that they could be produced as evidence of the state in which you found the tunnel? I expect so; that is a reasonable thing to expect.
5426. The Mayor instructed you to get those photographs taken? Yes..
5427. At the time when those photographs were taken, had you ever heard that the contractors' men had been working near this tunnel in putting down the foundations for the Civil Service Co-operative Society's new stores—close handy to the spot where those photographs were taken? They had been working all round there.
5428. You knew that? Yes.
5429. Did you know that they had been blasting close to it? No, I do not think they ever blasted close up there; in fact, I am certain they did not—well, not to my knowledge. I had a man there watching, and I never had a report from him that they were blasting at all in that particular frontage.

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5430. Did you hear at the time those photographs were taken, or before you produced them in evidence here, that these contractors' men had pulled the packing away at the side or the top of the tunnel? I never heard that they pulled any packing away; but it would naturally follow that if you excavated down the side, whatever was loose would fall away.
5431. You never heard that some of the contractors' men had taken some of the packing away from the side, and that it had fallen away from the top as well? No; I never heard of it.
5432. Have you heard that since? No; I have not.
5433. Is the opinion of the municipal authorities with regard to the defective work outside the Civil Service Co-operative Society's new stores as strong to-day as it was when you produced those photographs? Yes, as regards the defective packing on the top.
5434. In your opinion—expressed very strongly when you were last giving evidence—there was bad work done by the officers who constructed the tunnel in front of the Civil Service Co-operative Society's new stores? That was my opinion.
5435. And is it your opinion to-day? It is my opinion still.
5436. *Mr. Cann.*] How long do you say those photographs were taken after the excavation was made? I could not tell you that very well. I think that question was asked me before, and I could not answer it.
5437. If an affidavit were produced declaring that the packing had been taken out by the contractors' men, would that be true, so far as your knowledge goes? I have no doubt that packing was taken away, or fell off the side. It is quite reasonable to suppose that. But the packing could not have been taken off the top—between the top of the tunnel and the poling-boards.
5438. If it were taken away from the side of the wall of the tunnel, would not that allow the packing to the centre of the arch to fall down the side? A certain amount would fall from the crown of the arch down the sides.
5439. Did you know that the packing had been removed from the side at the time you had those photographs taken? Undoubtedly.
5440. Then what was the object of producing the photographs? As I mentioned before, one of the photographs shows that the timber had sagged.
5441. But did you not actually say before that the object sought was to show the defective packing? I think they answered several purposes. No. 2 shows defective packing. I think that I drew attention before to the hole there where it was not thoroughly consolidated between the sides of the arch and the wall of the next building, where you could push the handle in. That was very soft, and it had not been excavated or dug out.
5442. As a matter of fact, those photographs could not show defective packing on that particular side after the packing had been removed? Not on the face.
5443. Then, in view of that, the photographs can be of little practical use so far as showing the defective packing? They are of use in showing the packing down the sides, which was the principal part. No. 2 photograph shows the sort of packing that was put down the side of the tunnel, on the right-hand side of the photograph.
5444. *Mr. Cook.*] Supposing that timber to have been taken out, and that side of the pavement being exposed, as you have shown in that photograph, and supposing blasting to have been going on frequently, would that or would it not be liable to disturb the packing? In the first place, there was no necessity to blast. It was principally soft stuff there.
5445. Assuming that blasting did take place? But it is of no use assuming that blasting did take place, if you did not blast at all. Of course, if you were to blast alongside the tunnel, and removed the stuff there, naturally anything soft alongside the tunnel here would fall away.
5446. There is no need, fortunately, to assume that there was no blasting, because there has been a witness here who said that they did blast all the rock out there; and in fact you admit the whole thing yourself? No, I do not admit all that. I admit that there was blasting taking place on the ground, but it was a long way from there—120 feet, I suppose, from there.
5447. Was there rock down by the side of the tunnel;—what is the nature of the ground alongside the tunnel? It was very poor soft stone for the first few feet down. When they got down to the basement, I think it got pretty hard; but they never blasted there to my knowledge.
5448. They never blasted there to your knowledge? Not in that corner.
5449. *Chairman.*] How far would the blasting be away from there? The nearest place I saw drill-holes put down would be fully 80 or 90 feet from there—from the building-line of Pitt-street.
5450. *Mr. Cook.*] If a witness came here and used these words, "We blasted the rock as we came to it; we used powder there very freely"—have you any knowledge of anything of that sort having gone on? I should say that he was rather stretching the point, because powder could not be used very freely there.
5451. The foreman of the work would be likely to know? I should like to know his name. Perhaps he is one of the men whom we prosecuted for blasting in connection with the next building, and it may be rather spiteful evidence on his part.
5452. If this blasting did go on very frequently it would have a tendency to upset the whole packing, would it not, after it had become exposed? I have no doubt that blasting would do a certain amount of damage there; it would depend entirely on the size of the charges they put in.
5453. *Mr. Bavister.*] At Question 328 you were asked, "You have referred to previous visits of inspection to the next building which were made in consequence of complaints about the blasting?" and you replied, "Yes"; and at Question 329 you were asked, "Did those complaints arise in consequence of people thinking that their buildings were in danger from the excessive force of the blasts?" and you replied, "I think so";—if those blasts were so forcible as to endanger a substantial building, would they not be likely to shake out the packing on the span of the arch of the tunnel when the supports at its foot had been removed? In the first place, the building to which I referred was not a very safe one, and no doubt the blasting would affect that building a great deal more than it would affect the tunnel.
5454. Which building was that? Washington Soul's, if I am not mistaken.
5455. And were the person interested in that building the only persons who made complaints of this excessive blasting? Yes; the only person I knew of that addressed the Council on the matter was Washington Soul himself.
5456. Am I to understand you to say that the only complaint that came to you as to the force of the blasting there was from Mr. Washington Soul? That is the only one I can recollect.

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5457. I am not referring merely to written complaints;—were complaints of any kind made to you in any manner by persons other than Mr. Washington Soul? Yes, you are quite right. Hagon, the tailor, addressed the Council on the subject.
5458. And how far was Hagon's building removed from this blasting? Quite alongside; his place was on one side and Washington Soul's on the other.
5459. Which is nearer to the blasting—Hagon's building or the tunnel? Where they were complaining about particularly I think was nearer Hagon's. It was at the back where the blasting went on; one stone went through a window at the back, and I think that must have been nearer Hagon's than the tunnel.
5460. Do you not know that if a blast blows up it does not shake laterally? It depends, I think, a great deal on the charge.
5461. That is so in practice, is it not? Yes.
5462. Is not Hagon's on the other side of the Civil Service Co-operative Society's new stores from Washington Soul's? Yes; it is on the King-street side.
5463. And the tunnel is right along the face of the excavation? Yes; it runs in front of it.
5464. I think you have stated in your own evidence that the excavation for the Civil Service Co-operative Society's new stores went right up to the side wall of the tunnel? Yes.
5465. So that whatever support the packing on the spandril of the arch depended upon had to be removed to enable that excavation to be made, had it not? Yes.
5466. And was it not, then, impossible for the packing to remain on the spandril of the arch? No doubt it was impossible for it to remain there. I have repeated over and over again that it would be impossible for that packing to remain on the side of the arch.
5467. And this being so, would not this blasting which affected buildings also affect the remaining packing? I do not think it affected buildings in any way there.
5468. Would not the blasting which caused the owners of adjoining property to fear for the safety of their buildings have a detrimental effect on the packing? I do not quite see that.
5469. Do you think that their fears were groundless? I do not think that they had any very great cause for complaint, so far as regards doing the buildings any damage. It was principally the breaking of windows that they were complaining about, I understood. There were some windows broken in both places.
5470. When giving your evidence about that, did you make any reference at all to their fear of broken glass, or did you say that they feared for the stability of the building? I do not recollect.
5471. Whatever evidence you did give, then, would be true, I suppose? Yes, I think so.
5472. *Chairman.*] As regards the blasting of rock, to which reference has been made, was that rock which you knew had been blasted near enough for the blasting to do any harm to the tunnel, or to the packing round the tunnel? No; it was a long way from it.
5473. *Mr. Bavister.*] When we had one of your employees here, a question arose as to where he was employed on a particular day—I refer to Mr. Wadsworth; can you give any information as to the date on which he and the men under him were working at the Criterion Theatre previous to the opening being made across Park-street? I think that Wadsworth was working on the street at the time, somewhere between Bathurst-street and Park-street; in fact, I am sure he was.
5474. Is it a fact that, previous to the opening of Park-street, Wadsworth had been employed close to the Criterion Theatre in connection with the footpath there? Yes; I believe that he had been on the work right through from the Natatorium—coming northerly.
5475. And had he been preceding or following the Post Office men who were taking out the timbers? I think he was pretty well with them at every opening they were making—going from opening to opening.
5476. So that some of the Corporation employees knew exactly how far the Post Office authorities had proceeded with the removal of their timbers? Yes.
5477. The Council did not take any steps without full knowledge? In what respect?
5478. Any interruption of, or interference with, the works that were being carried out by the Post Office authorities? They knew pretty well what was going on.
5479. Then did you know that the Post Office authorities had withdrawn the timber from the railway end right up to the Criterion, and had gone back slightly along Pitt-street to complete some work, where the timbers had been withdrawn, when the Corporation men broke into Park-street? I did not know that.
5480. But the Corporation people did know that it was being done by the Post Office authorities? Yes; and we knew what they were going to do at that particular place.
5481. Will you kindly say what they were going to do? Yes. I think I have told you before in my evidence that we had heard.
5482. But just now you said you "knew"? Well, I was informed that they were going to tunnel under Park-street and remove the timber.
5483. And that was objected to? I do not know it was objected to. It was reported.
5484. I quite understand that you are not responsible for what the Mayor or the Corporation may decide to do, but, from your position, do you know that they insisted on the traffic being blocked at that particular place, instead of allowing the work to be done by tunnelling, without interference with the traffic? I did not know that.
5485. But is that what actually took place? The traffic was undoubtedly blocked there.
5486. By whom? By the Council.
5487. The Post Office authorities did not block that traffic, did they? They did not.
5488. And it was within the knowledge of the Council's officials that the Post Office authorities were going to do that work without interfering with the traffic? We understood that they were going to tunnel under the street.
5489. And that would not have necessitated an interference with traffic, would it? I question that very much; I believe it would.
5490. Could it not have been done by opening one-half of the street at a time—working from the Criterion side of the street to the centre first, and then meeting the other side, as has been done at other crossings? Of course it could.
5491. In your opinion, would not that have been more conducive to the welfare of the business community and the public using that locality? Yes; there is no doubt that that was the proper way to do the work—keeping only half of the street open.

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5492. *Mr. G. McCredie.*] You were not on the Civil Service Co-operative Society's job all day, were you—you were not continually inspecting it? No.
5493. Would not the foreman, or the ganger of the men who were excavating there, be in a better position to say what took place in connection with the carrying out of that work than you would be? Yes; probably so, if he is truthful.
5494. Do you question his truthfulness at all—do you know the man? No, I do not.
5495. He should know what took place, and if he came here and gave evidence on oath, we may take it as being correct? Yes.
5496. At the Question 4325, that witness, Cornelius Toohey, was asked by the Chairman, "You said just now that you had instructed the men to take the earth away—can you recognise any of the points shown on this photograph as places from which you instructed the men to take the earth away?" and the witness replied, "All I had to do was to get the men to work. I did not think that there was any tunnel at the back. We cut away the stuff, and the legs shown in the photograph were exposed. As shown in the photograph, they seem to be going down into the brickwork. This photograph was not taken as we excavated first, because when we excavated first the legs were going right down to the very solid bottom, as low as we went; and seemingly they were in our road, and the carpenter had the legs, which went down the full distance, removed and notched into the side of the brickwork, and put in these temporary legs, which I now recognise";—you would take that statement as being correct? Yes.
5497. Do you think that knocking about and taking out the timber would interfere at all with the packing and work at the side of the brickwork? I do not think it would affect any of the packing that you could see from the top of the arch through on to the top of the other side. It would not affect the close-packing of it.
5498. At Question 4327 the same witness was asked, "Did you take all the earth from under there?"—that is, from under the poling-boards—and he replied, "The men under me shifted the earth away. When we took away the stuff the packing that was near the wall of the tunnel, and some of the stuff on top of the arch, had to fall out, because we had taken away the support, and it was so much more for us to excavate";—you would take it that that man knew what he was talking about, anyway? Undoubtedly.
5499. Coming now to the blasting, the same witness was asked by Mr. Cook, at Question 4342, "If there was blasting carried on there, would not that shake the whole packing, pavement, and anything else?" and the witness replied, "I could not say that we did any damage with the blasting, although it is very likely the vibration may have done so. We blasted close on to the tunnel—as near as I can remember, within 3 feet. I took no notice of what was being done near the tunnel; but the 'boss' said to me, 'Be careful not to blow the bottom out of the tunnel.' I said that I would look out for that. We risk all these things. I was put there to do the work the best I could for him, and so I did"? I did not know that they blasted within 3 feet of the tunnel—in fact, I doubt it very much. Knowing that we had a man watching them hour after hour, and sometimes all night, I do not think they would do such a thing. They did not blast within 3 feet of the tunnel while my man was there.
5500. What was the name of the man whom you had there? Edward Read, a labourer, in the employ of the Council?
5501. The same witness, at Question 4247, was asked, "There was a statement made here that you could shove a pick-handle into almost any of that packing?" and the witness replied, "Not in front of that excavation. I never saw it. There may have been unavoidable holes. Most of it was packed up with ballast and sandy stuff, and there may have been a little finger-hole or something like that. I took particular notice, and went along looking, and I made the remark to some of the men that it was well packed. I saw nothing that I could see any defects in";—do I understand from the answer you gave to the question this morning, regarding the pick-handle, that you referred to a time after the photograph was taken? Before the photograph was taken.
5502. After the excavation for the building was made? Yes; the day we made a visit there.

William Mainer recalled and further examined:—

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5503. *Chairman.*] I want to know why you desire your evidence to be corrected? It is a very short matter. It refers almost entirely to Mr. Bavister's questions.
5504. Do you know what particular parts you want to have corrected? Yes; I refer to the last page of my evidence. I refer entirely to questions put to me by Mr. Bavister, in reference to the minimum wage clause. I am not going to dispute the answer that I gave to Mr. Bavister. I think that the gist of the question that Mr. Bavister put was whether I would, all things being equal, employ the man who was the cheapest.
5505. *Mr. Bavister.*] At Question 4737, I asked you: "You said something in regard to a clause respecting wages preventing contractors from employing men whom they chose—for instance, men getting into years;—do you prefer to employ men of years and experience when you are unhampered by conditions?" and your answer was, "I prefer to be free to employ any man I please, and if he is an elderly man or a weakly man, and his output is not equal to that of the best man, though his work may be equally good, if he is willing to work for 7s., as against the current rate of 8s., I ought to be free to employ him. It is against the principles of humanity to debar that man from employment; and that is the tendency of a minimum wage clause"? That represents my views.
5506. The following question is: "If you had two men offering for the one work of equal ability, but one being a man of greater years, and, consequently, of greater experience, and if you were unhampered by any conditions, which would you prefer to employ?" and your answer was, "I would prefer to employ an experienced man." And the next question was: "But if you had to pay him the same rate as a younger man you consider that does not give a contractor the freedom that he should possess—is that so"? and your reply was: "If you mean would I employ a man all things being equal, but one younger and the other older, and if I could get one for 1s. a day less——" then there appears to be something which is unsatisfactory to both you and myself? It is unsatisfactory to me in this way: I failed to discriminate between what might be regarded as a question applied generally and a question applied to myself as an individual; in other words, that answer makes me slander myself.
5507. What do you want to say? My practice has been never to take advantage of the opportunities that the labour market has afforded me. On numberless occasions I have had opportunities of employing men

men more cheaply; men have offered themselves. That is the experience of most business men, but I was not in the habit of availing myself of those opportunities. When I speak of employing a man at 1s. a day less if I please, and if he is willing to work for 1s. a day less, I wish to be understood as meaning that his output is not worth so much to me by 1s. a day as that of the other man. W. Mainer. 24 Nov., 1897.

5508. *Mr. Cook.*] That is governed by the market rate? Governed by the market rate for highly skilled men.

5509. *Mr. McGowen.*] Therefore, if you employ him, you take him at 1s. a day less? Yes; but not to my advantage, because the presumption is that his output would be worth less by 1s. a day than that of an abler and younger man—a man in the prime of life.

5510. That is what the question meant? No. That question puts me in the light of availing myself of any opportunity that offered to employ a man more cheaply; to get rid of a man to whom I paid 8s. a day, for instance, and employ another man, equally competent, whose output was equally good, at 1s. a day less. That has not been my practice.

5511. *Mr. Bavister.*] I quite recognise that an answer may be given which does not convey the meaning intended, but at Question 4740 you were asked by me, "The contractor wants the old man, if he can get him more cheaply?" and you replied, "Do you not want your boots, if you can get them, more cheaply";—is that intended to convey that you would employ labour on the terms most favourable to yourself that were obtainable at that time? It does not mean that.

5512. Then is that misleading answer drawn from you, as your letter to this Committee suggests, "in consequence of the complicated manner in which Mr. Bavister framed his question"? It is, undoubtedly.

5513. You consider that those thirteen words produced such a complication as to make it almost impossible for you to return an intelligible answer? Well, it is a peculiar question to ask, and I do not care to answer it in that way. I have given you credit for asking a very adroit question. I, without considering sufficiently long, fell into the trap, and answered it against myself; against what is my actual practice. I slandered myself; will that satisfy you?

5514. It is not a question of satisfying me; but is that not rather opposed to your statement, in answer to some of my questions, that age necessarily gives experience; you referred to the fact that you were getting gray, indicating both age and experience;—surely you do not mean to say that so simple a question as that led you into a trap? I am getting gray, as you say, and I am candid enough to believe that my output, if I were to work at the trade to which I was originally brought up, would not be what it formerly was.

5515. What trade was that? I was brought up to the carpentry and joinery. You must take my answer in this sense: Happily, I am not so reduced; but we will suppose that I am reduced to the necessity of working as a journeyman carpenter and joiner, and that you are my would-be employer, and that my outputis not equal to what it was twenty years ago. I argue that I have a right to be employed by you, and you have a right to employ me at 1s. or 2s. a day less, if you please, and I am willing.

5516. If you were a carpenter and joiner, (say) if you like from 50 to 55 years of age, and I required some cabinet-work to be done, or a good staircase made, would not the fact of your years and experience make you a man worth more money to me, if I desired to employ you for such a purpose, than a young fellow of 20 or 22 years of age, such as you would employ to put up joists on buildings? That would depend entirely on the kind of work you wanted to put the experienced man on.

5517. Supposing that I require a first-class cabinet or a good staircase made, which of the two men would be worth most to me? The experienced man, because the value of the services that his brain would contribute would be more than that of the services which the other fellow's limbs would furnish.

5518. Then where would be the necessity of refusing that man employment at the same rate that you would be prepared to give for a man of 20 or 22 years of age? Really, I cannot answer that. I do not understand the question. I should be glad if you would put it again. You make your questions so long that it is almost impossible to gather your meaning.

5519. You quoted a case in your own trade of a carpenter—I take that as the illustration which you can deal with best, and on which you are less likely to get confused—I desire you, if you will kindly do so, to inform this Committee, if you required a staircase of first-class quality to be constructed, or a bit of good cabinet-work, and two men offered themselves for that work, one being a young man of 20 or 22 years of age, and the other being a man of 50 or 55 years of age, which of those men for that purpose would be most valuable to you? The man that had most experience, whether he were the younger or the older.

5520. Where comes in the question of complication;—you say the man who has had most experience, whether he is the younger or the older? The most competent, if you like, I will say.

5521. Is it possible for a man of 22 years of age, being in the same occupation, to have had greater or as much experience as a man of 55? Some men of 55 have never had any experience of any value. I have met men of 40 and 50 years of age who were practically valueless as tradesmen, and I have met men of 21 or 22 who were skilful and clever. That cuts both ways. I have had a good deal of experience as an employer.

5522. *Mr. Cann.*] Would you apply that as a general rule? I cannot apply it as a general rule. I am only quoting one's experience. I had practically a boy for a foreman once, and I paid him 13s. a day.

5523. *Mr. Bavister.*] To go back to the question of the age of the two men and their qualifications for the work, supposing that a good staircase or good cabinet-work had to be carried out, would there then be any necessity to have the freedom to employ the older man at a lower wage? The freedom to employ whom you please, whether the wages be greater or less, is a right that pertains to freedom of contract, but what we are upon, is the question whether I would avail myself of all the opportunities that a crowded labour market would give me.

5524. I have asked no such question as that? But my answer is made to appear to be a personal one. I am merely defending myself.

5525. You, in answer to a question—I do not know where it appears, or in what connection—said that you had paid £300 a week in wages, I believe, week after week? Yes; I did for several years. I paid that in brickmaking and building operations.

5526. Can you say what number of men were in your employ, and the wages? Well, it is ten years since I left the business. The number varied from 150. I had more than that at one time—I had nearly 200 men in the brickyards and various jobs; but I cannot answer that question definitely. I have no record. My old price-books and bank-books would tell me.

5527. Was that in New South Wales? Yes; it was

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5528. Those men were in your direct employ? Yes.
5529. They were not employed on any sub-contract—you paid the individuals their wages? Generally speaking, my work was done day-work, as I explained before—not exclusively, but generally. Plastering was done day-work.
5530. As regards the payment of £300 wages to your own employees, to men in your own direct employ, did that occur week after week, or do you mean that such a thing might occur, because of delay of their payment for one week? My men's wages were never delayed in payment. I never was in that position. I always paid at 1 o'clock on Saturday.
5531. *Mr. McGowen.*] You are very much opposed to the principle of day-labour? I am opposed to the principle of day-labour, not necessarily, mind you, because work is done by day-labour, but I am opposed to the principle of day-labour in connection with Government employment, because of the opportunities of favouritism, in my opinion, and because I am wedded to the opinion that the same results cannot be secured to the taxpayer generally as when works are let under contract.
5532. Only that one objection, favouritism? I have given two objections.
5533. The results cannot be assured because of favouritism—that is the only objection you raise? It admits of opportunities of favouritism.
5534. In other words, it admits of men getting employment through political influence? That is what I mean.
5535. Supposing that the State specially guards against that, and makes it a condition that no man shall be employed except in the same manner as a contractor does, giving power to the overseer to dispense with the services of a man if he cannot do what is considered a proper day's work—in other words, putting the State on exactly the same footing as a contractor;—does your answer hold good under those circumstances? Yes.
5536. Why? Because I believe that in a roundabout way, which I am unable to describe, political influence will still be exercised.
5537. In other words, you do not believe it is possible to kill favouritism? No; I do not believe it is possible.
5538. You do not believe it is possible to prevent political influence from being exercised? I believe more than that.
5539. Do you believe that political influence is as strong in the Railway Service as ever? No; I do not.
5540. Then it is killed there? But you give the Commissioners powers under statute.
5541. Only powers to do away with political influence? Well, you are trying to get it back now in the Works Department, and have pretty well succeeded.
5542. I am only asking you a question about favouritism—you are opposed to day-labour on account of political influence? Yes.
5543. I ask, if we kill political influence, does your sole objection to day-labour disappear, and you say that political influence cannot be killed, and when I quote a case in point, and you admit that we have killed it? I do not admit it. I met that question by saying that you gave the Commissioners statutory powers. I am not certain that that killed it.
5544. Will you admit that there is no political influence there? No; I will not admit it, because I do not know. It is impossible for me to know.
5545. Have you any other objections to the day-labour system? Yes; because it has the effect of discriminating as between men. It fixes a rate of wages that makes the employment of only the best skilled and the most capable men arbitrary, and the first consideration.
5546. In what way does it discriminate between men? I should take the minute issued by Mr. Young once, in which he said, speaking of the Printing Office work, "The object of getting this work done by day-labour was in order that only the best and most capable men should have any chance of finding employment." Those were Mr. Young's own words. If that is carried out in practice, and I have no doubt it is, or is pretended to be, it is a cruel, brutal edict to come from any Minister.
5547. You say it is a brutal thing for a Minister to say that none but the best men should be employed—that is, that the men to be employed shall be those who will give us the best return for the wages we pay them;—now speak honestly, never mind yourself individually, is not that the general principle upon which all business men, all contractors, all foremen, work in employing men;—if you engage a foreman to do your practical work, with your interests in view, would he not engage the men who will give you, as his and their employer, the best return for your money? Yes; undoubtedly he would. I like a question put in that way.
5548. Well, if that is the ruling principle with the contractors, why do you object to it in the case of the State? But that does not exclude the old man or the weakly man.
5549. I asked nothing about that, but if that is the ruling business principle of business men, why do you object to it in the case of the State, and you say the State cannot get the best service? Because it is not a sound commercial principle in the case of the State. It does not follow that you get the best results necessarily, by excluding all the aged men when you can get them for less money.
5550. It is the same fundamental principle that guides you as a business man, is it not? The State does not follow that principle.
5551. Another thing you say is that the experience of the world is against the day-labour system? Exactly. You do not believe in it.
5552. You say, "I put the whole experience of the world against the suggestion"; you say that the whole experience of the world is against day-labour? Yes, I do.
5553. Do you know that it has been carried out by the London County Council? Yes.
5554. And that it has been a success? No, it has been a great failure.
5555. Do you know that we have reports from men who are administering it, such as an alderman of the London County Council? Yes; I know to whom you refer, and he told you a lot of untruths.
5556. I have the assurance of an alderman of the London County Council, that the day-labour system has been so eminently successful that they are continuing to carry on their works by it? I have reports at home of the committees appointed to inquire into the matter, which show that it is a lamentable failure, and that large sums of money have been lost.
5557. Do you know that the day-labour system is being carried on in America? I do not know particularly; I have no doubt that it is. It must be, of course, in many instances.

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5558. You do not know whether it is a success there? No; I have not studied American affairs much lately.
5559. You are against having a minimum wage? I am.
5560. You have been in the habit of paying wages to men? I have.
5561. And, in paying those wages, you have always had a minimum or lowest wage, have you not? All men were not paid the same wage—a maximum.
5562. There is always a less wage paid to some men on your work? Undoubtedly, some men have less than others.
5563. There is always a standard wage, too—some men get a little bit above the minimum wage? Yes; I think most contractors pay some men above the current rate. I know I did.
5564. There is what is called a maximum wage—you may have a first-class staircase hand who is paid 12s. a day, or a lot of carpenters who are paid 10s. a day each, and you may have another man working for you who gets 9s. a day, the minimum? Yes; for the sake of argument I will admit that.
5565. That is the custom that prevails with all contractors? It should be the custom.
5566. By that means you discriminate between the classes of workmen? Yes.
5567. Look at this phase of the minimum wage question as a carpenter: You having learnt to be a carpenter, your fellow carpenters come to the conclusion that no carpentering work, even if it is rough carpentering work, shall be paid for at less than the minimum wage of 9s. a day, and what I want to point out to you is that the Government in fixing a minimum wage have done only what the contractors have done ever since men have been employed in civilised countries; the minimum wage does not necessarily become the standard or maximum? I think it does.
5568. *Chairman.*] In regard to the question that Mr. Bavister was asking you about, and in regard to your evidence in reference to which you asked to be called again;—do you mean to convey that if of two men seeking employment one was older and not so qualified as the other, and could not return to you by 1s. or 2s. a day as much as the more competent man would do, you should be allowed to employ the less competent, although you would not receive any benefit thereby? Yes; I should have the right to employ him. I have no right to take advantage of the state of the labour market.
5569. *Mr. Bavister.*] A question arose as to whether Government day-work was based on sound commercial principles;—do not some employers, acting on the basis of sound commercial principles, employ one or two old men and a number of lads? I have no doubt they do. Unfortunately, I know of some very sad cases where advantage is taken of the state of the labour market.
5570. If their conduct were challenged would they not defend it by the assertion that they were conducting their business on sound commercial principles? I do not know what they would do.
5571. But you admit that such methods of carrying on business are in vogue? Yes; I very much regret to say there is a good deal of sweating carried on—too much. I have known of things that have shocked me, and of which I have been ashamed, but I should like to say, in speaking of the contractors, that my experience justifies me in saying that that body of men will compare more than favourably with any other class of employers that I know.
5572. Has there been any tendency shown in the Government work for that kind of evil to be perpetuated? How could I tell?
5573. Do you know of any? That is a question I should ask to be excused from answering.
5574. Do you know of anything indicating a tendency to perpetuate that very evil in connection with Government day-work? I do not know; how should I? You have dwelt very much on commercial principles. I discriminate as between the State and individuals. If the State undertakes to employ people at day-labour, it has no business to discriminate. Its favour should be distributed equally. While the State has a maximum wage for men of the highest degree of skill, it should make such provision that those of less skill may be employed, and men whose output is otherwise less.
5575. You remember a meeting at the Builders' and Contractors' Exchange at which Mr. Neild, myself, and Mr. Alderman David Davis were present? Yes.
5576. Do you remember any reference being made at that meeting to some cement having been condemned on some works, and its being asserted that this cement was taken over and used in the construction of the Government telephone tunnels? Yes; I remember its being said.
5577. Do you know who made that assertion? I think it was Mr. David Davis, but I am not certain.
5578. Does your memory serve you as to whether he quoted the number? Yes—500 casks.
5579. You have, I think, paid some attention to the manner in which the paper known as *Liberty* is conducted? Yes.
5580. Do you look upon its reports as reliable and truthful reports? If they are reports furnished by myself, I do.
5581. I meant its officially-taken reports; you are aware, I believe, that *Liberty* had a reporter at that meeting—the gentleman who conducts that paper was at that meeting and took a very prominent part in it? Yes, I think he was.
5582. And under the circumstances, would you not look upon the report of that meeting, in that paper, as a correct one? I should imagine so; but he is responsible for what he publishes.
5583. Are you a member of the National League? I am now. I was not at that time.
5584. Are you aware that that publication carries on the face of it the names of important public men who, when on oath upon this Committee, have stated that those names appear there without any authorisation on their part, and without their being members of that association? No, I am not aware of it.
5585. Would you look upon such a state of things as being creditable for so large an association, if it were known to exist? If it were known to exist I should think that such a state of things was most reprehensible. If, as you say, such a state of things exists, I should think, according to my code, it is most rephrehensible.

John Francis Hennessy sworn and examined:—

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5586. *Chairman.*] What are you? An architect, of the firm of Sheerin and Hennessy. I am a silver medallist and Ashpital Prizeman of the Royal Institute of British Architects, London.
5587. *Mr. G. McCredie.*] You have gone through the telephone tunnels and made an inspection? I have made a very careful inspection of the whole of the works, as far as I was able to get at them, both underground and at the various excavations that were made, from the first day that I was asked to inspect those works. I have been through the whole of them underground.

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5588. Will you give the Committee a general report of what you saw, and your opinion of the work underground? The brickwork underground, I believe, is about 3 miles long, and it is the first work of such a vast extent that I ever saw in brickwork without the slightest sign of a fracture or a settlement throughout. The work is not in a straight line; it deviates first to the right and then to the left, and then it descends and ascends. These deviations were necessary on account of the various obstacles that were in the way. I examined very carefully and critically the junctions at every bend, at every descent, and in no instance did I see a sign of a failure. The work is a good, strong job, economically carried out. The bricks I consider to be suitable for the work. They are strictly in accordance with the specification; they are the particular kind of brick that was called for. A wire-cut brick was called for, and the advantage to the engineers in calling for that brick was that the brick itself, being wire-cut, is rough and has a splendid grip on the cement mortar used for the work. The work is amply strong enough for all the practical purposes that are required of it there, and that being so, it has a splendid grip of the mortar—a far better grip than a double-pressed sewer brick would have, or than a dry-pressed brick would have. The brick is one that our firm has used in several buildings. One building particularly that I would recall is a large steam laundry at the St. Magdalen's Retreat, Cook's River. The ground there may be said to be practically under water in wet weather; in the excavations, if you go down 2 or 3 feet, you come across water. We selected that brick specially, because, in our opinion, it would not disintegrate under the action of water. It is a plastic brick, it is a cheap brick, and it does not facilitate the growth of fungi which you occasionally see upon bricks. I examined very carefully the numerous openings that were made in the walls of the tunnels where jack arches or relieving arches had been placed over to take the weight off any pipes that were underneath. I may say that this work was essentially one of contingencies. It is a work that no specification could adequately describe for a contractor, because there are no records in existence of which I am aware—and I have had a pretty good experience in Sydney for some years—showing the positions of the sewers and the pipes previous to the existence of the Water and Sewerage Board. No man in drawing out that specification could have placed on plans the various obstacles that would have to be met with by the contractors in carrying out the work; you will see in various places where jack arches and other relieving arches are placed to allow of pipes to go just level in some instances, or almost level with the bottom of the tunnel; and in some instances, very rarely, they pass through the roof. I examined the cement and the bricks in those instances, and I found them very good indeed. I found the mortar very hard. I daresay I tried the mortar in over 500 different places in the practical way we generally do try it—in the joints. The walls, the sides, are struck work, and the roof is what is called bag-wiped.

5589. Will you tell the Committee what sort of bricks were in the roof? Radiated bricks gauged to the shape to form the arch—wider on the outside than on the inside.

5590. How is the bag-wiping done? While the mortar is green, before it sets, they take a rough piece of canvas or old bag and run it along evenly; it fills up all the places where dust or dirt might get into and also rubs off all projecting portions of mortar to make it quite smooth, so that there is no place for either dust or dirt to settle upon.

5591. Will you go on with your description? Speaking of the inside first, I think that it is all that could be desired for a work like that; it shows the advantage of employing an outside private firm, because one thing that struck me particularly was that the work had been done economically; it is very strong, and it is a different type of work from what is generally done in connection with the Government offices—that is, every effort has been made to save expense throughout, as far as I could judge; but not at the cost of substantial or thorough workmanship. As far as I could judge of the brickwork, it has been done by skilled workmen; there is every evidence of it. I tried to put my knife into any number of joints, and it was very rarely that I could get my knife in three-eighths of an inch, and that is a splendid test for work of that description.

5592. Did you observe anything about the drainage of the tunnel? Yes; I noticed that the drainage throughout was very perfect; the subducts seemed to be clear; I did not notice them to be choked up in any instance; and adequate provision had been made to deal with the matter of the subsoil drainage. This is a matter to which I paid particular attention. You may take this telephone tunnel from one point as acting as a wall to the subsoil drainage—a dam, in fact, to the subsoil drainage. There is naturally a considerable subsoil drainage, and if you first walk overhead you can from your judgment say, "I will go underneath here, and I am sure that I will find a natural weepage there caused by the obstacle of the tunnel to the subsoil drainage." You can then go down and verify your statement. In crossing a street, for instance, Park-street, where there is a subsoil drainage right from Hyde Park, the geological strata has been interfered with, and the subsoil drainage has had to work itself out. You can then go to Liverpool and to Bathurst streets, and lower down to Kent-street—to the different crossings where there is a natural fall, and you would expect to see the subsoil drainage manifesting itself—and in every instance my judgment was verified down below by seeing the east side of the tunnel damp; that is to say, that the engineers in designing the tunnel had foreseen this, and had provided adequate drainage to deal with this subsoil drainage, and run it underneath, as far as they possibly could, right out into the subducts and the outside sewers.

5593. Perhaps you will now deal with the street openings you saw made? My first visit to the surface openings was on 1st July, at Liverpool-street, on the north corner. Twenty-eight feet was opened. I doubted the packing; I did not wish to trust appearances, and as soon as they lifted off the boards I went down myself. I took a spade first to try and move the packing. I was unable to do it without a pick, and I took a pick and went over the whole of the 28 feet. I tried it throughout the length, and it proved there to be very good, well-rammed packing—solid. It was well packed with brickbats, rubble, and clay similar to the formation surrounding it. But, as I have said before, this work is essentially one of contingencies, and at this first opening I met one of the contingencies. On the east side there was a drive for an old drain, and you could see the formation of the drive with a natural arch in the clay, and this old drive had been filled up in the way I have seen them often filled up previous to the Water and Sewerage Board taking control—that is, with road scrapings and any soft filling they could get handy: The men were not supervised who did these fillings, and the result is that with moisture the filling consolidates. Moisture consolidates all filling. The filling had subsided alongside the side of the excavation, but the packing was quite solid. The pipe, I think, was a 12-inch pipe. In one small place part of the packing had slid down. Nothing could prevent that, unless at great expense, the drive was

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followed down and refilled, and no man would be justified in doing that for the results obtainable. On the west side of this there was the dead-end of a 12-inch drain-pipe. The last 2 ft. 9 in., that is the southern portion of the 28 feet, was apparently the meeting of two drives. Liverpool-street has a very great fall down there. The upper portion of this 28 feet was practically protected from the subsoil drainage, but the lower part was not. The lower part got the subsoil drainage down the street, and whereas in the upper part the packing was close up to the poling-boards, in the last 2 ft. 9 in. the packing had consolidated probably 3 inches, and it was very wet compared with the other; but I wish particularly to point out that (the poling-boards are as near as they practically can be—1½ inch apart. At the top of this consolidated portion—and in nearly all consolidated parts of the packing I noticed the same thing—there was evidence that the packing had been forced in the crevices) they had rammed the packing in as well as they possibly could. In this particular case, and in others where water had consolidated the packing a little, there was evidence that the packing had been put in the crevices. Before the packing was disturbed there was evidence in many instances of a small ridge which had sunk down, caused by the action of the water. The boards were an inch or an inch and a quarter, or an inch and a half in some places, apart, but there was some part of the packing that showed a key under it in the shape of an impression that had dropped down from some solid substance owing to some action of the water. This and the smoothness of the surface of the consolidated portion are ample proof that makes me say I am certain that this packing was done in an efficient manner, close up to the poling-boards, when it was left. If it had not been so, they could not possibly have got a small ridge upon it, as there was in many instances. I examined the whole of the work as it was opened between Liverpool-street—when I was first called in—down to King-street. I inspected 19 feet just opposite Walder's, in Pitt-street, and saw the boards lifted. The packing was done in a thoroughly workmanlike manner. A portion of the top of the tunnel was bared, and the bricks were generally flushed. On the 7th July I inspected again the centre of Liverpool-street. On the 7th July I also inspected 60 feet of Bathurst-street, opposite 286, to the end of Townsend's. I found the packing done in a close, workmanlike manner, with proper material; but it had consolidated slightly. The top of the packing had been jambed against the flat surface of the underside of the poling-boards, and there were slight signs of ridges caused by the crevices between the poling-boards, showing that the work had been done efficiently. I had 26 feet of the top of the tunnel bared. I examined the brickwork carefully, and found it well-grouted and flushed up. On 8th July I went through sections 1 and 2. I have already described my impressions in regard to those. Wood-bricks were placed in those for fixing the galvanised-iron frames, and the frames were secured by bolts which were securely fixed 4½ in. in the wall. Cook's bricks were used throughout the whole job. Where openings occurred the bricks were sound and well bedded in cement, and the arch bricks were radiated. The cement floor was sound and substantial—no settlement was observed. Sections 1 and 2 of that contract are 5 ft. 6 in. high. On 8th July I went through No. 2 contract, going from Moore-street to Gresham-street. I found it fairly dry throughout—drier than I expected to find it. I examined it very carefully, and in my opinion the work on these contracts is well done; but I think that the work on the day-labour sections—the latter portion of them—is better than that on the contract section, which was not so well finished as is some of the day-work portion. There was a subduct the whole length. On the afternoon of the 8th of July the poling-boards were lifted at the entrance to Macintosh's, on the railway-station side of Park-street, in Pitt-street. There was in one portion a consolidation of the packing; but on examination an old drive was found there. The filling-in of the old drive had fallen back a little, and allowed the packing put in by the workmen to slip down, causing a slight consolidation there. Opposite Macintosh's there were two joints of the brickwork not filled in. I may say, in reference to that, that these bricks were at the top of the tunnel, that the work had to be done by men in the dark—they could get no light to it so close to the caps, and they did this particular work by feeling; and considering the spaces that I saw bared—that I asked to have bared—on the top of the tunnel, and the very few instances of these hollow joints that I saw, I consider the work had been done in a remarkably careful manner. It is impossible for an inspector to supervise the top joints, and it is impossible for the men to always do the work perfectly. The outside work as a whole was done very well. On the 9th July I was in the tunnels, and went to the dead-end of the Equitable Building, and across George-street and Barrack-street. On this occasion there was a leak from a service pipe overhead, and there was a very slight percolation through the soil; but you could tell at a glance that the cause was a local one, and it was easily discovered and rectified. I went through York, Clarence, and Kent streets, and at Druitt-street, going down part of the way where there is a small tunnel that runs into Harbour-street. My concluding note on those streets is: "The Kent-street section is a sound, well-drained, well-finished, workmanlike job." I made notes of a number of the holes that were cut for pipe connections on the east side of Pitt-street. There were close, well-filled joints, and the cement was good. Where brick vaulting has been carried out, it has been done by skilled workmen. From Campbell-street the rendering was ⅝ inch to ¾ inch thick, commencing from the footings, 2 feet 6 inches high part of the way and rising to the crown. That is in the vicinity of the sewer. Where it passes under the sewer the whole of the tunnel is rendered, and this rendering has been done in a very substantial manner. It had set hard, and was well done. They are all well drained, and where the tunnel goes under the sewer a sump pit has been constructed for drainage, with a water ejector. On the 10th July I was examining the tunnel from Hay-street to the Railway Station. I walked along the footpaths over the tunnels on the 12th, and saw no marked signs of settlement of the pavement anywhere—in fact, this pavement would compare most favourably with any long length of side-walk in Sydney during my recollection. In the evening of the 12th I first inspected the settlement in the roadway at Park-street.

5594. I should like you to explain to the Committee fully your impression with regard to that settlement under the road in Park-street? I examined it very carefully on a dozen different occasions, and I am as sure as any man can be that the cause of that settlement was water. I considered the question of carelessness on the part of the workmen underground. If that settlement in Park-street had been caused by the workmen's carelessness in working and excavating by letting more earth fall through than they should have done, the settlement above it would have been irregular. If more earth had fallen than should have been excavated, through the carelessness of the workmen, and a settlement had taken place, that would to a certain degree have dropped down bodily, leaving an irregular surface on the top of the soil below the concrete. I examined this part very carefully, and there was every evidence of the surface of the soil underneath the concrete being water-worn. It was smooth with practically one fall right away down to

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the lowest part of it. More than that, it had a green scum on it, in portions of it. There is no doubt about that. There was evidence of that being water-worn, and there was a green scum on the surface of it in portions which could only have been formed by water. This, in my opinion, is nothing very unusual under wood-blocked streets. The ground under the roads is always travelling or working, and one of the causes of the resonance of the wood-blocked streets and the great complaint made by shopkeepers is that the frequent occurrence of these settlements, although on a smaller scale than this, form what may be called a drum-head above it, and creates a large amount of the noise that is complained of by shopkeepers. On 8th November, while passing along Castlereagh-street, opposite to Roberts', the solicitor, office. I saw the men working in the street. I went and examined what they were doing. I came across an excavation there that was at least 9 ft. by 8 ft. 11 in. under the concrete. It was water-worn. It was caused by a leakage. I measured it, and found it to be 14 inches deep. I have said that it was at least 9 ft. by 8 ft. 11 in., but the iron bar that I used for testing it was not long enough to reach the end of the excavation. My note concerning it is: "This is a similar occurrence to that in Park-street, and there is no question about it that this is caused by the action of water." When the excavation was opened in Park-street, I was there early, and I saw in a marked manner the weepage from the subsoil. I saw in one place that it had concentrated itself at one particular part, where it came drop, drop, drop, drop. That was immediately over the hole underneath where they had forced a pick-handle down. The pick-handle showed a hollow space. The excavation at the side had been so carefully done—that is, by a straight line apparently—and so little more than was necessary, that there was not a large space for filling in on the sides—that is, below the springing of the arch. This at the sides had apparently been filled in with quarry sand. By quarry sand I mean a coarse sand that will allow the water to go through without carrying everything away with it. It is well known that where water will go sand will generally go. Some of these interstices are practically so small that it is necessary to fill in with sand. The subsoil drainage having been interfered with by the construction of the tunnel, nature, of course, finds another outlet for the drainage, and, in my opinion, where that pick-handle was used was a place where the pressure of the moisture had washed out a connection down to the drains that had been built for draining the tunnels. The side walls of the tunnels had been filled in, in the best approved manner, with the most suitable material. Where such an opening as that occurred, it was simply nature asserting her right to provide an outlet for the subsoil drainage, and, in my opinion, the subsoil drainage had something to do with the settlement to which I referred previously on the north-west side of Park-street; but, at that north-west side, every preparation had been made for a settlement (which, in my opinion, had been in existence previous to the construction of the tunnels), owing to the existence of an old drive. You cannot fill in an excavation with any material that is known which nature will not consolidate after man has done his utmost. Across Park-street also there were a number of pipes. I think I counted thirteen. On the west side of Park-street, beyond the line of the excavation, there was a settlement of 3 inches over a space of 4 ft. by 3 ft., which I tried, and my bar would not go further than that, in addition to which the Hydraulic Power Company's pipe had been tunnelled through under the sidewalk, and an attempt had been made to fill it in loosely with what appeared to me to be a mixture of clay and sand. This filling in I could remove with my hand, in addition to which this fall-in was so smooth and rounded at the edges that it could only have been caused by the action of water. The water had smoothed off all the hard edges. If these had been sinkings only, not caused by water, there would have been an irregular surface, but both this and also the settlement in front of the Criterion were worn so smooth and rounded that it was evident to me that even if water had not actually caused them, it had been the chief motive-power in regard to them. On 15th July, I inspected the raising of timbers to the extent of about 50 feet in Pitt-street, opposite Lucas and Kearey's. The packing was very sound and full, the timbers were all well preserved, and—I wish to emphasise this matter particularly—in every instance I found the timbers as well preserved, and in as good a condition, as on the day when they were put down, and, if I had been the owner of one of those frontages, I would have asked that the sets of timber should be allowed to remain in. I watched this length particularly, to satisfy myself on the question of inconvenience to the shopowners. The men commenced to take this 50 feet excavation up at 7 a.m., and it was filled in sufficiently for business purposes by 4 p.m.—that was a length of 50 feet. If this had been done by open-cut work, instead of tunnelling, it would have caused probably three weeks inconvenience in connection with the shops, and would have been a gross injustice to the occupants of the shops, whereas by doing it by tunnelling, and afterwards taking the timbers out from above, although it may have cost a little more, still it was a great convenience to the occupants of the shops, more particularly in the depressed state of trade which we have had for some time. I was referring previously to the consolidation of packing caused by moisture, and also to the consolidation of filling in. On 15th July, I made a careful examination of Devonshire-street—the portion between the railway station and the Benevolent Asylum. This has cube sets, and the action of the rain and subsoil drainage, &c., was such that it was almost like small waves of the sea, and you will notice that very often where there is blue stone paving, and where there is a natural fall in the ground, the soil works and makes holes and ridges in the bluestone paving. This I mention to emphasise in a small way the action of water under concrete, because the earth is what we may call always moving. In reference to subsoil drainage, I have the following notes of things that you could observe from the inside of tunnels. In King-street, on the east side, the walls show moisture—that is, going along Pitt-street—then dry beyond. At Market-street, the crossing, where the subsoil drainage goes across it, is moist on the east side, then dry beyond, except where you will find any large open spaces that drain towards Darling Harbour. Anywhere you can see a large opening like that you will find in the tunnel the exact place indicated on the inside wall by the appearance of dampness. As I mentioned before, every provision had been made by the engineers for this work for the subsoil drainage. At Park-street the crossing was wet on the east side, then dry beyond, except at the large openings. At Bathurst-street it was wet; at Liverpool-street it was wet on the east side; at Goulburn-street it was wet, and on the Kent-street branch you could find the same indications of the obstruction of the subsoil drainage on the east side. The King-street and the Clarence-street crossings are very moist on the east side, and they are dry immediately before you come to the crossing, and immediately afterwards, the Druitt-street, the Bathurst-street, and the Liverpool-street crossings also. I made notes in Pitt-street in reference to the working of the subsoil on the west side, which has caused settlement in the paving, and broken flags. There were fifty-four broken flags between Hunter-street and Market-street, not where the telephone tunnels were, but on the other side of the street, caused by settlements of the subsoil. There were twenty-three broken

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flags outside "Warby's Hotel" alone. There were thirty-four broken flags near Hordern Brothers. There were thirty-three broken flags outside Farmers'; and there were seventy-four broken flags on the west side of George-street, between Market-street and King-street. I wish to refer now to the concrete. The strength of concrete over Park-street, taking it as a slab 9 feet long by 6 feet wide and 9 inches thick, standing alone—whereas this had lateral support at the sides, and, therefore, would be stronger—would carry an evenly distributed load of from 20 to 23 tons, and there never was at any time the slightest necessity to raise the question of safety in reference to the road in Park-street.

5595. *Chairman.*] Do I understand you to say that that concrete of itself, without any support, would carry an evenly distributed load of 23 tons? Yes. I was at a concrete test at the Centennial Park—I think somewhere about 10th August. It was only breeze concrete of 6 to 1, whilst that which I have referred to in Park-street was bluestone concrete, the span was 18 ft. 1½ in., the thickness at the crown was 6 inches, the rise of the arch was 3 ft. 4½ in. This was done as a test, and they had to construct abutments to take the thrust. The abutments were constructed of brick and cement 1 ft. 10½ in. thick—in other words, the slab of concrete was 18 x 1½ span x 2 ft. 8 in. wide—and I wish to emphasise the fact that it was only breeze concrete. That stood a strain of 11⅔ tons before it broke, and then it only broke because one of the abutments slipped. Breeze concrete has not nearly the strength of bluestone concrete, which is very much stronger. The test was made at the new reservoir at the Centennial Park on John Ahearn's contract, and it was made in the presence of Mr. Darley and the officials of the Department.

5596. *Mr. McGowen.*] What do you say the Park-street crossing could stand, according to that? An evenly distributed load of from 20 to 23 tons.

5597. Therefore, there was no danger to the vehicular traffic? There never was, in my opinion, the slightest ground for raising any alarm whatever with reference to the strength of the road there. On 9th August, I inspected the excavation at Market-street, and found that the soil was hard up to the concrete everywhere, except over the Hydraulic Power Company's pipes, where it was from 2 to 3 inches slack.

5598. You saw the openings, too, in other streets? Yes.

5599. Will you state whether there was any depression like that in Park-street? I have mentioned those already.

5600. While you were making these inspections, and measuring these places, I suppose that officers of the City Council and persons employed by them were at the same time? Yes.

5601. They saw you make these examinations? Yes; I saw Mr. Gordon there several times, Mr. Wadsworth and Mr. Browne.

5602. And you were very particular to take notes at the time of exactly what had occurred? Yes.

5603. That is the evidence which you are giving the Committee—of what had occurred at the time those excavations were made? Yes. In regard to the bricks, I may say that a similar class of bricks to these were used at the Pumping Reservoirs, in Crown-street. I called to see those on 13th August. I inspected the pump-well, supply wells, and the foundations of the engine-house, and engine-beds, all made with similar bricks—wire-cut bricks from the same kiln, eight or nine years old, and they were in splendid condition. The life of timber under the most unfavourable circumstances would be far longer than the life of flagging, and where ground is oozy, or foundations are difficult to get at, wood piles are generally used. For instance, a portion of Gibbs, Bright's stone building is erected on wood piles. I have a sample of wood here seventy years old when it was taken up. It was taken out of a well on a contract we were carrying out in King-street, and was part of a conduit pipe such as was used in the earlier days of the Colony for drawing water up from wells. This piece of wood is as sound now as the day it was cut. It was taken up in 1892.

5604. *Chairman.*] What timber is it? Ironbark. There are many such instances to be found in and around Sydney. I believe that our Australian hardwoods are equal to any timbers in the world. We know of wood that is 2,000 or 3,000 years old—those are instances thoroughly authenticated. No one can say what the life of hardwood would be, but this piece was underground seventy years, and it is as good as the day when it was cut.

5605. From that block of wood that you produce, I presume the air has been absolutely excluded? No. In portions it would be excluded, but it was in an oozy kind of place, where the air would not be absolutely excluded.

5606. Well, that makes all the difference? Yes. I have brought this piece of wood here, because it was in a position similar to that in which the timber which has been used in the telephone tunnels was placed in, and the circumstances you may say are identical.

5607. Is the air excluded from the timber in the telephone tunnel? Practically excluded; as much as it was in this case.

5608. *Mr. McGowen.*] Practically you cannot fix any life for Australian hardwood? I believe it is one of the best woods in the world; no one can tell the life of it, but this piece is nearly 100 years old, and it is as good as on the day it was sawn. The cost of the bricks in the tunnel would probably be from 31s. to 32s. per thousand. If double-pressed bricks, which are generally used in Government underground works, had been used in these tunnels, at £4 a thousand, the day-labour work would probably have cost £6,000 more. The saving shows the advantage of employing a private firm—a firm that is up to date, and who are not afraid to use material, simply because it is inexpensive. I consider the design to be suitable in every way for the work the tunnel has to do. Being flat at the bottom is an advantage, because it gives the broadest base where the ground is soft. If any other form of base were used, except the straight base, it would not give the facilities for practically using the tunnel which are required by the Government, and if the sides were built with a slope out in any way like sewers are built, it would weaken the design, because these tunnels are often built where a number of old drives that have been imperfectly filled in occur. Then the greater portion of the tunnels, as I am informed—more than three-quarters—is on the rock, so that it would be absolute waste of money to construct from any other design than straight walls, with a flat base in such portions. No advantage would be gained by having the design either sewer-shaped or horse-shoe-shaped at the bottom. Portions of this work had already been completed for eighteen months, and I saw no signs of settlement, crack, or failure throughout, and wherever any opening was made in the wall—and this was done in a great number of instances—very sound work was exposed. I consider that the thickness of the walls is amply strong enough to sustain any load that would be brought over them. The timbers are also strong enough to do the work which they are required to do. I was repeatedly

through

J. F. Hennessy. 24 Nov., 1897. through the tunnels, and in no instance did I find the slightest vibration caused by overhead traffic. I believe that the packing was as well rammed as it was possible for it to be done. I have here a sample that proves how the ramming of the packing was done. I saw very many instances of this. This shows where the rendering on the top of the brick-work had been rammed into a conglomerate with the packing over it. If it had not been well rammed you would not have seen so many instances of this. There was a rendering put on the outside of the bricks, and in many instances you can see the evidence of the scraping of the rammer on the top of the brickwork. This is a conglomerate caused by the packing having been rammed up in a corner against the rendering. I have two pieces of cement here that I took from the opening in Park-street. I had to break them off with a hammer. They are of very good quality. I took them off the brickwork. They have been in a dry place ever since, and one piece is not so hard as the other now, but they had both to be hammered to get them off the brickwork.

THURSDAY, 25 *NOVEMBER*, 1897.

Present:—

MR. BAVISTER, MR. CANN, MR. COOK, MR. HARRIS.

W. J. LYNE, ESQ., IN THE CHAIR.

A. L. McCredie, Esq., appeared in person in his own behalf.

John Francis Hennessy recalled and further examined:—

5609. *Chairman.*] Have you any further evidence-in-chief to give? No; I do not think that I have.

J. F. Hennessy. 25 Nov., 1897. 5610. Have you had any experience in tunnel building? Not particularly in long tunnels—not further than short drives for sewers; but I have had a general building experience extending over nearly thirty years, of all classes of work, in England, in America, and in Australia.

5611. Have you ever had any experience in connection with sewerage tunnels? No, not particularly in reference to sewerage tunnels; nothing further than short lengths of sewerage.

5612. You are an architect? Yes.

5613. In what way did you test the cement that you saw in connection with the various openings to which you referred in the previous part of your evidence? I tested it with my knife in a great number of cases—that is the general practical test—and in some instances, where I could get broken bricks, I tested them with a hammer or with a bar.

5614. Had you any knowledge that a lot of cement that had been refused by the Works Department was used in connection with this tunnel? I had no further knowledge than from what I read in the newspaper in reference to the matter, and I asked where it was, and I was pointed out a particular part where it was used, and I tried it there, and I found very little difference between that and any other cement.

5615. What part was that? The place was pointed out to me by Mr. Donald, but I cannot just now find that portion of my notes which refers to it. Mr. Cardew was with me on the day this was pointed out by Mr. Donald, but the exact position of it I cannot find out from my notes.

5616. Then you cannot point out exactly at the present time where that was? No; I do not see it in my notes, but I remember the circumstance very well, and I recollect Mr. Cardew being with me at the time, and that we asked Mr. Donald to point out the place.

5617. Was Mr. Donald with you throughout your investigation? No, only at our request, when we wanted information from him.

5618. You say "we"—who else was with you? Mr. Cardew was with me two or three times. We wanted the position of the cement pointed out.

5619. Was Mr. Cardew with you all the time? No, not all the time.

5620. Who instructed, or requested, you to make the investigation? I was asked by Mr. Walker to prepare myself to give evidence before the Committee.

5621. Then you made it on behalf of the Postal Department? I suppose so.

5622. You would know that from who instructed you and paid you? I have not been paid.

5623. On what date did Mr. Walker request that you should do this work? I think it was somewhere about 1st July.

5624. Did you make any report? No, I made no report.

5625. You have not made any report at all to the Department? No; I was not asked to do so.

5626. What, then, were you instructed to do? My instructions were to carefully examine the work and make myself as well acquainted with it as I possibly could, with all the excavations that were being made, up to the time of the meeting of this Committee, so that I could appear before you to give evidence, and assist you in the inquiry. In reference to a report, one could not make a report except an interim report, because the excavations were going on for weeks or months, after I was first instructed, and only a partial report could have been made under the circumstances.

5627. What excavations? On the sidewalks, taking out the timbers.

5628. Do you know when that work of drawing out the timber was commenced? No, I do not know when it was commenced.

5629. You said that the tunnel was well drained: what do you mean by "well drained";—how was it drained? There are a certain number of manholes for ventilation purposes. A certain quantity of rain is bound to get down there, and these underground works weep to a certain extent, and every provision had been made to carry off any moisture that would come in that way.

5630. Do I understand you to mean that the drainage was from the inside to the outside—that is, to keep the inside of the tunnel dry? Yes; connected with the sewerage system—sub-ducts.

5631. Was the tunnel in any way drained or protected outside by drains? Oh, yes; of course, in carrying out a work like this, you interfere with the geological strata, and the drainage of the sub-soil, and every provision had been made, so far as I could see, by the engineers, in the way of having rubble drains on the outside, and drains to carry away any of the weeping from the sub-soil, and to carry it into the sewerage system, so that there would be no particular force of water dammed up at the back of it.

5632. What rubble drains were at the back—on the outside? You saw the openings in Park-street; well, in taking out an excavation to put the brickwork in, you cannot take it out exactly, and you take it out,

out, say, 6 inches wider than the brickwork. That has been filled in with hard quarry sand, or small spawls, as small as they could possibly have them, and sand. They act as rubble drains.
5633. That is alongside? Yes. They act as a kind of rubble drain to intercept the subsoil drainage and to carry it away to the sewers.
5634. Was it filled in in that way all through? I can only say what I saw. As far as I saw, the work had been done in a good practical way.
5635. Quite so; but what was that outside—6 inches, 3 on each side, or whatever it was—connected with? A perforated drain at the botton, and down the centre of the tunnel there was a subduct.
5636. Outside? No, inside at the bottom.
5637. But I am speaking of the outside? A rubble drain.
5638. I want to understand clearly whether the whole of the tunnel was drained on the outside by means of rubble drains in the way in which you have described? Of course, I am not competent to answer that question, as I can refer only to what I have seen.
5639. I want you to be clear as to what drains you know of outside the tunnel, because you have already said that it was well drained outside the tunnel? Yes.
5640. I want to know in what way, because we have no evidence that I know of that it was drained outside the tunnel? The weep-holes will show that provision was made for the drainage, where the drainage comes in through the weep-holes in many instances.
5641. That is inside the tunnel? To drain the outside of the tunnel to the inside, in the particular parts I am speaking of. There was a small fine-rubble drain along the side, and the weepage from the subsoil would come against that and wash down, and you can see in numberless instances adequate provision by means of weep-holes.
5642. That is, to bring the drainage through spawls and sand on the outside of the tunnel;—I suppose you mean that the rubble drain is where the packing is supposed to be? Yes. I say fine packing. You may call it by either name. This acts practically as a French drain or fine rubble drain. Yesterday I said specifically that that was coarse quarry sand or very small spawls. They are hardly large enough to be called spawls, and they are too large to be called sand, but still it acts as a French drain.
5643. Do I understand you to say that you are or are not in a position to state positively whether that exists on the outside of the tunnel all through? I answered that question. I am only speaking of what I saw, and I have not seen the whole of the tunnels. I have only seen certain portions.
5644. Did you see any parts where there were no small stones or sand, but where the earth was rammed in? I saw places where nature had worked a fall-in down there. Nature will eventually close those openings to which I am referring by the action of the subsoil drainage, and nature will find another opening in the same way as it found an opening for subsoil drainage at the hole in Park-street. In going through the tunnels at the present moment you find evidences of the subsoil drainage on the east side of the tunnels generally throughout the length of them where there is a good fall to the streets above. In course of time nature will gradually fill up those openings and force a natural outlet itself, and some of these walls that are now moist will become drier from time to time.
5645. But did you in anything you saw notice along the outside of the tunnel, where you say there are rubble drains, portions that were filled with earth rammed in, and not stones or sand? Wherever water goes the sand would be washed out.
5646. Did you see any place where there was no sand, and where it was earth? I saw one place where a pick-handle was put down in Park-street, and that place was immediately under where there was a dripping from the subsoil when it was first opened two or three days, and that was a natural drainage.
5647. Did you see any other place? I saw other places, but these places that I saw were very wet, and showed evidence of the passing of weepage down them, and the weepage would have carried away sand, and the soil would have gradually worked down to take its place.
5648. Where would it have worked down from? From the natural soil at the side.
5649. The ordinary earth where it was excavated? The ordinary iron-stone or marly-clay.
5650. In cases where you saw that, was the side filled between the brickwork and the solid earth? No; the water had washed away the sand in many instances.
5651. But was it filled; you say that you saw evidence of water leakage, and that sand had evidently been washed away and that earth had fallen in; where you say that had taken place, was that rammed tight or was it loose earth, or was it a space? In a 3-inch space, in such a position as that, you cannot ram it; you can only do it in the best way that a man can do it; you cannot make it perfect under such circumstances; you can only finish it in a good tradesmanlike manner, and then nature comes in, and Nature works after man is finished; but I believe that everything was done, as far as I could see, that a good tradesman could do there.
5652. Was it rammed? No; you could not ram the 3 inches. Some places were only 2 inches, and you could not by any means ram 2 inches.
5653. Then what was in the places where you say the water had washed the sand away? In some places there was very little.
5654. Very little material? Yes; the larger pieces of the quarry sand and clay, and stuff that had fallen down, softened down, with it. But generally the filling in at the side of the tunnels was done in as good a way as workmen could do it.
5655. That is where you saw it, I suppose? Yes, where I saw it.
5656. You have said a good deal about the bricks, and you have compared them to the bricks used at St. Magdalene's Retreat, Cook's River—do you consider that these bricks are sufficiently well made to keep out any leakage or serious leakage from the outside into the tunnel, call it weeping or whatever you like? I must ask you to explain what you mean by serious leakage.
5657. Well weeping—natural weeping? Certainly, because this is a wire-cut brick, and it has a rough surface, and it is a much better grip for the cement than a double-pressed brick would be, or than a dry-pressed brick would be.
5658. On the 28th July, Mr. J. Davis, in his evidence says he tested the bricks, and in his report of the 26th July, he says:—

In company with Mr. Arthur McCredie and Mr. Chamier, on behalf of the City Council, I made another examination of the arch of the telephone tunnel where it was stripped by the Corporation at the intersection of Park and Pitt streets. I had a little more of the packing on each side of the opening removed. This confirmed me in my previous opinion—

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opinion—that, while the space was fairly filled with clayey material, the packing had not been rammed. I also had a portion of the brickwork taken out. This showed the bricks to be of a soft nature, and the mortar very inferior. The bricks had in some cases been very badly bedded, while in others the bedding was fair. I removed one of the bricks, and had it tested for porosity, with the result that it absorbed 10·6 per cent. of water. I understand from Mr. McCredie that this brick is a fair sample of those used in the whole of the arch-work. It is a wire-cut, semi-plastic brick, very rough and not hard.

You understand the absorption of bricks, do you not? Yes.

5659. Do you consider that a brick which will absorb as much as 10·6 per cent. of water is a good brick for a tunnel of any kind? I consider that Mr. Davis was unfortunate in the sample he got. My tests were different from that—mine were 5 per cent.

5660. You did that as to absorption? Yes; I tested several of them. I consider that those remarks of Mr. Davis are most scathing and uncalled for.

5661. I ask you whether you consider that a brick of that kind is fit for a tunnel of any kind? The answer to that is, go through the tunnel, and see the dryness of the tunnel; and that is the proper answer to give also to the remarks you have just read. The tunnel itself proves that the bricks were right, and they are sufficiently suitable in every way. It is easy to pick out an odd brick here and there that has defects.

5662. But Mr. Davis says that he was informed by Mr. Arthur McCredie that that brick was a fair sample of the bricks used in the tunnel? I form my own opinion on that, and I would ask you to go and look at the tunnel itself and see its dryness.

5663. Mr. J. Davis refers to these bricks later on in Questions 966 and 967:—

966. Do you consider that the bricks used are sufficiently good for the work of the tunnel? I believe that the tunnel as it stands will answer the purpose for which it is intended; but if I were going to carry out the work I would not use those bricks.

967. Is the quality of the bricks up to the specification? No.

Under the heading bricks, the specification says "plastic wire-cut bricks are preferred." The plastic wire-cut bricks that are used there are without doubt the very best of the kind that is in the market, or that has been in the market here for years. I do not know of any plastic wire-cut brick that has been in the market which has been superior to that, and we have used that brick on many large works. It is in accordance with the specification in every way, and it is suitable in every way. The only objection probably that the witness finds to it is that it is too cheap a brick. It is a most economical brick.

5664. Why should you make that remark about Mr. Davis's evidence? I consider that evidence to be unfair from my point of view, and I have had a large practical experience.

5665. Evidence has been given that it requires as good a brick, or perhaps a better brick, to keep out moisture, as it does to keep in water in a sewerage tunnel;—do you know whether that is so or not? I should say most certainly not; because, when a brick is first built into a wall, it is far more porous than it is, say, three years after exposure to the air.

5666. But, I suppose, that would apply in either case? Underground, where there is a natural clay formation, nature generally works rounds it, and makes a kind of clay-puddle round it; and it also acts in filling up the pores of the bricks of the tunnel, which in (say) three or four years from now will be much drier than it is at the present moment; but it is dry enough now for all practical purposes for which it may be required.

5667. The statement or evidence that has been given to which I referred was that there is more moisture-pressure on the outside which will penetrate, in the shape of weepage or drainage, into a tunnel, than if there is a flow of water in a tunnel, which is simply a tunnel made to carry that water to its destination, wherever it may be;—do I understand you to say that that is not so? Will you kindly put your question in fewer words?

5668. The statement was that if there was water inside a sewer it was easier to keep it there than to keep water from coming from outside through the bricks into the sewer? I do not hold with that, because if it once went out of the sewer it would crack the bed in some soils all round, and break up the sewer in no time. If a little weepage went out of the sewer it would undermine the bed on which the sewer rested, and in so doing, and softening it, it would tend to fracture the sewer. Supposing that a water-main bursts on the outside, you will see an indication of it inside, and can go up above and locate it immediately, and get it repaired. An extreme case that you would have to deal with in one instance probably would be the bursting of a water-main; in the other case the damage would be done, and would be irretrievable, except at a large expenditure, to put it right, and it would be done before you could find it out.

5669. Your answer indicates that you could detect more readily the leakage that comes in through a brick into the sewer and repair it; but what I wanted to know was whether, in your opinion, water from the outside is more likely to filter through a porous brick than the pressure of a stream of water inside, which was being conducted by the tunnel to its destination? The pressure of the stream of water inside the sewer would be much greater, and would require a less porous brick that the converse that you were referring to.

5670. The water inside would require a less porous brick than the other one? Yes; because the other has the advantage of nature forming a cover round it.

5671. You said you got instructions from Mr. Walker about the 1st July? Yes.

5672. If Mr. Walker has made this statement in his evidence, is it, or is not, a fact:—

97. Has anyone else made a report? No. It relates to this particular part of the work specially.
98. I want to know if you have a report from anyone else? No.
99. Has anybody else been instructed or asked to make a report? I have given no instructions.
100. Has the Department? No.

That evidence was taken on the 15th July; is that correct? As far as I am concerned, it is correct. I know nothing about anyone else.

5673. But you have already said that you got instructions from Mr. Walker? You said to make a report, and I answered you decidedly no.

5674. Then you were not to make a report, but to watch the work? I have already said that I have made no report, because I was not asked to make a report, and I could not have made a report, except an *interim* report, for a couple of months after I got my instructions, whilst this work was going on.

5675. But you got instructions? Yes; I got instructions to make myself thoroughly acquainted with the work.

5676. With the view of doing what? With the view of giving evidence before this Select Committee, and assisting them in every way in my power.
5677. You mean that you were never asked for a report, but you were instructed to examine the work? Mr. Walker never broached to me the subject of a report.
5678. You have given evidence as to what you saw at Park-street; and, I think, that afterwards you said that the surface underneath the concrete—as indicating that it was caused through the influx of water—was regular? Yes; I meant to say smooth—one smooth fall. If that had been caused by a lump of earth falling from the roof in the excavation, the earth at the sides would have settled down irregularly. If there had been any large fall of earth from the centre of the tunnel during all this driving and excavation, the earth on the top would have settled down irregularly. If you test with a body of earth, and let it drop, you will find that that earth will not drop in the way we saw it there. There was a gradual fall to the soft old drive that was there. That was green, and there was evidence there of slime, caused by the flow of water.
5679. Do you tell the Committee that the surface was not irregular? I did not say not irregular; I said smooth.
5680. But in the lines that you have just drawn by way of illustration you have made it smooth and regular in one place, when you say it would be the effect of water, and you have made it irregular when you say it would not be the effect of water? Yes; if a large body of earth had fallen down.
5681. Was not that surface just about as irregular as you have made it on the irregular line there? No.
5682. I saw the surface, and it was not gradual? There were little watercourses trickling down. It was damp near the bottom, much more so than near the top. That was from soakage. There was also a green slime on a portion of the lower part. I took some of it up in my hand.
5683. *Mr. Cann.*] Reverting to the question asked by Mr. Lyne on the French drains, I suppose you mean that provision was made for the seapage water by apertures in the brickwork from these drains? Yes; but I also mean more than that. Mr. Lyne was asking particularly about the 3-inch filling on the side, and I used the words "French drain." It is so small that you can hardly use the term, but I thought that probably Mr. Lyne would have known what a French drain was, and it was an illustration on a small scale. You cannot fill in a 3-inch drain on the side in circumstances like these except by using very fine sand. To use very fine sand would be the greatest mistake you could make, because the subsoil drainage would wash it away in no time, and you would have to get the largest pieces of rubble you could get into it, and then fill it in with the best material you could get, and leave it to nature.
5684. In drains of that kind you do not make any leak-hole? We make weep-holes.
5685. Only by apertures in the brickwork to carry to the proper drainage? Yes.
5686. By the natural outlets you refer to, do you mean the natural outlets to be on the surface after the soil has washed down and filled up the lower apertures? Yes.
5687. You mean natural outlets right on top? No; I mean if you take a section—say, 12 feet deep—through soil, you will find there evidence of nature making her own little streams—percolations through—and that water generally washes down towards Darling Harbour. The tunnel is like a dam placed in the middle of this. That dam, probably, is 9 feet high. It disturbs the natural subsoil drainage, and nature has to find another opening. If it can get down to the bottom and get down underneath the tunnel it will do that. If there be an impervious strata in between, the moisture cannot get through. It may work itself up and pass over the top of the tunnel, as I believe it has done particularly in Park-street, and you will see another instance—I think it is at Bathurst-street—where the west side is damp, and not the east side. That shows where the strata has carried the subsoil drainage right over the top of the tunnel, and the weepage has gone down on the other side.
5688. Is the soil which works down the soil immediately around the tunnel, or is it the soil carried in from the natural drainage? It is the soil carried in from the natural drainage.
5689. That would not be in the immediate vicinity of the tunnel? It would be 3 inches away from it. If you make the excavation, say, 3 inches wider than the brickwork on one side and you fill that in, after a time the surrounding soil and the packing you have got there will all consolidate somewhat and come together.
5690. I suppose the soil is carried with the water which comes in—wherever the water comes from the soil would be carried on by the water? Yes; for instance, the packing has been rammed in many instances. I saw evidence of it. I tested it with a pick over large areas, and I also saw the marks of ridges on it that were formed by forcing it up through the crevices between the poling-boards. That, in some instances where it is very wet, has consolidated as much as a couple of inches in some places. The water having got in there has washed down the sides partly. That is what I mean.
5691. Reverting to the construction of the tunnel, would it be an advantage or a disadvantage to have a tunnel of this kind water-tight? I should say it is an immense disadvantage to the State to throw the money away in constructing such a one, because there would be no practical result from it which would justify the large expenditure which would be entailed. Then you would not be aiming for strength in a case like that; you would just be seeking an opening to spend money.
5692. Was not the tunnel specially designed to allow for water being drained out of the country round the tunnel into the drain in the middle of the tunnel? Yes.
5693. In the class of brick or in the class of material used, you would not expect the same kind of stuff in a telephone tunnel or a subway of this kind as you would in a sewerage tunnel? By no means. There would have been an item of £6,000 or £7,000 in the cost of the bricks alone.
5694. Speaking generally, you consider that the construction of this tunnel answers the purposes of its designer? Yes; I think it thoroughly strong and thoroughly economical.
5695. *Mr. Harris.*] Do you consider these bricks just as good for this work as double-pressed bricks? No; I do not.
5696. These bricks would answer the purpose for which they are used just as well as double-pressed bricks? They will answer the purpose, and it would have been an unjustifiable waste of money to have used double-pressed bricks in such an undertaking.
5697. You do not get all bricks to take in the same quantity of water? No. You can take a dozen bricks from the same kiln and the porosity of them will vary, no two being alike.
5698. You can go to any stack of bricks, supposing they are double-pressed bricks, and pick out a brick which would absorb twice as much water as another? Yes.
5699. You would have no difficulty, I suppose, in that job to do the same thing? In any quantity of bricks;

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bricks; but then the porosity of a brick when it is first built in a wall is very much more than it is in a few years. The pores get filled up, and in this instance there is so much clay round the top that it would make a natural puddle round it, and gradually in the course of time make them almost impervious.

5700. *Mr. Cook.*] Do you consider the plan of drainage adopted in connection with this tunnel a good one? Yes; as far as I could judge by practical results, I think the best system has been adopted that could be adopted.

5701. Is it a plan usually adopted in connection with tunnels? Yes, with sewers; subducts are specified generally with them, but they are not always carried out. In this instance they are carried out. In some instances they are not required—that is, for deep underground sewers; but the subducts are in existence there right throughout.

5702. You think that no exception can be taken to the plan of the work? May I ask what you refer to?

5703. I mean the whole project from a contractor's point of view? I think the Government have never had better value for an undertaking than they have had there, and it would be to the interests of the State if more of this work was done by outside men. Their every-day usage of materials makes outside men more sure of using smaller strengths than are generally used by Government officials who make themselves doubly sure very often by using very strong construction.

5704. That is more than an answer to my question;—I only wanted to know if, in your opinion, any exception can be taken to the plan of the work as a whole, having in view what is required? No.

5705. *Mr. Bavister.*] Reference has been made as to the resistance of water by the cement used;—is it not very frequently found in actual practice that a cement not up to standard for porosity or resistance to penetration by water is yet fully up to the standard as to binding or adhesive qualities? Yes, it is sometimes found in that way.

5706. Would such a cement, while not being suitable for sewerage or water works, be a first-class cement for general constructive purposes? To answer that question I want a sample of the cement to test it.

5707. But on the assumption that tests have proved it to be a cement not up to standard for resisting water, but possessing all the adhesive and binding qualities, would that not be a first-class cement for constructive purposes? I do not know about that, because we like it to be as impervious as we can to water.

5708. In reference to drainage, did your inspection bring under your notice that special provision had been made for subsoil drainage where indications of water were perceived? Yes.

5709. And were the general arrangements for drainage based on a good system in your opinion? Yes.

5710. In carrying out a large work in which very many contingencies of a widely-varying character are encountered, where it is desired to have full control and secure the most efficient work, which system do you say would be the most favourable to secure that object—contract or day work? I am opposed to day-work on principle. As a rule, I believe it to be far more costly—15 per cent. more costly than contract work; day-work is more expensive than contract work. A builder, as a rule, is an expert. He knows the amount of work which men are capable of doing in a day; he knows how to select men and how to manage men, and there is a good deal in purchasing materials. I consider that it was in the interests of the State that this work should have been done by day-work. There are no plans in existence that would show the various drainage-pipes and every network of pipes laid down in Sydney prior to the efficient working of the Water and Sewerage Board. You could only draw out a specification and a set of plans, and state in those all the knowledge that you could get with reference to this matter. In actually carrying it out you come on so many of these old drives, old drains, and other obstacles that it means practically that a contractor in tendering for it has to do a gamble. He has either to allow a large amount for contingencies, for obstacles which, if he does not meet with, he has not earned, or it means that he has a big lawsuit with the Government. It is essentially a contract which would give a good basis for a lawsuit, and for that reason I think it was desirable and in the interests of the State that this work should have been done by day-work.

5711. Then admitting that for general purposes contract work may be the most desirable where the matters are clearly defined, and no unforeseen difficulties may be expected, still, where a work full of contingencies as this one not only has proved to be, but must have been expected to be if let by contract, the contractor would put such a price on as to fully secure himself, and all the favourable conditions would result in his profit and an unnecessarily large cost to the State;—is that so? Yes; in addition to which there is the basis for a lawsuit, where he takes a chance of getting a very large verdict, and where an ordinary jury would probably give him a large verdict.

5712. Having seen this work as completed, do you consider that the State has saved a large sum of money under the heading of claims for contingencies or extra works, as well as a considerable sum for a contested lawsuit? I consider that they may have done so. Of course, there is the other side, that you may have got a contractor who made an immense blunder in his estimate, and went bankrupt over it.

5713. But we have already had your statement in your evidence that contractors are careful, experienced men, who, once they blunder, blunder to their own advantage? I beg your pardon; that was not my remark, and that is not my experience. I am very sorry to say that within the last three years I have had six cases very largely the other way.

5714. In ordinary business does any departure from specification, contract, or schedule usually result in higher charges for such extras, which are difficult to adjust fairly to the proprietor? No; not as a rule. In some instances it is the other way. You state what is the additional work you require to do, and a builder gives you a price before starting it, and in some instances they are on the wrong side—done on the spur of the moment.

5715. Is it not of frequent occurrence that extras are authorised without a price being obtained for them? No, not with us. Where an extra is there, we always get a price for it and submit it to our clients.

5716. Is that in consequence of excessive charges being made previous to this system? No; it is in consequence of carrying out business habits. It is a proper business proceeding to do.

5717. May I put it in this way: That your experience has shown that that course is necessary? We do that in all cases before letting a contract.

5718. Has your experience shown to you that such a precaution is necessary? Yes; in all cases to get a price in advance.

5719. Is it not a common saying amongst those having to do with building operations that contractors make their fortunes out of extras? No; it is the reverse. Contractors will tell you, "We do not want to

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to do this; we would rather not do it. It may seem that our prices are high, but there is so much waiting, humbugging, and altering, that it is not to our advantage. We make our contract price out to start the job and go straight along with it. We do not want to be kept waiting three or four days negotiating with you over £3 or £20 worth of work. We have other work to do."

5720. Did you compare the qualities of the bricks in various portions of the tunnel works? Yes.

5721. Did you examine the quality of the bricks used in that portion of the tunnel which was done under contract? Yes.

5722. Was the quality of those bricks similar to the quality of the bricks used in the portion done by day-work? Yes; from appearance they all seem to be similar, as having come from the same kiln.

5723. Is there anything about an ordinary brick that would enable it to resist water better from one side of the brick than from the other. That is to say, if you were to apply the pressure on one side of a brick, and take its resistance there, and then turn the brick over and apply the same pressure on the other side, would you expect to find any difference in its resistance to pressure? There very often is, particularly with a double-pressed brick.

5724. Let me amend my question to the extent of its having reference not to a double-pressed brick, but only to such class of brick as has been used in these tunnels? It applies to all bricks. You take a brick in your hand, and before you put it down you put the best face—that is, the smooth face—out; the smooth face is generally the best burnt.

5725. Then it will penetrate that face better, the pressure being applied to one side than the other? Yes.

5726. I desire to read a passage—not for your comment or criticism—but to ask you whether, in your opinion, it is a fair description of the bricks that came under your notice:—

> The bricks in the side walls are ordinary machine-made stock bricks of coarse material, and appear to be perfectly sound, hard, well-burnt kiln bricks; the radiated bricks in the arch are of a finer material and finish, and are of a good, sound, hard, well-burnt quality.
>
> Four sample bricks were cut out of the arch in Pitt-street at the corner of King-street, and tested for absorption as follows:—
>
> *No.* 1 *Specimen.*—Rectangular brick (part) weighed dry, 6 lb., and after immersion in water for forty-eight hours weighed 6 lb.
>
> Absorption, nil.
>
> The cross-section of the brick after breaking exhibited no cavities or fire-cracks in the clay, but a density and compactness throughout.
>
> *No.* 2 *Specimen.*—Radiated brick (part) weighed dry, $5\frac{3}{4}$ lb.; after forty-eight hours immersion in water it weighed the same—$5\frac{3}{4}$ lb.
>
> Absorption, nil.
>
> The cross-sections of the brick after breaking exhibited a very dense and compact material throughout, with no cavities or fire-cracks.
>
> Time would not permit of further testing for compression and so on; but from my knowledge of bricks I should say they would stand a compressive stress of 20,000 lb. before cracking, and therefore are of a fairly strong quality.

Does your opinion coincide with what I have read? Yes; except that I would add another most important remark,—that they are strictly in accordance with the specification, and that they are the best class of brick in the market of its respective class.

5727. Were your instructions to so acquaint yourself with this work as to assist the Committee to a full and correct understanding of all the facts, circumstances, and conditions of these tunnel works? Yes.

5728. Have you done so? I have done so to the utmost of my power.

5729. Do you think that the Government can as readily secure the services of foremen and supervisors and at the same rates as contractors can? My experience teaches me that many contractors get the very best men they can get as foremen, and pay very high wages. On some of our works I have known foremen joiners to get £1 a day, and it paid the contractors well to pay that wage. It is all a question of salary.

5730. Do you think that the men to whom you have referred would work as willingly for the Government for the same wage as they would for a contractor? If the job were as long as the contractors, certainly.

5731. *Chairman.*] Are you aware that the description of the bricks which Mr. Bavister read to you is part of Mr. Cardew's report? I know now from looking at the paper alongside the shorthand-writer's note-book.

5732. Did you know before? No.

5733. You have not seen that report? I have seen it. I saw it this morning.

5734. You saw it this morning? Yes; on the table, amongst some papers.

5735. The original document? No; the printed report.

5736. Were you supplied with it this morning? No; it was lying on the table.

5737. You said, I think, that Mr. Cardew was with you part of the time you were making the examinations? Yes.

5738. I suppose you did not know the nature of the instructions from the Department to Mr. Cardew to report? I had nothing to do with it.

5739. How long have you been employed on this work? From the 1st July.

5740. Till when? Till about attending your Committee.

5741. You have not been employed since then? No, but I have taken a general interest in it. I have followed up everything I possibly could; made every note I could that would assist the evidence.

5742. Do you know whether Mr. Cardew in your presence tested a specimen of the bricks. Take No. 1 specimen, "Rectangular brick (part) weighed dry, 6 lb.";—what sort of brick was that? He did that at his own visit of inspection. I was not with him.

5743. You do not know what sort of brick it was? We were both separated. We were together once or twice.

5744. Do you know what No. 1 specimen of brick was? A rectangular brick is a brick which is used in the whole of the walls. A radiating brick is a brick which is used in the whole of the arched roof.

5745. *Mr. Bavister.*] A rectangular brick is a brick taken from the side walls? Yes.

5746. *Chairman.*] Is it possible to take a brick of the character mentioned in this description and immerse it in a proper way in water, and to have no absorption? It is possible to get some of them.

5747. *Mr. McGowen.*] How many examinations, in accordance with your instructions, does your report cover? I think I made about six visits inside, and I made a large number of visits outside; sometimes for hours at a time watching the men testing the packing as to the ramming. I have made at least fifty visits.

5748. Out of that number, how many did you make in conjunction with Mr. Cardew? They were not very

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very many—on 7th July, in the afternoon; on 8th July, in the morning and afternoon; on 9th July, and on 10th July. On 12th July I walked along the footpaths over the tunnels.

5749. Roughly speaking, how often were you with Mr. Cardew? Those were the times I was with him.

5750. Less than a dozen times? I do not think it was half a dozen times.

5751. In making these examinations in conjunction with Mr. Cardew was it usual for you to compare notes after the inspection was over? We never compared notes, but we had verbal notes; for instance, if I saw anything I would say, "Look at that," and he would see it. Of course, we had to go to look at the same thing at the same time. We were together with a boy underneath. The boy had a lamp, I had a amp, and Mr. Cardew had a lamp.

5752. Anyhow, you say that you were with him only half a dozen times out of fifty examinations, and of course you would compare notes of what you saw;—did you ever agree on the reports you would submit in regard to what occurred to you in your examinations together? No; we never did.

5753. Did Mr. Cardew submit his report or his evidence-in-chief to you before he gave it to the Committee? No.

5754. Did you have any idea of what he would say in the main with regard to the work? Nothing for certain. I could only surmise from the times we were together there.

5755. With regard to your report, did you submit anything of that kind to Mr. Cardew? I have made no report.

5756. I mean, did you tell Mr. Cardew at any time what evidence you were going to give to this Committee? No.

5757. *Mr. Bavister.*] In his evidence Mr. J. Davis states: "On the 26th July, in company with Mr. Chamier, I made another examination";—were you and Mr. Cardew, or were you only, present on that occasion? No; I never met either of the gentlemen that I am aware of, and if they were present there I did not know of it.

5758. With regard to your evidence, is it given from memory or were the notes to which you have referred entered during your visits of inspection and examination? Mostly; but they were all made on the same day. Short notes were taken on each occasion, and I went to the office and extended them on the same day.

5759. But all important facts you noted on the ground at the time of your inspection? I noted them on the ground.

5760. Is Mr. Cardew held in high esteem as being an able man in his profession? I am not in a position to answer that question, but I have a high opinion of him.

5761. *Chairman.*] In Mr. Cardew's evidence I find that I asked him these questions:—

3368. Was there anyone with you when you were making this examination? Yes.
3369. Who? Mr. Hennessey. I went through the tunnels under Mr. Hennessy's guidance. Walker instructed Mr. Hennessy to accompany me.

Is that correct? I cannot answer that question. Mr. Walker did not instruct me to accompany him; but Mr. Cardew came up to the office and said that Mr. Walker said, as I was going there that afternoon, he would go with me; but he was no more under my guidance than I was under his guidance. We were both independent.

5762. You see what he says here? I see. He may have received that instruction from Mr. Walker; but I did not. We went together.

5763. *Mr. Bavister.*] On what date was the visit made when he says, "I went with Mr. Hennessy," or "I went through the tunnels under Mr. Hennessy's guidance"? I have just given the dates on which he was with me.

5764. Had you been through the tunnels at all without Mr. Cardew previous to him and you going together? Yes.

5765. *Mr. A. L. McCredie.*] What would you understand if you got this letter from the Town Clerk to the Deputy Postmaster-General:—

In reply to yours of 3rd instant, *re* the construction of the second section of the underground tunnel for telegraph and telephone wires along Pitt-street, I have the honor to inform you that permission is granted for the street to be opened up without prejudice to the rights or the future requirements of the City Council, and conditionally that the work be proceeded with as may be directed by the Corporation, and all operations carried on underground, and disturbed surfaces made good to the satisfaction of the City Surveyor.

—? That the whole of the work had to be tunnel-work; that they would not allow open-cutting work there; that the Council wished, in the interests of the ratepayers and shopkeepers, to cause the very smallest amount of inconvenience to them. It was a very stringent instruction that the work should be done underground.

5766. *Chairman.*] Have you seen this letter before? No; I have heard about the letter.

5767. You have heard a conversation about it? Well, I saw it in the paper; and I have heard, in reference to the work having been done underground, that it was the wish of the Corporation from the very start to have it done underground.

5768. Have you had any conversation with Mr. McCredie on this letter? Yes.

5769. *Mr. A. L. McCredie.*] With reference to the basement walls of buildings, you know that, for the sake of the drainage, French drains of rubble, wall-stones, broken bricks, loose material, are put against the basement walls? Yes.

5770. Have you known of that being any injury to the footpaths? No; I have not known it particularly.

5771. And these go down some considerable depth—sometimes 10 or 12 feet? Yes; they go down to the footing of a building.

5772. Can you see any objection if the same material were put over the crown of the arch of the tunnel? Well, I would rather have the packing that has been placed over the tunnels than have the general filling-in which is executed by builders against the walls of buildings.

5773. You prefer that which is on the tunnel? The packing which has been used on the telephone tunnels is the usual class of packing which is used, and it is the very best which could possibly have been used under the circumstances, except you could imagine that you had exactly the same strata as the surrounding strata, which is impracticable. That would be the ideal filling; but after the ideal filling, the packing which has been used is the best which could have been used under the circumstances.

5774. *Chairman.*] Have you made a charge for your work? I have not.

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5775. You expect to be paid, of course? I expect to be paid up to the date of your Committee commencing to sit.
5776. That is, for the time you were engaged? Yes.
5777. *Mr. Bavister.*] Mr. Chamier has been referred to here this morning;—do you know the gentleman? No; I do not know him.
5778. I mean, do you know him to be in the profession;—do you know that there is a member of the engineering profession named Chamier? I did not know before I saw his name in the papers in connection with the tunnels, and Mr. Nelson mentioned the name to me once.
5779. Do you know whether he is the Mr. Chamier who was in company with Mr. Davis in the inspection of the tunnels, and who gave evidence here? No, I do not.
5780. And who was retained by Mr. Hickson in connection with an inquiry at North Shore, to procure evidence or to give evidence in defence of the Works Department? No; but I have heard, since the commencement of the tunnel, his name mentioned as having occasional retainers from the Works Department in reference to various items, but I do not know what they were in detail.
5781. You have some idea that a person of that name was retained in the service of the Department at various times? I have heard it so stated, but I know nothing of my own knowledge.
5782. *Chairman.*] You submitted some mortar here;—was it cement mortar? Yes.
5783. Do you consider all that you submitted good mortar? I think a fair portion of it was good.
5784. You saw me break off a couple of pieces;—do you think that that was good? You can break any cement.
5785. Did you think that that was good that I broke off? It was very good at the time of breaking it off with the hammer; but with thin pieces like that you can crumble them away once you break into them.
5786. You saw me break that cement? Yes.
5787. It broke into two pieces? Yes.
5788. It was not a matter of crumbling away, was it? No.
5789. It broke into two? Yes; you can break any piece of cement of the same thickness as that you broke from.
5790. I tried to break another piece? That was thicker; the piece you did not break was over a quarter of an inch thick.
5791. Was it a better piece of cement? Well, it was taken from the same part at Park-street. If you take a thin piece of cement it rubs off, and it frays. If you were to break the skin of the cement on the outer wall of this building, and make an incision with your pen-knife, you would find that the cement would fray and run down.
5792. Take the two pieces I broke yesterday;—in the condition in which they were here yesterday were they good pieces of cement? They had been good pieces.
5793. But they were not then? No. I had to break the cement-mortar off the brick with a hammer, and the fact of hammering it and the thinness of it would make it fray.

Edward Reid sworn and examined:—

E. Reid.
25 Nov., 1897.

5794. *Chairman.*] What occupation do you follow? I am a labourer.
5795. Whom are you working for? For the City Council.
5796. Were you instructed by the City Council to see what was done in connection with the work outside the telephone tunnel and at the new Civil Service store? I was sent to prevent them from blasting there.
5797. To see that they would not do any blasting there? Yes.
5798. Was that close to the tunnel? It was; it ran up backwards like.
5799. Did you prevent them from blasting? Yes, while I was there.
5800. Did they blast? Not while I was there.
5801. Do you know whether they did blast when you were not there? They may have done so.
5802. Do you know whether they blasted quite close to the telephone tunnel? They had a hole at the corner next Hagon's. I saw it when I went there one time, and I got them to cut it out.
5803. Did they blast it? Not that hole.
5804. Did they blast any other place near the telephone tunnel as far as you know? Not as far as I know, but they might have done so; I was not there all the time.
5805. *Mr. Cook.*] But they might have done so? I was not there all the time.
5806. *Chairman.*] Would you not see indications if they had done it? I did not see any signs of it there.
5807. *Mr. Harris.*] There may have been complaints made at the Town Hall that there was blasting done? The men told me that blasting had been done, and that Mr. Hagon sent some report to the Town Hall.
5808. *Chairman.*] Where was the blasting done that Mr. Hagon complained of? The main rock which was near the back.*
5809. Was that next to Mr. Hagon's? It ran right across—there was no solid rock near the front of it; it was a kind of shale.
5810. I understood you to say that the solid rock was further back? Yes.
5811. How far was the blasting that Mr. Hagon complained of from the tunnel? I could not say how far it was back that he complained of; I am only speaking of the rock.*
5812. Do you know where they blasted, and where he complained of the blasting? It was at the solid rock there; it was pretty well to the back of the building.
5813. How far is that back? I could not say.
5814. Have you any idea how many yards or feet it was? I could not form any idea.
5815. Was it 20 feet? Fully.
5816. Was it more than 20 feet? I could not say how far they blasted down towards there.
5817. Was it 7 yards? It was fully that to the main rock.
5818. Do you know of any blasting which took place nearer to the telephone tunnel than 7 or 8 yards? Not to my knowledge; I was not there all the time.
5819. *Mr. Cook.*] Where was the hole that you said you discovered? That was down next to Hagon's corner.

5820.

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* NOTE (*on revision*):—(Measured since evidence was given and sworn to.) I have measured the distance from the bnilding line of Pitt-street to the place where blasting was complained of by Hagon, and find it to be from 90 ft. to 100 ft.

E. Reid. 25 Nov., 1897.

5820. How far was it from the tunnel? I could not say how far it was from the tunnel. I went there on one occasion.
5821. What do you mean by the corner? The corner nearest to King-street.
5822. *Mr. Bavister.*] Do you mean the corner of the Civil Service stores, nearest to King-street? Yes.
5823. *Mr. Cook.*] That would be close to the tunnel? It was not quite close to the tunnel; there was a hole down.
5824. About how far away? It might have been 6 feet. It might have been more, or it might have been less.
5825. Practically, it was close to the tunnel? Yes; but that hole they cut out. I discovered the hole, and I stayed there till they cut it out.
5826. Might there not have been one fired without your knowing of it? There might have been. I was not there all the time. I discovered this hole, and I got them to cut out more holes further up.

George Bancroft sworn and examined:—

G. Bancroft. 25 Nov., 1897.

5827. *Chairman.*] What occupation do you follow? I am a quarryman.
5828. Were you doing work at the foundations of the Civil Service stores? Yes.
5829. Were you there simply as a quarryman, or were you there as a superintendent or foreman? I was working there as a quarryman.
5830. What work are you doing now? I am working for Mr. Saunders at a quarry over at Pyrmont.
5831. Have you been working there ever since you left the work at the Civil Service stores? Pretty well all the time.
5832. Where else have you been working? I was working down the harbour for Mr. Dean a little while ago.
5833. Is that the only other place where you have been working? Yes.
5834. We had a declaration by you put in by Mr. G. M'Credie in these words:—

I, GEORGE BANCROFT, hereby declare that I have been employed on the work of excavating for the cellar for the building now being erected for the Civil Service Co-Operative Society, Pitt-street, and that I was so employed in close proximity to the telephone tunnel on the 5th instant, and for several days before and since. While working at the place, the timber supporting the cap timbers of the tunnel was in my way. I asked a labourer to knock it out, which he did. I then saw that the space between the brickwork of the tunnel and the timber above had been thoroughly filled and well rammed. In continuing my work I had to cut away the material at the side of and on the arch of the tunnel. Part of the materials fell out when the supports were taken away, and when the other parts were taken out by me and other men.

Do you adhere to that declaration? Yes.
5835. Do you recognise the place where you were working from any of these photographs on the table? Photograph No. 4 shows the place where I was working.
5836. Were you working on the wall which is shown there? Not on the wall; this wall was put in afterwards; we took the excavation down to this level.
5837. You took the excavation down, and somebody else built the wall? The bricklayers built the wall.
5838. From photograph No. 4, can you tell what took place there in connection with the declaration you have made? Yes; these legs supporting the cap-piece were in our road when we were putting in the gutters, and they were taken out, and in the spring of the tunnel little notches were put in to hold the false legs to carry the cap.
5839. Take photograph No. 1;—what took place in connection with this? The portion on the front of the tunnel which was rammed before the excavation gave way.
5840. In photograph No. 1, do you recognise any particular spot you pulled away? Yes.
5841. You worked right along the wall up to the spring of the arch? From the spring of the arch down into the centre of the building where the pillar was put in.
5842. What I understood you to say was that when you took away the packing, which was along the side, the stuff which was on the top of the arch fell out? No; it would not have fallen out itself. We had to pull it out for our own safety in case it should crumble down and hit a man on the head.
5843. You pulled out the stuff in the poling-boards;—did you pull out any on top of that? We had nothing to do with the top; it would not affect us.
5844. *Mr. Cook.*] These photographs have been taken after all this packing has been taken out? Yes.
5845. And after all the false legs have been put in? Yes.
5846. And after the ramming you have pulled out? Yes.
5847. Do these photographs show correctly the condition of things before all this mauling about had taken place? This large photograph shows very well where the cap-piece had been put in.
5848. After it has been done? Yes; that is a very good photograph of it after it was taken away.
5849. But the photographs do not show the condition of things before the excavation was made? Not at all.
5850. This right up to the crown of the tunnel was packed thoroughly, and the sides as well, and therefore the photographs are worthless as showing the packing of the tunnels? Yes; they do not show anything of the packing. Had this excavation not been taken away, the packing would not have been interfered with. It would have been as solid as the day it was put in.

WEDNESDAY, 1 DECEMBER, 1897.

Present:—

MR. BAVISTER, | MR. HAYES,
MR. COOK, | MR. ROBERT JONES.

M. HARRIS, ESQ., IN THE CHAIR.

A. L. McCredie, Esq., and G. McCredie, Esq., appeared in person in their own behalf.

Edmund Lonsdale, Esq., M.P. for Armidale, sworn, and examined:—

E. Lonsdale, Esq., M.P. 1 Dec., 1897.

5851. *Mr. Cook.*] You know the building called the Civil Service Co-operative Society's new store in Pitt-street? Yes.
5852. Do you remember having paid a visit to there at any time? Yes. I was passing by when I saw a number of people there, and I was asked to have a look at the excavation. 5853.

E. Lonsdale, Esq., M.P.
1 Dec., 1897.

5853. Who was there? Mr. A. L. McCredie, yourself, Mr. Donald, and some other gentlemen.
5854. Do you remember the Mayor being there? Yes; Mr. Ives was there, and, I think, the Acting City Surveyor.
5855. How came you to be there that day? I was there by accident. I was simply passing along the street.
5856. Will you describe to the Committee what you saw there? You asked me if I would have a look into the excavation, and I had a look across the crown of the tunnel. I noticed the packing that was in there, and it appeared to me to be packed as well as it could be packed. The excavation had been taken down on the side next the building, and of course a large amount of the packing on that side of the crown of the arch had been either picked off or had slipped in consequence of the foundation going away from it. On looking through it I could see no fault in the packing. The packing was as well put in as anybody could have put it in.
5857. That is over the crown of the arch? Yes. Of course, on the side next the building it had slipped off the haunch of the arch.
5858. Was that, in your opinion, due to the excavation? Yes. The foundation having been taken away from it it slipped down.
5859. Where a full view of the packing could be obtained, and where the packing remained intact, what was its condition there where it had not been disturbed? It was as well packed as it could have been packed.
5860. You have had some experience, I suppose, in such matters? Yes.
5861. Have you ever packed any places similarly? Yes. I have not had a very large experience in packing, but I have done some packing of that kind.
5862. Having regard to the nature of the work and to the fact that it had been done underground, in your opinion a reasonably good job had been made of the packing? Yes; I do not think anybody could have done it better.
5863. Here are some photographs—Nos. 1, 2, and 3—of that place; was the place anything like that when you saw it? It did not look quite so bad as that looks.
5864. Do those photographs indicate anything as to the character of the packing? No; you cannot see the packing in the photographs. No. 3 shows the haunch of the arch, and the packing next the building may probably have been picked away, and if not it would of necessity have slipped away to some extent. What packing was there you cannot see at all from these photographs, which are absolutely useless to tell you how the packing was done. The packing shown in No. 1 photograph by the side of the building appears to me to be solid enough, and the piece at the side of the building shown in photograph No. 2 appears to be all right.
5865. Looking at those photographs as they stand, you would not count them of much value as indicating the nature of the work? I would not count them of any value, as they do not show anything of the packing except little bits left on the haunch, and the photograph shows that to be as sound as it could have been made.
5866. Did you look all along the section that was opened against the street? Yes.
5867. Did you see any places where the packing was undisturbed? I saw some places where the packing was undisturbed on the far side—on the crown.
5868. You saw nothing wrong in the condition of the undisturbed packing, and you had a proper sectional view of it? Yes, I had; and I saw nothing wrong about it.
5869. Do you know anything else about the tunnels? No; I did not examine them at all anywhere. In going away from that place I remarked that of course, in my opinion, the better way was to do such work by open-cut, but that with an excavation of that kind and tunnelling of that kind it was not possible to make an absolutely sound job of it. That no man in the world could do it. The packing, so far as I could see, was as good as it could have been done. I was told that open-cut work was not gone on with because the Corporation objected to it. The tunnel being so close to the surface, you would have to be very careful or you would let the footpath down in any case.
5870. Mr. Gordon, the Acting City Surveyor, stated to this Committee that when he went down into the side of the tunnel the packing on the top of the tunnel was very loose, and he could put the long handle of a shovel or a pick-handle through it anywhere;—in your opinion is that a correct statement? I did not try to do that, but I should say that that statement is not true. By searching he might find out holes, but from the appearance of the work I should say that that statement is not correct.
5871. Did you see any stones in the packing up to 8 or 9 inches in size? No; there was nothing of that size. They were not thick; they were thin, flat pieces of stone that appeared to have been put in. I do not think it would have been possible to have put in lumps of stone such as you have mentioned.
5872. *Mr. G. McCredie.*] I desire to know what you consider to be the meaning of this letter, dated the 13th May, 1895, from the Town Clerk to the Deputy Postmaster-General:—

Sir,

In reply to yours of 3rd instant, *re* the construction of the second section of the underground tunnel for telegraph and telephone wires along Pitt-street, I have the honor to inform you that permission is granted for the street to be opened up without prejudice to the rights or the future requirements of the City Council, and conditionally that the work be proceeded with as may be directed by the Corporation, and all operations carried on underground, and disturbed surfaces made good to the satisfaction of the City Surveyor.

I want you to give me an opinion as to whether it was intended by that letter that this work should be done by tunnelling? Yes; I think there can be no doubt about it.
5873. *Mr. Cook.*] You would take that letter to be a direction to that effect? Yes; that you were not to open up the footpath to any greater extent than you could help; that you were only to put down shafts, and tunnel from one shaft to another. I do not think there can be any doubt about that; indeed I do not know that any doubt has been raised in regard to it.
5874. *Mr. G. McCredie.*] You would be more firmly of that opinion if at the time this work was going on under contract, the Acting City Surveyor selected the sites where the shafts were to go down? Yes.
5875. That would make you more firm in that opinion? Yes; but even without that, it is absolutely clear to me that it was intended you should do the work by tunnelling and not by open-cut.

George McCredie recalled and further examined :—

G. McCredie. 1 Dec., 1897

5876. *Chairman.*] You now produce a statement showing the length and the cost of the construction of these telephone tunnels? Yes.

5877. It shows how the work was to be done—either by contract or by day-labour? Yes.

5878. And it gives the length in feet and the cost both by contract and by day-labour? Yes.

5879. You put these documents in? Yes; they are as follows :—

STATEMENT showing the length and cost of construction of Telephone Tunnels.

Section.	Length of section.	Cost.
	feet.	£ s. d.
Contract—		
General Post Office, *via* Moore-street to Castlereagh-street	757½	3,401 3 11
Moore-street, *via* Pitt-street, to Merchants' Exchange, Bridge-street	1,478¼	4,931 13 1
Total contract work	2,235¾	8,332 17 0
Day-labour—		
Pitt-street to Clarence-street	1,530	3,494 3 2
General Post Office to Park-street	1,857½	5,054 11 10
Clarence-street, *via* King-street, and Kent-street to Liverpool-street	3,936	9,661 12 9
Moore-street, *via* Castlereagh-street, to King-street	1,128	2,808 14 0
Park-street to Goulburn-street	1,827	4,475 5 11
Goulburn-street to Railway Bridge	3,180	9,519 9 0
		35,013 16 8
Less value of plant and timber on hand	.....	250 0 0
Total day-labour	13,458½	34,763 16 8
Grand Total	15,694¼	43,096 13 8

G. McC., 30 November, 1897.

STATEMENT showing the total cost of construction of Telephone Tunnels by contract, the length of each tunnel, and the cost per foot.

Section.	Length of section.	Cost.	Cost of removing timber, &c.	Total cost.	Cost per foot.
	feet.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
General Post Office, *via* Moore-street, to Castlereagh-street.	757½	3,394 0 0	7 3 11	3,401 3 11	4 9 9
Moore-street, *via* Pitt-street, to Merchants' Exchange, Bridge-street.	1,478¼	4,546 0 0	385 13 1	4,931 13 1	3 6 8

G. McC., 30 November, 1897.

STATEMENT showing the cost to date of construction of Telephone Tunnels by day-labour and the saving effected, as compared with last contract cost.

Section.	Length of section.	Labour and material.	Removing Timber, &c.	Total cost.	Cost if computed at last contract rate—£3 6s. 8d. per foot.	Saving effected by day-labour.
	feet.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Pitt-street to Clarence-street	1,530	3,420 5 8	73 17 6	3,494 3 2	5,100 0 0	1,605 16 10
General Post Office to Park-street	1,857½	4,540 0 10	514 11 0	5,054 11 10	6,191 13 4	1,137 1 6
Clarence-street, *via* King and Kent streets, to Liverpool-street.	3,936	9,545 19 7	115 13 2	9,661 12 9	13,220 0 0	3,558 7 3
Moore-street, *via* Castlereagh-street, to King-street.	1,128	2,808 14 0	.....	2,808 14 0	3,760 0 0	951 6 0
Park-street to Goulburn-street	1,827	4,190 14 8	284 11 3	4,475 5 11	6,090 0 0	1,614 14 1
Goulburn-street to Railway Bridge	3,180	9,377 6 4	142 2 8	9,519 9 0	10,600 0 0	1,080 11 0
	13,458½	33,883 1 1	1,130 15 7	35,013 16 8	44,961 13 4	9,947 16 8
Less value of timber and plant on hand				250 0 0		250 0 0
			£	34,763 16 8	£	10,197 16 8

G. McC., 30 November, 1897.

5880. *Mr. Cook.*] The statement that you have just submitted to the Committee purports to be a statement of the accounts in connection with the whole of the tunnels constructed? Yes.

5881. How do the various sections compare as to cost—day-labour as against contract? In the total amount they show a saving under the day-labour system of £10,197 16s. 8d.

5882. Is that a *bonâ fide* saving? Yes; I consider so.

6883. Are there any circumstances connected with the construction of the tunnels, which would account for that other than the fact that it has been done by day-labour? No; there were no other circumstances in connection with that. The work is carried out under identically the same conditions as contracts.

5884. Some sections have been carried out by open-cut, have they not? Yes; some of them have been carried out by open-cut.

5885. And it has been stated here that open-cut is very much cheaper as a rule than tunnel-work? Yes, it is cheaper; but not a very great deal cheaper.

G. McCredie. 1 Dec., 1897.

5886. How do the various sections of the work compare as to difficulties of construction;—for instance, are some harder than others? The section where most of the open-cut has been carried out is very hard rock—extraordinarily hard rock.
5887. Where was that? That is the Clarence-street section.
5888. Was that all hard rock? Pretty well all hard rock.
5889. There was some timber though even in that? Yes; at the crossings.
5890. And, therefore, some tunnelling? Yes.
5891. Did you tunnel under all the crossings? Yes.
5892. Even where you did the work by open-cut? Yes.
5893. Comparing that section which you are speaking of now with any of the other sections in which tunnelling was done, would you say that that section was easier or more difficult than, or as difficult as, any of those that were tunnelled? I say it is quite as difficult as any of those that were tunnelled.
5894. Is there a saving on any of the sections where the whole of the work has been timbered and tunnelled? Yes; on the section from the General Post Office to Park-street, a saving of £1,137 1s. 6d. was effected by day-labour.
5895. Has the whole of that been tunnelled? Yes.
5896. The cost of taking the timber out of that was rather heavy, was it not? Yes.
5897. To what was that due? The way we were humbugged in connection with it—interfered with—as much as anything else.
5898. And the number of crossings? Yes, King-street, Market-street, and Park-street—the costly gronnd we had to deal with, the number of pipes we had to ram round and consolidate, and the making good of the concrete wood-blocks and the granolithic pavement.
5899. So that, whether tunnel or open-cut, there is a saving on all the sections carried out by day-labour? Yes, decidedly.
5900. And the total of those savings amount to what sum? £10,197 16s. 8d.
5901. Is that what you would recognise as a good contractor's profit on a job like that? Yes; it is a very good contractor's profit—£10,000 on £40,000.
5902. The last contract price, which forms the basis of comparison, was the price of the man who tendered lowest for doing the tunnel-work? Yes; just previous to our going on with the day-labour system.
5903. And were the conditions observed in regard to the carrying out of the work the same in both cases? Yes.
5904. The same kind of material? Yes; and practically the same labour. A great number of the men working on the tunnel at day-labour were men who had been employed in carrying out similar work by contractors, and I think that evidence has been given before this Committee by contractors and others to the effect that those men were good reliable men who had worked under them on contracts. I should like to add that in my opinion the day-labour work on these tunnels is better than the contract work, and my opinion is backed up by other engineers who have been examined before this Committee.
5905. Does this statement which you have just produced show the results since the taking out of the timber—in other words, does this statement of accounts include the cost of taking out the timber? Yes.
5906. Everything is now finished up and completed? Yes.
5907. And that is the resulting balance from a comparative view of the case? Yes.

David Davis recalled and further examined:—

D. Davis. 1 Dec., 1897

5908. *Mr. G. McCredie.*] Just before the conclusion of your examination, so far as it went, the week before last, some question cropped up in connection with the cement, and we were prevented going on with the question at that time;—do you remember having at any time made a statement in regard to condemned cement that was alleged to have been used in connection with the telephone tunnels? I do not think that I ever made a statement that I knew anything about it. I have heard all kinds of rumours. I heard in a discussion in the Builders' Exchange that a lot of cement had been brought up; but whatever I heard was simply rumour. I have no knowledge of it myself.
5909. You do not remember having made a statement at the Builders' Exchange in connection with it? I think that it was a kind of interjection or something like that which I made. I do not remember having made a statement there. I think it was only an interjection to the effect that I had heard something about the cement. As a matter of fact, I do not know anything about the cement; I had no opportunity of knowing.
5910. You do not know even now whether any condemned cement was used in connection with these tunnels? No; I was not in a position to know. I was never on the work, and I did not know where the cement came from. It was only what I heard in the way of rumours at the Builders' Exchange that night.
5911. I want you to listen to me while I read a report in *Liberty* of a meeting where a discussion took place on Mr. Mainer's paper—a report that appeared in *Liberty* of 24th July, 1897, as follows:—

Mr. David Davis (hon. treasurer of the Chamber of Manufactures) said he spoke with an experience of some twenty-two years as a Government contractor, and there had never been anything approaching a lawsuit between himself and the Government. He did not, therefore, approve of the Minister's statement that one saving under the day-labour system would be in the matter of law-costs. His objection to the day-labour system was that it was a socialistic scheme, and he feared that Bellamy's book had done an immense amount of harm to the Colony, as it had been thrown about a great deal, and allowed certain men to make stalking-horses of the working-classes. These men had got into Parliament, and had exercised a very bad effect. Speaking of the tunnels, he had it on the authority of a very large contractor that some 5,000 casks of cement were used in the work which had been condemned by the Government inspectors on another work. He knew something of the various works done under day-labour, and was positive that they could not be done at the same cost as by contract. He was a member of the Woollahra Council, and they had tested this principle. They had had to reduce the work of some of their men; but, to allow them to pay their rents, they had been kept on for one day a week breaking metal. The Council found that whereas they paid 5s. 10d. a ton for Kiama metal this cost them 11s. 6d., and it was their first and last experience of day-labour for breaking stones. They were told that they would get jolly and fat on these socialistic schemes; but he had not found anyone yet who was so. In neither Queensland nor Victoria had they State relief works, and in Queensland he had just tendered for a £80,000 contract. There was no chance of that here. A farmer going on to the land got only what he earned, and was paid by results; and the same with the miner. He was not paid 6s. a day for eight hours. The tendency of the present system was to make everybody look to the State for employment; and men, instead of putting their sons to trades, thought only of getting them Government billets. Referring to the paragraph in Mr. Mainer's paper, headed "A Disgraceful Political Job," he could say that he had seen the bricks, and he proceeded to express his opinion upon them.

Is that a correct statement? I think that is fairly correct. 5912.

D Davis. 1 Dec., 1897.

5912. Do you not remember having made that statement about the 5,000 casks of cement? I may have made it in the way of conversation; but, as a matter of fact, I do not know where it came from, or whose it was, or whether it was used on this work.
5913. Do you think you were justified in making a statement of that kind at a public meeting? I qualified it; I said that I had heard it; and I had previously heard something of that kind said by various speakers at that meeting. We were discussing very unpleasant business, which was not tasteful.
5914. But you say in connection with this matter that you had it on the authority of a reliable contractor? I do not think that I used the word "reliable."
5915. Well, it says in this report, and in another report, that I will read directly, that you had it on the authority of a very large contractor? I have heard several contractors discussing it—a dozen of them.
5916. Do you not think that it would have been fairer to those concerned in this work if you had made inquiries before you made a damaging statement like that? I daresay it would; but I had no time to hunt up information about the cement, and I said that I had heard about cement being bought up. I have heard it, and I could give you the names of several contractors whom I have heard discussing the matter.
5917. I suppose you know it is not true? I do not know whether it is true or not.
5918. When you made that statement, I suppose you knew it was a damaging statement to those connected with the work;—do you not think your reputation was at stake, and you ought to have considered it before you made a public statement of that description? We know that contractors very often will discuss matters of this kind, and I think it was a pretty open secret, if I may use that term, at the discussion on that night, that cement had been bought up. I was led to believe it from what I had heard from some dealers and manufacturers; but I never took the trouble to ascertain where the cement came from, or whether it was used in this work.
5919. As a matter of fact, you do not know that Goodlet and Smith supplied the cement? I do not.
5920. You do not know that they supplied most of the cement under contract? I do not know that they supplied most of it. I heard that they supplied a lot of it, and that their sheds were cleared out, but I could not prove it.
5921. Do you consider that you were justified in asserting that 5,000 casks of condemned cement were used in this work without being thoroughly satisfied in your mind that that was a correct statement? I only spoke from what I had heard, and I qualified it and said that I had heard it from a contractor in conversation; and I say now that there has been common talk in this city about a large quantity of condemned cement being used in this work. I had no right to go into Goodlet and Smith's factory to see whether they made the cement, nor to go into the telephone tunnels to see if it was used there.
5922. Do you not think that you had a right to ask those people who were connected with the work whether it was true or not;—did you not know that you were injuring them in making a statement of that sort? It was a public work, paid for with public money, and I am a taxpayer, and if it is true it is not a credit to the Department; but I have said already that I heard it by way of conversation, and I say so again now.
5923. Will you be prepared, when you find that it is a false statement, to deny it was correct? I have not made such a statement. I said at the start that I had heard so. If you can prove to me that what I have heard is not correct, I will at once admit that it is not correct.
5924. Will you give the Committee the names of the contractors—the name of the "reliable" authority? There were a dozen there.
5925. I will read the report in the *Herald* of the same meeting to show that there was no collusion between the reporter of *Liberty* and the reporter of the *Herald;* these damaging statements were made in the public Press, and they have never been refuted; and I want you to say whether you know anything about this report in the *Herald*, under the heading of Contracts *versus* Day-labour:—

Mr. David Davis, Hon. Treasurer of the Chamber of Manufactures, said the new departure was a socialistic system that had been started by Bellamy's work, "Looking Backward," which had been the means of landing a few self-seekers into Parliament. With regard to the telephone tunnels, he was informed by a prominent Government contractor that in their construction 5,000 casks of cement, condemned on another Government contract, had been used in this work. Mr. Mainer's description of the Government Printing Office as "a disgraceful political job" was fully justified, whilst in the tunnels bricks were used that were not fit to build a dog's house with.

Will you say whether you made that statement—is that a correct report? I will not say it is not correct. I said a great deal more than is reported there.
5926. Do you consider you were justified in making that statement without making full inquiry before you made it? I admit that I should have inquired into it, but we do not always inquire into things which we hear discussed at meetings of builders and contractors.
5297. You say, in answer to Question 5127:—"From the time the work started down at about Moore-street until it reached the railway station I had a look at the work just from the street. I never went into the works, not even inside the enclosures"; and in reply to Question 5128, "You saw the work as it was progressing?" you said, "Yes, from time to time, looking at it from the footpath";—can you tell the Committee how much you saw of it when standing on the footpath? I did not measure it.
5928. Give me a general idea? From time to time I have seen the street opened in various places.
5929. Can you tell the Committee where the various places were? Yes. I have seen it in front of Tattersall's Club. I saw it fall in one day almost in front of the School of Arts—I saw the whole thing collapse one day.
5930. When did you see it collapse? I could not give you exactly the time. I saw the whole of the pavement—flags, and everything—fall in.
5931. Do you know who was working there when that fell in? No.
5932. Do you know whether it was the tunnel people? Yes; I saw that it was the tunnel people.
5933. You cannot give me about the date that that fell in? No; I did not make a note of it. I was coming out from luncheon and was standing in Pitt-street with Mr. George Raffin. We saw a commotion in Pitt-street and the flags had collapsed. I do not think there was any brickwork there at the time, but that they were excavating.
5934. That was while the work was going on? Yes.
5935. That was not after the brickwork was completed? No; I do not think the brickwork was in that part then.
5936. *Mr. Cook.*] Is that the same Mr. George Raffin who is connected with the Cullen Bullen Cement Works? Yes.

5937.

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5937. Their manager? No; I think his brother John was the manager. He is away now in Western Australia. George has never been the manager, but he was a shareholder in the company.
5938. He looked after the works? No; John did.
5939. George did? I would not like to contradict you.
5940. *Mr. G. McCredie.*] With regard to the time when you saw the work going on from the footway, was it while the brickwork was being built, or when the timber was being taken out? When it was first being constructed in various places along there—in front of Her Majesty's Theatre, and right along Pitt-street. I went that way nearly every day, and occasionally I had a look at the work as I went along.
5941. How much would you be able to see of it—30 or 40 feet? Perhaps not more than 8 or 10 feet—just the size of the paddock that was open.
5942. I suppose you are aware that all that work was done underground? Yes; most of it—all except where there were open sections.
5943. Or where a portion fell in while they were going on with the work? Yes.
5944. In carrying out work of this description, do you not find the top roof fall in while you are carrying it out? It is likely to fall in if they do not timber it.
5945. You seeing it from the footway above, as you state, you would not have a favourable opportunity of examining the work—you would not be able to tell what the work was like? Not very much. I would only see what was going on in the open-cut.
5946. As a matter of fact, there is no open-cut there? In various places I saw the paddocks open.
5947. There was no open-cut except in taking the timber out or where the ground had fallen in? I think it was in front of the lamp store—Braun's.
5948. As a matter of fact, pretty well all that work was done undergroand? I could not pick out the places where I saw it open.
5949. I thought you might possibly be confusing your view of the matter with when they were taking the timber out? Oh, no. Of course, I saw them taking the timber out from time to time.
5950. You admit, I suppose, that it is impossible to judge from a manhole the class of work that is being done in the tunnel? You could not tell very well from a manhole what was going on down below. Nobody could judge unless he went down below with a candle, and had a look at it. I may state that in front of the Good Samaritan Convent in Pitt-street I saw a lot of material going down for packing which seemed to me to be not suitable at all for it—a lot of debris, soil, and old stuff.
5951. You were not down the holes there, were you? No; but I had seen the filling stuff being passed down.
5952. Do you know the nature of the bottom there? No.
5953. In reply to Question 5130 you said: "The footpath had gone down, and the water seemed to have found its way in over the tunnel, exposing the water-main and exposing the crown of the arch and the brickwork, showing a large cavity between the pavement and the crown of the tunnel";—it was after rain had come on that you saw that? I think it was after some rain.
5954. You say the footpath had gone down;—do you know how it went down? No.
5955. Do you know who laid this water-main? I believe Mr. Robertson, of the Water and Sewerage Board.
5956. Do you know if it was laid before or after the tunnel was constructed? I could not say.
5957. Are you not aware that it was the Water and Sewerage Board who dug up the ground and laid this particular portion of pipes on the top of the sill that went across the tunnel? I do not know anything about that.
5958. Supposing that they dug up there and opened out, would they not be responsible themselves for the filling? Well, judging from the way they generally leave their work, I should say that they would have rammed it down thoroughly and made a solid job of it, for it is rarely that we have a collapse of the street after the work has been done.
5959. You do not know whether that sinking was caused by their excavation? I should say that it was not caused by that, because the stuff that went down with the water was much below the water-main.
5960. I suppose you will admit that water will make a hole where it rushes down? Yes; if there is a cavity there the water will soon find its way into it.
5961. And carry debris and other stuff with it? Yes; carry all sorts of stuff with it.
5962. In reference to the pipe you spoke about, in answering Question 5130, you said: "I saw the water-main strutted with pieces of timber, and the labourers driving them with great power, hammering them up to keep the water-main strutted";—for what length was the excavation opened where you saw that pipe? Fifteen or 20 feet, perhaps.
5963. Can you show the Committee how it is possible for a pipe to drop 3 inches without breaking or being made to leak? If there were a space under the pipe, naturally the weight of the earth on top would cause the pipe to go down.
5964. And it would not leak if it went down 3 inches? These mains are first of all stopped with gasket, and this main appeared to me to have a kink of 2 or 3 inches in it.
5965. How far were you from it when you saw the kink of 2 or 3 inches in it? Four or 5 feet.
5966. From the top surface? I was standing on the top surface.
5967. Do you think that it is possible for any man to stand on the top surface of an excavation and be able to tell whether a pipe is or is not out of the line on which it was laid? Yes; if you are not blind.
5968. You can stand on the top surface and look down and tell whether a pipe is out of the line on which it is laid? Yes; if you are not a blind man.
5969. How wide was the excavation? Five or six feet.
5970. And how long? I should say about 15 feet.
5971. And how long was the length of pipe that was put in? It was just at a joint.
5972. And you say it is possible for a pipe to go down 3 inches without its leaking? It might leak perhaps if it went down an inch, but it is possible for water-mains to subside a little without leaking. When I saw the men driving the timber struts up under the water-main I concluded that there was a danger of the pipe collapsing. It was that which attracted my attention to it more than anything else.
5973. Did you know at that time that Mr. Smail was the officer who was looking after that work? I did not know what Mr. Smail was doing when I saw it that morning.
5974. You know that he is Engineer to the Water and Sewerage Board? Yes.

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5975. He is a man of great experience, and thoroughly understands his work? Yes; but I think that it was Mr. Robertson who first drew attention to the main over this work.

5976. You made inquiries, and Mr. Smail told you that it was all right? He told me that he had a man watching it.

5977. Do you not think that the man in charge of that work would be the most likely man to know whether it was or was not progressing favourably? I did not know that there was a Water and Sewerage Board man in charge of it.

5978. Do you not think that a Government officer would be specially careful in carrying out work under the extra supervision of an official of the Water and Sewerage Board? Judging from what I saw there, I think that he was very neglectful if he was responsible for ramming over these tunnels.

5979. Do you think that the superintendent for the Government has to please every member of the general public who chooses to comment on the work, or to please the engineer in charge of the work;—if you were carrying it out, whom would you try to please? I do not think it would be his duty to try to please every member of the general public, as you put it. This is the first time that I ever heard that the man in charge of any work had to please every member of the general public.

5980. But you gave evidence the other day of what you saw, and mentioned that this pipe went down 3 inches, without having satisfied yourself in the first place whether the Department was the cause of it, or whether the pipe actually went down 3 inches? My reply to you was that when I saw the men driving the timber struts I thought that my word might be doubted, and so I took the trouble to take some Pressmen down there.

5981. Do you not think it would have been more becoming of you to have consulted the engineer in charge of the work, or the engineer of the Water and Sewerage Board? Decidedly not.

5982. Mr. Smail, who has been examined here in connection with this work, was asked the following question by Mr. Robert Jones:—"In the carrying out of this tunnel work, as far as regards the relationship existing between your Department and the workmen employed in making the tunnel and those who supervised it, did you find any difficulty in working harmoniously with them?" and he replied, "Oh, dear no; we never had the slightest trouble." He was then asked, "Were they at all times ready and willing to rectify any little error pointed out to them by your Department?" and he replied, "Oh, yes; anything we wanted was always done; in fact, I never had to write a letter to the Postmaster-General about not being able to get it done";—do you not think that when the engineer in charge on behalf of the Water and Sewerage Board states that, he must have been satisfied with the manner in which the work was being carried out? From what he says it appears that he was satisfied, but Mr. Robertson must have been dissatisfied, because he told me that he put thirteen or fourteen loads of earth under the pipes to keep them in position. Mr. Robertson was responsible for the pipes, and he told me that he carted down thirteen or fourteen loads of earth and rammed it in.

5983. At that same place? Between Goulburn-street and Liverpool-street.

5984. I suppose you are aware that this work was not finished when all this commotion took place; that the work was not out of our hands as the engineers? I could not say; I do not know.

5985. As a practical man—a contractor who has carried out a large quantity of work in Sydney—would you think it was fair for anybody to come and interfere with your unfinished work, and comment on it in the way this work has been commented upon? No; I should not think it would.

5986. And this commotion and agitation caused by the articles that were put in the papers—inspired articles I call them—were in your opinion, under the circumstances, unfair when the work was not finished? I would not say that, for as far as I could judge the work was finished along the street where the timber has been taken out and removed since. Where I saw the hollow places where the timber was removed, I consider that it was in a very unfinished state, but as far as I could see it was finished as far as you were concerned.

5987. How do you know that? Because there were no openings and no men employed about it.

5988. I suppose you are not aware that we were then proceeding, under instructions from the Postmaster-General, to complete our work by taking the timber out? I was not aware of that. I am very glad to hear that.

5989. In connection with a statement that appeared in regard to the 3-inch pipes, the Engineer-in-Chief for Telegraphs asked for a report from the overseer in charge of the work, and the report that Mr. Donald furnished I will now read to you, giving his version of the affair at the time. It is as follows:—

Sir,

In this morning's (1st July) *Herald*, on page 3, is a report of a meeting of the Water and Sewerage Board, at which Alderman Davis is reported to have certain statements attached.

The first statement, that he inspected the work at the corner of Pitt and Liverpool streets, is correct. I was there at the time, in company with Mr. A. McCredie and Mr. Inspector Browne of the City Council. There were no timber struts put under the water-main to support it. In laying the main recently the men employed at the work by the Water and Sewerage Board laid it hard down on the cross-trees of the tunnel drive, and it was necessary in removing the timber from under the pipes to cut away some of the ground underneath. While this was done the timber held the pipes in the original position in which they were placed, and before it was attempted to move the timber the pipes were supported on flat stones packed under the pipes between the timber and tightly wedged with wooden wedges 1¼ inch thick until the timber was removed, when the material was thoroughly rammed in.

The statement that the main had gone down 3 inches is absolutely false.

It is also false that the tunnels had subsided; there was no appearance of the slightest subsidence or even shrinkage of the filling above.

At the corner of Liverpool-street, while Alderman Davis was looking on, the men were uncovering the timber there. He was heard to remark to a bystander that that dog (referring to a large St. Bernard dog which stood near by) could roll under that timber. He did not wait to see the timber removed; and when it was removed, in the presence of Mr. McCredie and Mr. Browne, together with myself, it was found to be well packed underneath.

As to the statement that the mains were not in a safe position, I can only say that the mains wherever the work has had to go underneath have in every instance been as well supported as they were at first; as a proof of this statement, no complaints have been made by the Water and Sewerage Board officers and men, and no leaks have ever been caused by the work in connection with the tunnels.

The Engineer-in-Chief for Telegraphs.

That is Mr. Donald's statement, dated 1st July, 1897? This is the first time I have heard it. It makes me all the more pleased to think that I took the trouble to take witnesses with me. Their names were Mr. Henry Briggs, contractor, Carlingford, and Mr. Corlette, a reporter for *Truth* newspaper. When I saw what I have already stated, I was determined to have witnesses to bear me out, because I felt pretty sure that a report would be furnished, and I anticipated what that report would be like.

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5990. You mean a report to the Water and Sewerage Board? No. When I paid a visit to the work that morning I intended to bring the matter before the Water and Sewerage Board, and I was doubly careful to take witnesses down to see it.
5991. Do you not think that your statement reflects somewhat on the engineer for the Water and Sewerage Board? When I spoke about it, I did not know anything about the engineer's connection with it. I have already stated that.
5992. *Mr. Cook.*] Why did you not get a reporter from the *Herald* or the *Telegraph*? I do not know. I went to the *Star* Office—it was the nearest newspaper office.
5993. *Mr. G. McCredie.*] Was that reporter for *Truth* a practical man, or a man capable of judging this work? He was a man who could see the timber struts there, and that was what I particularly called his attention to, and I should like the Committee to call him as a witness, if they think it worth while to do so.
5994. Do you think that he knows a strut from any other piece of timber? I think he would.
5995. Do you think that it would be fair to bring him here as a witness after you took him there and told him the position of the thing, as no doubt you did? He himself saw the men driving the strut up.
5996. Would he know the difference between a strut and a wedge? I think so; I did not see any wedges or stones there.
5997. Is it possible that they may have put stones or wedges underneath without your being able to see them? They may have done it afterwards, but when I was there, there were not cross timbers, nor stones or wedges.
5998. Did you tell the reporter you took down there what to state about this, or did you leave it to his own discretion? Nothing of the kind.
5999. *Mr. Cook.*] What did you say when you took him there? That I wished to call his attention to the way in which the water-mains were being strutted up with timber struts. Had I known at the time, and had had time, I would have taken a photographer down there and had a photograph taken of the struts.
6000. *Mr. G. McCredie.*] Would you take a reporter to any places that you are building at the present time, and show him one thing and another, and expect him to pass a good judgment upon them? There was not much to show him. There was a hole in the ground, and the water-main crossing it, and three or four pieces of timber driven up under it. That was all I had to show him. Mr. Briggs is a practical contractor who has carried out first-class Government works. I took him with me, and I think that he would bear out what I said in regard to the struts.
6001. *Mr. Cook.*] He is a friend of yours? Yes;—not an enemy.
6002. *Mr. G. McCredie.*] Do you think that he would confirm your statement that from the surface of the ground you could see whether a pipe had gone down from the line on which it was laid? I think so.
6003. You said that you would not be certain whether it was laid in that way by the men of the Government Department? I did not see them laid.
6004. You could not say who were the cause of its falling in? No; but when I saw the struts being driven up I concluded that the main was in danger, and that the struts were being put there to keep it in position until the filling and ramming were brought up to it. The earth was 18 inches, or probably 2 feet, below it at that time.
6005. Considering that the men employed on this tunnel work have carried the whole of the work through under exceptionally difficult circumstances, have supported pipes the whole length of the tunnel, practically, carrying a water pressure of from 700 lb. to 800 lb.; considering the fact of their having done all this work, and safely supported those pipes without a single leak or single complaint from the Water and Sewerage Board on the one hand, or from the Hydraulic Power Company on the other—does it not appear to you that that is a sufficient reason to justify Mr. Smail's remark, when he said that everything was all right? I think it was their duty to do so. It would have soon told a tale if it had collapsed.
6006. Do you not think that these men did their work competently when they did not have a leak in a pipe? I have nothing to say about that. They only did what was right. If a pipe had collapsed and the water run away they would have heard of it.
6007. *Mr. Cook.*] Did they do what was right? I suppose they did, considering there was no leakage.
6008. *Mr. G. McCredie.*] I suppose you will admit that if a main of the Hydraulic Power Company, working under a pressure of 700 lb., had burst, the consequence would have been serious? I think so.
6009. There would have been fewer men left alive in the tunnel? I think so.
6010. In regard to the bricks, the report of your remarks at that meeting winds up by saying "Referring to the paragraph in Mr. Mainer's paper, viz., 'A disgraceful political job,' he could say that he had seen the bricks, and he proceeded to express his opinion upon them"—can you tell me why *Liberty* did not publish your opinion upon these bricks? I do not know.
6011. Have you any idea? No.
6012. Do you think that your opinion was so bad that they would not publish it? I could not say. I do not know the proprietors of *Liberty*, I do not know the reporters for *Liberty*, and I have only met the secretary for *Liberty* at the meeting held at the Builders' Exchange. I have never met or spoken to him elsewhere.
6013. I asked you that question, because another report published in *Liberty* in reference to the matter says:—

> Mr. David Davis said that he wished to explain with reference to his remarks at the previous meeting as to the class of bricks used in the telephone tunnels; that he intended to convey that the bricks were of a very different class to those specified for this work under contract. They were good bricks of their kind, but were not radiated, durable, pressed bricks, which he had used in the construction of underground sewers.

Is that a correct statement? I did not know anything about the radiated bricks. I only know that the bricks that I have been in the habit of using are radiated. I have not seen any radiated bricks on the tunnel work.
6014. Do you think that that was a fair, reasonable thing to say simply because you had not seen any there? I did not ask anybody whether radiated bricks were or were not used there I had something else to do.
6015. Do you think that you were justified in making a damaging statement like that—damaging to the people concerned—that there were no radiated bricks there? Who was I damaging?

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6016. The report goes on to say:—

Mr. Cook, the contractor for the bricks used in the tunnel, said that the bricks supplied by him for the day-labour part of the work were the same as those used in the contract portion. There was a difference between the bricks for sewers, which were used to carry infectious matter, and those for a tunnel, which was only utilised for fixed wires. He considered that Mr. Davis' statement was calculated to injure him in his business, and that it should be either withdrawn or proved. There was not a brick used that would not last 1,000 years, unless it was through an earthquake.

? I think Mr. Cook did say that.

6017. The report also says:—

Mr. Davis said he should be pleased to make fifty apologies rather than say anything inimical to Mr. Cook. He was very sorry that anything he had said at the previous meeting, or then, should cause Mr. Cook to think he wished to injure him. What he intended to convey was that the bricks used were not of the class he used for sewer tunnels.

You stated that? Yes; I did say that.

6018. I think you said the other day that you had done work similar to this in Sydney? I have never built any tunnels for carrying wires like that.

6019. Can you tell me of any similar tunnel work done in any of the Australian Colonies? No; I do not know of any.

6020. Are you aware whether it is necessary to keep the water in or out of the tunnel? I should say that it was very necessary to keep the water out.

6021. Why? Because if you build a subway underground, and there is a soakage from the subsoil or the surface, unless it is either cemented or pugged the water will naturally find its way through if the bricks are at all porous.

6022. Do you think it is damaging to the wires for the water to get in? I do not think that it would improve them if the water were allowed to find its way through the brickwork.

6023. I did not say there was any water in? I would not like to say so either, for I do not know.

6024. Speaking in reference to double-pressed bricks being used for this, I suppose you will admit that it will cost a great deal more money to put double-pressed bricks in? I should think so. Mr. Cook admitted that double-pressed bricks were then selling at £4 a 1,000, and that he had received as high as £6 a 1,000 for them.

6025. Do double-pressed bricks keep out the water? As a rule they are not as porous as commonly-made bricks; they are generally more glazed, and a better class of brick.

6026. Do you know the constructive section of the tunnel;—I suppose you know the shape of it? No, I do not know that. I suppose it has vertical walls and then a semi-arch over it.

6027. It is not constructed at all like a sewer? Not an egg-shaped sewer.

6028. I suppose you know that it has counter-ports? I could not say that. I have never been down in the tunnel.

6029. You could not say whether it had collapsed? No.

6030. I thought you stated that the tunnel had collapsed? I have not seen the brickwork portion of the tunnel. I spoke of the surface portion.

6031. You cannot connect that with the tunnel? No; it is a subsidence of the soil.

6032. So the statement that the tunnel had collapsed is not true? No; that has been misunderstood.

6033. Do you know anything about the subways made under the railways? No.

6034. I suppose you know that they are built with double-pressed bricks? I believe they are. I believe that some at Parramatta and along there are built with double-pressed white bricks.

6035. Would you be surprised to know that water was coming through them so badly in some places that the roof had to be lined with galvanised iron to prevent the water from dropping on the passengers? I daresay so.

6036. If that is the case, where is the advantage of using double-pressed bricks? A good deal would depend on the joints. These subways have very flat arches, and there would be more likelihood of water coming in there when merely a tunnel than would be the case with a semi-arch over it.

6037. Have you never noticed that coming through abutments in connection with the same sort of thing when there is no flat arch at all, and when there is a substance of brick of considerable thickness? Yes; water will find its way through.

6038. Even with double-pressed bricks? Yes, even with double-pressed bricks; but they are generally backed with common bricks. I would not be surprised to see water go through double-pressed bricks.

6039. Then, as far as you think, double-pressed bricks to keep water are concerned, you are in the same position as by using the others? No; you would have a better chance when using a better quality of brick.

6040. Do you know anything about the Manchester drainage? No.

6041. Following is an extract from a report of the proceedings of the Institution of Mechanical Engineers in regard to the Manchester Drainage Works:—

The main intercepting sewers vary in size from 2 feet wide by 3 feet high to 14 feet wide by 10½ feet high. All the sewers up to 5 feet diameter have been built in two rings of brickwork; from 5 feet to 10 feet diameter in three rings; and the main outfall, which is 14 feet wide by 10½ feet high, in four rings. In the smaller sewers blue bricks have been used for the inner ring, and common reds for the outer or back ring. Both hydraulic lime and cement mortar has been used, whichever was considered most suited to the nature of the ground.

I suppose you admit that blue bricks are not double-pressed bricks? The blue bricks that I have seen made at Tunbridge Wells and the special bricks used in the piers of the Tay Bridge are more like iron than bricks.

6042. Do you know what a brindle brick is? No; I do not think they use that term in Australia.

6043. You say the blue bricks are very hard? Yes.

6044. The following is an extract from a report in reference to the Glasgow Waterworks Tunnel:—

Blue bricks are not considered suitable. In one case where a very smooth glazed brick had been used an invert had been blown up by hydrostatic pressure, whereas the brindle—a less expensive brick—was rougher on its surface, and therefore held the cement more tightly. In the case of the glazed bricks referred to, the bricks came away, leaving the face of the cement perfectly smooth, but when the brindle brick was substituted the strength of the invert was much increased, while, at the same time, the cost of the brickwork was much reduced.

You admit that those who carry out such works in the old country are a reliable authority, do you not? I daresay they are reliable enough. I would not offer any opinion about that. I do not know anything about it.

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6045. You would say that engineers, having a larger experience in the old country, ought to be able to better judge as to what is most likely to be suitable than engineers in this country would? I should think so.

6046. You know Mr. Cardew, the civil engineer? Yes.

6047. With regard to the bricks now under consideration he says in his report:—

Four sample bricks were cut out of the arch in Pitt-street, at the corner of King-street, and tested for absorption as follows:—

No. 1 *Specimen*—rectangular brick (part) weighed, dry, 6 lb., and after immersion in water for forty-eight hours, weighed 6 lb.

Absorption, nil.

The cross-section of the brick, after breaking, exhibited no cavities or fire-cracks in the clay, but a density and compactness throughout.

No. 2 *Specimen*—radiated brick (part) weighed, dry, 5¾ lb.; after forty-eight hours immersion in water it weighed the same, 5¾ lb.

Absorption, nil.

The cross-section of the brick, after breaking, exhibited a very dense and compact material throughout, with no cavities or fire-cracks.

Time would not permit of further testing, for compression and so on, but from my knowledge of bricks I should say they would stand a compressive stress of 20,000 lb. before cracking, and, therefore, are of a fairly strong quality.

You see that after that test and examination, these bricks were found to be fit to do the work they were put in for? That particular brick may have been, but I do not think that the bricks were all alike. I do not think they were all of the quality stated there. They vary a little. There are a lot of bricks on the street in front of this building now, and all the bricks there are not alike.

6048. Are you aware that although there has been no special provision other than ballast filling around the tunnels forming French drains, with connections at intervals to subducts running the whole length of the tunnel, the tunnels are exceptionally dry, and you could take a lady down there, the same as in Paris, and she could walk about there without soiling her clothes? I am not aware of that, but I am pleased to hear you say so.

6049. How long is it since you were in Paris? I was there eleven years ago, and also four or five years ago.

6050. You were telling the Committee the other day that in Paris the sewage matter does not flow along the tunnel in an open channel, but is carried in pipes? The one I went down into; but they have brick sewers there as well. Near the Paris markets I saw a sewer opened up, and sewage matter was running through that, but I obtained an order from the Municipal Council, and a party of us went down and saw the big pipes on the brackets.

6051. Was there any sewage matter at all running through it? Not where we were.

6052. I should like to draw your attention to the latest information in connection with the Paris sewers. I think that when you were there you may not have noticed the real arrangement of the sewers, and this information may refresh your memory. The authority I have for this information is a book called "Public Health in European Capitals—Berlin, Paris, Brussels, Christiania, Stockholm, and Copenhagen"; by Thomas Morison Legge, M.A., M.D. (Oxon.), D.P.H. (Cantab.); and the book is dedicated as follows:—

To Arthur Newsholme, M.D., M.R.C.P., Medical Officer of Health of Brighton, and Hon. Editor of *Public Health*, this book is gratefully inscribed by the Author.

I will just read an article from it on the Paris sewers. It is last year's publication, and therefore is the latest:—

The Sewers of Paris.—To understand this pollution, it is necessary to consider of what the sewage of Paris consists, and what are the methods commonly employed there for getting rid of waste matters from houses. A very fine net-work of sewers exists, designed in 1856 by Belgrand; but there still remain some 150 kilometres length of them to be constructed before the necessary 1,000 kilometres are reached. The sewers differ entirely from those in this country (that is, in England), in their much greater size, and in the fact that they subserve other purposes than that of the removal of waste matters. They are, in fact, gigantic subways, everywhere accessible, freely ventilated, in which the sewage flows along in a special channel at the bottom; on both sides in the larger sewers, or on one side only in the smaller, is a footpath for the workman to move along; against the walls, on racks, are the mains for conveying the drinking water, and those containing the Seine water for public purposes, while along the roof is the net-work of telegraphic and telephonic wires, and the pipes for compressed air. The gas-pipes, owing to the risk of a possible explosion, are not carried in them. The sewers are of fourteen types. The largest, which include the three main intercepting sewers of Asnières, that on the left bank of the Seine, and that serving the north-east of Paris, have a height of about 14½ feet, and a breadth of 19 feet; those in the ordinary streets are 7½ feet high and 4 ft. 2 inches broad. The public is allowed to visit the sewers in the summer, and the journey from the Place de la Madeleine down the Rue Royale, and along the Rue de Rivoli to the Boulevard de Sebastopol, gives one plenty of ground to marvel at the excellence of construction and the admirable manner in which they are kept. Their dimensions, however, and slight fall are such that they cannot be self-cleaning, and an army of about 900 men are constantly occupied in the task. The sewers receive all the refuse of the streets, horse droppings, sand, &c., that is washed into them, partly by the action of the men who keep the main thoroughfares so beautifully clean by constant watering, and partly by the sweeping action of the water which is turned on and allowed to run by the edge of the pavement for a short time every day. No intercepting trap is placed between the street and the sewer. The sand that is washed in gives rise to an immense amount of trouble, owing to the accumulations of it which form, and the damage caused to the sewer itself by the friction. In 1893 no less than 33,311 cubic metres of this material had to be removed at a cost of 118,866 francs.

The principal method adopted for cleansing the sewers is to flush them out by means of flushing reservoirs, the number of which have been largely increased of late years. When there are accumulations of sand to be removed, some special apparatus is required with the object of breaking it up and moving it onwards. In the smaller sewers the machine used is called a *Mitrailleuse;* it is shaped to the size of the sewer, and is moved by hand. In the larger-sized sewers the apparatus moves on rails, and in the collectors it is fixed to an iron boat. At certain points there are chambers for retaining the sand and other solid bodies, from which the matter can be readily removed. Six siphons carry the sewage from one side of the Seine to the other. Storm overflows from the sewers into the Seine exist, only coming into use, however, during times of very heavy rain.

You say you remember going down a particular portion of the Paris sewers? Yes; I think it was at the Rue de Rivoli. The proprietor of the hotel where I stayed got permission for us to go down.

6053. Do you not recollect that certain parts of the sewer were open, and sewage was running down the centre? There was a kind of channel with sewage flowing in it.

6054. So that would be an exposed channel in a tunnel? It seemed to take the drainage from small pipes in the side. It was pointed out to us that the pipes carried sewage and water.

6055. We were talking the other day about works in connection with the Otford tunnel on the Illawarra railway, and you said that the bricks used there were specially moulded plasted;—I want to know the difference between those bricks and the wire-cut plasted? I know that in the trade they always look upon the wire-cut as an inferior brick to the hand-made brick.

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6056. Why do they look upon it as inferior? Well, being cut off by a wire, they are not so smooth; they are more rugged on the edges, sometimes very rough.
6057. Do you think it is an advantage to have them rough when they are built in cement? I daresay, if the brick is well burnt. There is no doubt that with a wire-cut brick there is no frog such as you get in a hand-made brick.
6058. But wire-cut bricks give a better key than hand-made bricks? I think that you get a better key with hand-made bricks.
6059. Were you with me when in connection with the Engineers' Association we visited that tunnel when Smith was carrying it out? No.
6060. They were then making bricks by hand? They started by hand, but afterwards they got some Fausett machines, if I remember rightly.
6061. Anyhow they were not using a double-pressed brick? No. They were using a good hand-made brick. The bricks made for use in the tunnels at this end of the contract were made at Hurstville. They are made of pipeclay, and they are very good bricks. They have been making radiated sewer bricks there since.
6062. Do you know any railway tunnels made with double-pressed bricks? No.
6063. Do you think that if it were necessary the railway people would use double-pressed bricks? I have not known any railway tunnel made with double-pressed bricks.
6064. *Mr. Bavister.*] Did you, of your own knowledge, know where any of the cement was obtained that was used on these telephone tunnels? No; I knew nothing about it.
6065. Who was the prominent Government contractor who informed you? Several, in conversation.
6066. Can you name one of them? Yes, I can. I think that Mr. Waine was present at the time, and also Mr. Raffin.
6067. I do not care who was present, I want to know who was the Government contractor who informed you that the 5,000 casks previously condemned had been used on these tunnel works? I think it was in the way of conversation. We were all Government contractors together.
6068. I want to get definite information as to so serious a statement that 5,000 casks of condemned cement were used? I would not be sure about 5,000. I think that was a mistake.
6069. You must know now who told you that, and I want you to tell the Committee? I could not say; it was in the way of conversation, when we were talking over the matter together.
6070. Did you repeat at a meeting, the proceedings of which you knew were to be reported in the Press, the assertion that 5,000 casks of condemned cement had been used on this work? No; I do not think I said 5,000 casks. It was reported; but I think the word 5,000 was an interjection.
6071. You know now a publication described as *Liberty?* Yes.
6072. Do you look upon its reports as reliable? I look upon all Press reports as fairly reliable.
6073. Whatever may be the character of the reports in *Liberty*, would you accept the reports of the *Sydney Morning Herald* as being truthful reports of meetings? I would accept the reports of all the papers. I do not think they have anything to gain by publishing an untruth.
6074. If any of your fellow-contractors were at that meeting, and remember the statement made, would you accept their word as to what took place? At the time I did not pay very much attention to the discussion; but I know there was a good deal of talk about the cement, both at the meeting and at different times, as I have already stated. Various cement dealers have spoken to me about it; also brokers who go round on business in connection with cement.
6075. *Mr. Cook.*] Who? Some men who have cement for sale.
6076. Can you give their names? No—but different people.
6077. *Mr. Bavister.*] Is it a fact that you cannot give the names, or that you will not? I do not feel disposed to give the names.
6078. But you have been sworn to tell the whole truth here—do you know the name of any contractor who gave you that information? I could not give you it now.
6079. Do you know the name of any such contractor? No.
6080. Did you swear the truth before when you said you did know? I do not think that I was on my oath at the Builders' Exchange.
6081. You are on your oath here? It was done in the way of conversation. I think it was a kind of conversational discussion, when they were touching on the point of cement. There were several interjections about the cement at that meeting at the Builders' Exchange. It was common talk in the city about the cement being used there—I mean common talk by nearly all classes of contractors, and people in business in connection with that kind of work.
6082. You repeated the statement that 5,000 casks—or, if you choose, 500 casks—of cement had been used? I did hear so.
6083. Before you repeated that statement, did you take any steps to verify it? No; I was only speaking from what I had heard in conversation with other contractors.
6084. Do you consider it a more serious matter to be negligent as a labourer in the construction of a minor detail of a work than it is to negligently repeat statements without any foundation of truth? No; I said at the time that I had heard that the cement had been used.
6085. I ask you which do you consider the most serious negligence, for a labourer not to put in a shovelful of muck where it should go, or for a prominent citizen to repeat a serious statement reflecting upon the system of carrying out a public work without his having taken any pains to ascertain whether that statement of his was true;—which of those two things do you consider the most serious? That is rather a peculiar question to ask anybody, but it is a very proper one. I qualified my remarks by stating that I had heard that certain things had been done.
6086. Would you consider any person justified in stating any rumours that he might have heard as to your own personal character or position, if he qualified it with some such blind statement as that? I do not know; I think so.
6087. Would you consider that by such conduct he would be doing you an injustice? It would all depend under what circumstances the words were used.
6088. If he were to hear some person say that you had used 5,000 casks of condemned cement, and if he were to give publicity to that statement, he simply mentioning in an offhand manner that he had been informed by a prominent Government contractor, would you consider that he was acting fairly towards you? I would not take very much notice of him if I thought there was no truth in it. 6089.

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6089. Would you think that he was acting fairly towards you? If he had heard it in conversation, I would not see much in his repeating it.
6090. Do you lay down that you are entitled to repeat in a public manner all conversations you may hear? I have often said that I have heard that such and such was the case.
6091. As to the subsidence to which your attention was attracted when you and Mr. Briggs were driving in the city, had you seen work going on at that same place previously? I do not think that I had noticed it just at that particular spot.
6092. Do you know whether the water-main, to which reference has been made, in that locality, was laid before the tunnel was constructed or afterwards? I could not say. I do not know what mains were laid.
6093. You not only take an interest in the work done about town, but you take a special interest in the work of the Water and Sewerage Board? Not particularly in one place. I often see other works in different parts of the city.
6094. Is it the same with members of the Water and Sewerage Board as you suggest with Members of Parliament—that they only partially do their duty, and do not take an interest in what they should? It is not the duty of any member of the Water and Sewerage Board to inspect water-mains and to see that they are properly laid or otherwise.
6095. I ask whether you do not take more than a general interest in the work of the Water and Sewerage Board? I think I have taken more interest in it than any other member of the Board. I think I am safe in saying that. I have probably taken more interest in the work of the Board than most of the members of it.
6096. Are you aware now—whether you were at that time or not—of the fact that that main was laid after the construction of the tunnel? I could not say.
6097. And that when the works which you saw being carried on there were carried on, it was for the purpose of extracting the tunnel timbers? They were taking out the tunnel timbers the morning I was there, but not at the place where the struts were, but on another section.
6098. In taking out the tunnel timbers, were not the Post Office workmen cutting under a large cap-piece a hole sufficiently large to put a timber strut under the pipe, and then to wall up a stone packing to receive the weight before they removed the timber? No; the timber appeared to me to have been removed at the particular place where the struts were put in. There were three struts under the joint of the pipe in the cutting.
6099. If it has been sworn by one of the officers of your Board that that was the case, you would admit that that was the case? I did not see it, and I would not admit it if I did not see it.
6100. You made some reference to not having seen any radiated bricks in this work;—did you see any section of arching turned in that tunnel? No; I do not think so, except what has been done about the open manholes, and I did not take much notice of it. I just had a look down when I was passing.
6101. Would you accept the statement that radiated bricks had been used, even although you did not see them? I daresay they were used.
6102. Would you believe it because of your knowledge as a contractor that it would be cheaper to use radiated bricks than to put in square ones? Decidedly.
6103. You have spoken in regard to what you termed a sag in a pipe? Yes.
6104. In connection with some reference to that this morning you said that you had seen a pipe sag a yard? I said that a water-main had been known to sag a yard, and not to leak where the earth had been washed away.
6105. And yet, having seen that, and in this instance believing that a pipe had sagged 3 inches, you thought there was cause to apprehend danger? When I saw the wooden struts put in.
6106. Do you look upon the struts as being a source of danger? No; as a protection to the pipe.
6107. You stated that you have seen a water-main sag a yard and not leak? I said that water-mains had been known to sag and not leak.
6108. You said "sag a yard," and you have repeated it;—you said that you had known a water-main to sag a yard and not leak, and yet in this instance when you fancied that a pipe had sagged 3 inches, you honestly believed it to be a source of public danger? When I saw the wooden struts put in I thought there was a liability of the pipe to collapse.
6109. In consequence of the struts? No; they were put there to keep the pipes in position.
6110. In consequence of the 3 inches of fancied sag? It was not a fancied sag. I saw a kink in the pipe, and I drew the attention of the other gentlemen to it.
6111. It has been sworn to this Committee by those whose duty it was to examine it that no sagging had taken place, and that the pipes were in the position they were laid in? Very likely.
6112. You have sworn that you had known a pipe to sag a yard and not to leak? Water-mains may go down in a long stretch and not leak. I believe it is a common thing, where there is a wash-out, for pipes to remain there and not leak.
6113. But in this case, where you believe a sinking of 3 inches had taken place, you thought that that constituted a public danger? When I saw the struts under the pipe I thought there was something wrong.
6114. *Mr. G. McCredie.*] You did not measure it? I did not go inside the enclosures. It was fenced in.
6115. *Mr. Bavister.*] If those struts had not been put in would you still have had your attention attracted to it, and thought it was a source of danger? Well, the pipe was not in line; but it was the struts that attracted my attention more than anything else. If the struts had not been there I do not know that I should have thought so much about it; but when I saw the men driving the struts under the pipe I took the matter up.
6116. Have you ever known your lead-joints to blow out owing to the pressure of water? It is very rarely that that occurs.
6117. Have you ever known a joint to blow out? No; I cannot say that I have.
6118. Have you heard of such a thing? No; I cannot say that I have.
6119. Are such things ever reported to your Board? I could not say. I know that when there is a leakage in a joint they generally strip the ground and caulk it again.
6120. If the lead-caulking of a joint had blown out would the reporting of that matter to the Board necessarily come under your notice? Not necessarily.
6121. There may be things seriously affecting the public welfare in connection with your Board without your being aware of the fact? There may be.

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6122. Do you know anything of a subsidence that was discovered a short time ago—I think last week—in Castlereagh-street? No; I have not heard of it.
6123. If a subsidence 2 feet deep and 4 feet square were discovered would you not look upon that as a serious matter? No; not 4 feet square and 2 feet deep. A water-main could easily pass over a subsidence of that size. It is where you get a length that there is liability to sink.
6124. I am not referring to a water-main, but to the danger to the street traffic;—if such a hole were known to exist in any portion of the city streets would you look upon it as a source of danger? I should say so.
6125. Would you consider your opinion as of much value, in such a connection, as that of the road officers of your Board;—would you look upon their experience as greater and more reliable than your own? No; I think that the experience I have had in road-work will compare with that of most road-makers.
6126. Well, if such an officer were to swear before this Committee to the existence of such a hole, and also were to follow that up by the assertion that it constituted no danger, would you attach importance to his word? If there were a hole 4 feet square and 2 feet deep in a street, the man who said there was no danger I should say was a fool.
6127. Not on the surface, but under the wood-blocks and concrete? Yes, there would be a danger. If heavy loads went over it there would be a decided danger.
6128. Have you on some occasions called public attention to matters of failure in connection with excavation or road works? No; I cannot say that I have.
6129. You have known of such things existing, you have seen them, and you have not gone to get a reporter to inspect the place? I have not seen them.
6130. Can you tell the Committee why you acted differently in this case? Because I was a member of the Water and Sewerage Board.
6131. Were you also a member of the Water and Sewerage Board when you have seen other subsidences in the streets? I cannot say that I have seen any particularly. I have seen the streets go down at different places at times.
6132. Is that answer to be taken as being on the same parallel as your inability to name the prominent Government contractor who informed you that 5,000 casks of cement previously condemned had been used on this work? I have not made a note of every subsidence I have seen in the street. If I find that there is a subsidence in the street anywhere where I am driving I generally call the attention of the municipal officers to it, or if there is a leakage in the street I tell the turncock or plumber, or mention it to Mr. Robertson.
6133. Do you know the name of any reliable person who told you that 5,000 casks of condemned cement were used in the sewer? I heard it in conversation, but would not like to pick anybody out.
6134. Do you know who said it? I know that about a dozen contractors were in company discussing the matter.
6135. Then one or more of them said that 5,000 casks of condemned cement were used on this work? It was in the way of conversation. I would not like to say that one individual had all the say, and that his word was taken about it.
6136. Will you name any individual on whose authority you made that assertion to the public that 5,000 casks of cement previously condemned had been used on this work? I would not be right in naming any one, because it was in a conversational way that I heard it. One single individual did not come to me and tell me that 5,000 casks of condemned cement had been used. It was in conversation with a number of gentlemen.
6137. Do you consider that it is from a desire to honor confidence that you refuse to give the name of your informant? I could not give it, and I would not give it either, because I could not. When I have heard something in the way of conversation with seven or eight or a dozen together talking about different things that took place, as we very often do, in connection with contracts, I could not single any man out.
6138. If a feeling of honor prevents a man from revealing his authority, should not the same feeling prevent him from publishing broadcast a damaging statement? I have already said that I heard it, and I say so now—I heard it in the way of conversation.
6139. If having been informed under what you may consider circumstances imposing confidence, you from a feeling of honor refuse to give the name of your informant, why did not a feeling of honor prevent you from scattering broadcast that assertion to the damaging of the public of New South Wales, when your feelings of honor prevent you from giving the name of your informant? I qualified the remark. I have said over and over again that I heard it in the way of conversation.
6140. And you did not hesitate to repeat at a public meeting what you had received in private conversation? I can scarcely say that it was a private conversation, because there were a number of gentlemen together.
6141. *Mr. Robert Jones.*] In making the statements you did at that public meeting, if this work had been carried out by a Government contractor, would you have so fearlessly made that statement as you did, knowing that the work had been carried out by day-labour? I do not think that I would ever screen anybody who did a rascally piece of work.
6142. Would you have made that statement so fearlessly if the work had been done by a contractor as you did, knowing it to have been done under the supervision of the Government in this way? I do not think I would for this reason: A contractor has always plans and specifications to guide him in carrying out his contract. His materials are specified, and have to pass inspection.
6143. I am referring principally to the question of condemned cement and bad bricks, such as you say you would not have built a dog's house with;—would you have made the same damaging statement if the work had been carried out by a Government contractor? I think I would have done exactly the same thing.
6144. Would you then consider yourself liable to an action for heavy damages if your statement had been proved to be groundless and untrue? If I have seen any rascally work carried out, I have never screened it.
6145. In regard to the bricks you have made two statements; one of them must be untrue; which of them is true; you have apologised to Mr. Cook, the maker of the bricks, for your statement about them; which is true, your statement or your apology? I say the same now as I did in the first instance about the

D. Davis. 1 Dec., 1897.

the bricks, viz., that the class of bricks used in the underground work of the tunnels is not the class of bricks always specified in Government contracts, and I have not known this class of bricks to be used in Government underground work.

6146. Did you not tell us that you never saw this class of work done before? Not exactly tunnel-work, but I have seen bricks used underground. As far as I know there is only this one telephone construction in all Australia. I do not know that this system of telephone subways has been carried out anywhere else.

6147. In making the statement that you did at that meeting, you knew at the time that it was detrimental to those who had the management of this work? I was commenting upon the work.

6148. Did you believe at the time you made the statement that it would be detrimental to the supervision? I did not consider the supervision at all, but that it was a public work, and I spoke about it as I thought at the time. I did not wish to make an attack upon anybody.

6149. Do you think that your statement would impress the public with the feeling that the supervision was not being carried out in a proper manner, or that the whole thing was being done in a loose manner? I spoke about the work just as I thought about it.

6150. But you have carefully kept your thoughts to yourself; I want to know what that thought was? I had no particular motive in it.

6151. You did not know whether it would be detrimental to the supervision of the work at the time, and you did not care? I did not know, and I did not care.

6152. Would you have boldly made the same statement if a contractor had been carrying out the work? Yes.

6153. You knowing that you would be liable to an action for damages if your statement were untrue? Yes; I would have made the statement, but I would not have blamed the contractors, but the specification and the supervision.

6154. You stated that if a man were not blind he could have seen the kink in the pipe? No; I said that in regard to the strut. I do not say that everybody could detect a kink in a pipe the same as a mechanic could.

6155. You said the pipe had dropped? I meant the pieces of timber driven under the pipe, and I said that the strut could be seen by anybody unless he were a blind man.

6156. Your reply was in answer to the question of Mr. McCredie, who asked you if you saw the kink in the pipe from the surface, and your reply was that if a man were not blind he could have seen it? The strut was there, and it was the strut I alluded to.

6157. In reply to Mr. McCredie, you said that if a man were not blind he could see the kink in the pipe from the surface, and Mr. McCredie asked you if you could see from the position you were in from the surface? I could see it.

6158. And your statement was, and is, that if a man were not blind he could have seen it? I have already described it.

6159. You said that you took witnesses with you because you expected untruthful reports from the officers;—what led you to believe such a thing? I was going to bring the matter before the Water and Sewerage Board meeting, and I said to my friend, "I think it is only right that I should have a witness to see this, and I will bring a pressman to see it." I went and brought a pressman after I had visited the works with Mr. Briggs, who was a practical contractor.

6160. *Mr. G. McCredie.*] Were you very excited on that occasion? No.

6161. You were quite cool? I am not very excitable.

6162. *Mr. Robert Jones.*] You actually had so little faith in the men supervising the work that you expected from them an untruthful report, and hence your reason for bringing a pressman from *Truth*—where truth is to be expected—so that that untruthful report should have no effect; is that so? No. I was determined that what I said about it should be fully borne out by witnesses I took down there.

6163. You state that you expected that an untruthful report would be furnished? I am not surprised to hear that what I stated was not verified by the inspector.

6164. Why are you not surprised? Because he was very much against the men who had charge of the work.

6165. Then the supervision, in your opinion, was not such as could be depended upon? I would not say that. I had seen the strut under the pipe and called attention to it, and I was determined to have somebody to substantiate what I stated about it, for I knew it was a serious charge.

6166. *Mr. G. McCredie.*] Was Mr. Donald standing there at the time? I think he was in Liverpool-street just then.

6167. He was responsible for the work? Yes; from what I have heard, I believe he was responsible for the work.

6168. *Mr. Robert Jones.*] Have you ever heard anything detrimental to Mr. Donald's character? Nothing whatever.

6169. Have you heard that he has been a contractor for many years of considerable experience? I believe he has.

6170. Have you also heard that he is also a tradesman? I could not say anything about that.

6171. Would you be surprised to hear that he is a tradesman, and a good one? No.

6172. You have never heard anything against his character? Nothing whatever.

6173. What led you to make the statement that you expected from Mr. Donald an untruthful report? I did not know that Mr. Donald would be called upon to make a report.

6174. Would it be that Mr. McCredie is an untruthful man? I did not know who would make the report.

6175. *Mr. Cook.*] From whom did you expect to get an untruthful report? I simply took down a witness, because I thought that if I were to make a complaint about it, it was quite likely that I should be contradicted; that is how I felt in the matter.

6176. *Mr. Bavister.*] Did you take the precaution to take a witness, because your previous experience had shown that to be desirable? Oh, no.

6177. *Mr. Cook.*] Referring again to the 5,000 casks of cement, I want to ask you whether, if you heard that a contractor had wrongly used the cement in a contract of his, and if you heard that statement in private conversation, you would go to the Press and the public and tell them that that contractor had used that cement? No; I spoke generally of what had been rumoured—that this cement had been used. I spoke from rumours that I had heard.

D. Davis. 1 Dec., 1897.

6178. Would you say that about a private contractor, and then refuse to divulge the name of your informant? I do not think that I would screen a private contractor if his public work were done wrongly.
6179. *Mr. Bavister.*] Would you actively expose him? I certainly would not screen him.
6180. *Mr. Cook.*] Would you tell the press and the public, as you did on this occasion, that he had purchased 5,000 casks of condemned cement? I perhaps would, if there were a public discussion on it.
6181. You have never done such a thing? I have had no occasion to do it.
6182. Have you never heard that a contractor did anything that was wrong? I could not say. Contractors, I suppose, have done work wrongly, and have been punished for it.
6183. Supposing that on your way home to-day you saw that a contractor was using bad cement; would you go to the Press and inform them about it? No; I do not think that I would.
6184. Where would you report the matter? I do not think that I would bother about reporting it. I do not think that I would put myself out about it unless it came out in the way this has, and then I suppose I would act in the same way.
6185. If you saw a man buying condemned cement to put in a public building, would you go and expose him? If there were a discussion on, the same as there was at the Builders' Exchange, it is quite likely that I would act the same then as I did in regard to this.
6186. But supposing you did not see him yourself, but a fellow contractor told you? I would say the same as I have; that the men had been using bad cement.
6187. Would you tell the Press that? I do not think that the Press was there—with closed doors.
6188. Would you name the contractor? I daresay he would be known the same as this work was known.
6189. And would you afterwards refuse to tell the contractor, after making the charge against him, the name of your informant? I would tell him that I heard a rumour that inferior cement was being used.
6190. You did not go and tell our people you had heard of this? I could not tell them.
6191. Why? Because I had heard it in conversation in a general way.
6192. But you could tell the public, and you know you did that? I have said over and over again that I heard this in a conversational way, and it was a thing rumoured about the city.
6193. I ask you again whether, as a man, you think you are justified in reflecting upon people's characters, and then to decline to give the name of your informant;—do you think that it is a manly action? I do not know whether you consider it is, but I stick to what I have said.
6194. You think that it is quite good enough to throw any sort of rubbish at a man without giving him an opportunity to defend himself? I was not throwing any kind of rubbish at any particular man—it was from a general rumour, and I spoke in a general way.
6195. *Mr. G. McCredie.*] Would you put your name to a statement to that effect now? No; I have no right to do so. I have stated that I knew nothing about the cement, except what I heard in a conversational way in the city.
6196. *Mr. Cook.*] Without taking any trouble to find out whether it was true? I have something else to do without running about to find that out.
6197. *Mr. G. McCredie.*] I suppose you mentioned it to one party and then to another, and that is how it got about? I do not know.

CONSTRUCTION OF TELEPHONE TUNNELS.

APPENDIX.

[*To Evidence of P. B. Walker, Esq., M.Inst.C.E., Chief Electrician and Engineer-in-Chief for Telegraphs.*]

A 1.

APPROVAL TO CARRY WORK ON BY DAY-LABOUR.

Introduction of Day-labour.

WE are having a good many contractors looking at the plan and specification for the tunnel. If anything is going to be done in the direction indicated, had not the tender notice better be withdrawn, otherwise it will probably cause some of the contractors a lot of trouble for nothing, in the way of taking out quantities? P.B.W., 5/9/95.

Submitted. It would perhaps be as well to withdraw the notice.—S.H.L., 5. Yes.—J.C., 5. Appt. Branch for immediate attention.—JAS. D., 5/9/95. Advertisements withdrawn from *Gazette* and newspapers.—J.O., 5/9/95. Secretary of Telegraph Service.—S.H.L., 5/9/95. Read.—P.B.W., 5/9/95.

After an interview with the Secretary for Telegraphs and Mr. McCredie, I have decided that the proposed section of tunnel across Martin Place shall be carried out directly by the Department by day-labour, and I shall be glad if the matter can be put in hand without delay. Let tenders for this work be at once withdrawn.—J. COOK, 5/9/95.

Instructions were issued to the Government Printer on the 5th instant for the withdrawal from the *Gazette* and newspapers of the notice inviting tenders for the construction of the third section of underground tunnels, and the instructions were repeated a few days later, when the notice appeared in the *Daily Telegraph*. Positive instructions have again been given for the withdrawal of the notice.—A. J. ARNDELL, 13/9/95.

Noted. The contractors are still coming up. Three were here yesterday, and one was in this morning, but he was informed that tenders had been withdrawn. No doubt the bungle has arisen through the Government Printing Office making some mistake over the matter. The tunnels will be put in hand at once.—P.B.W., 13/9/95.

Read. Papers returned to Mr. Walker.—S.H.L., 13/9/95. Acct. to note.—P.B.W., 17/9/95. Noted.—W.H.M., 21/9/95.

Postal and Electric Telegraph Department, General Post Office, Sydney, 27 August, 1895.

TENDERS will be received at this Office up to 11 a.m. on Wednesday, the 18th proximo, from persons desirous of contracting for the construction and completion of the third section of Underground Tunnels for the Postal and Electric Department, from the junction of Pitt and Moore streets, along Martin Place, across George-street, and up Barrack-street to the corner of York-street, in accordance with the plans, specifications, and general conditions, which may be seen at the office of the Secretary of the Telegraph Service, General Post Office, Sydney, where tender forms may be obtained; and also in accordance with the special conditions now applicable in the Department of Public Works to contracts of a certain value, as indicated in the minute of the Secretary for Public Works, dated the 3rd September, 1894, and the schedule of the minimum rates of wages to be paid, which may also be seen at this office.

The tender must bear the signatures of two approved sureties agreeing to be responsible for the due performance of the contract, in the event of the tender being accepted, and undertaking in that event that they will execute and deliver, within one week from the usual notice of acceptance, a bond to Her Majesty in a sum equal to 10 per cent. on the value of the contract, for securing such performance, otherwise the tender will not be taken into consideration.

A cash deposit of £80 must accompany each tender as a guarantee of good faith, which will be returned on completion of bond.

In the event of the successful tender failing to sign the bond for the due performance of the contract within the period aforesaid, the deposit will be forfeited to the Government; and the Government reserves the right to advertise the contract anew or to accept another tender.

It is to be distinctly understood that the Government will not necessarily accept the lowest or any tender.

The cost of the necessary duty stamp (£1 on the bond and 1s. on the tender) must be borne by the contractor.

Tenders to be addressed to the Deputy Postmaster-General, General Post Office, Sydney, and endorsed "*Tender for Third Section of Underground Tunnels.*"

JOSEPH COOK.

A 2.

MR. DONALD'S APPOINTMENT AS CLERK OF WORKS.

THE attached letter has been forwarded to me by Messrs. A. L. and G. M'Credie, with reference to the 2nd section of the tunnel in Pitt-street.

Mr. Grocock, the contractor for the work, called yesterday to say he will be prepared to commence the work on Monday next. It is now necessary that a first-class man be selected for the position of clerk of works, and Messrs. McCredie have recommended Mr. George Donald for the position at £4 per week, this being the usual charge for such services. The appointment to be terminable at will, or upon completion of the work.

I have made inquiries in reference to Mr. Donald, and find that he is in every way suitable for the position, and is a thoroughly competent builder himself.

I therefore recommend that he be appointed to the position. P. B. WALKER, 3/5/95.

Submitted.—S.H.L., 2/5/95. Approved.—J.C., 3. Inform. Acct. to note.—P.B.W., 4/5/95. Mr. George Donald. Journal.—S.B.D., 4/5/95. Noted.—W.L., 6/5/95.

Dear Sir, 250, Pitt-street, opposite School of Arts, Sydney, 2 May, 1895.

In reference to the contract for the second section of the underground tunnels, it will be necessary to have a clerk of the works to be constantly present during the process of the works, and we have much pleasure in recommending the appointment of Mr. George Donald to that position at a salary of £4 per week.

Mr. Donald is a man of considerable experience and capabilities, he is well acquainted with the class of work required, and we have every confidence that he will perform the duties of the position in a very satisfactory manner.

We are, &c.,

S. H. Lambton, Esq., Deputy Postmaster-General, Sydney. A. L. & G. McCREDIE.

IN connection with the tunnel arrangements it will be necessary to make an alteration in Mr. Donald's, the clerk of works, pay, at present £4 per week, as he will have the responsibility of the gang upon him, as well as looking after all the material and arranging the men's time. I therefore think that he is fully entitled to £6 per week, which I recommend should be paid to him during the time the work is in operation, provided he gives satisfaction; the appointment to be only temporary and terminate at will. Mr. Donald has given every satisfaction in the supervision of the Pitt-street section of the tunnel, and I have no doubt he will make a good job of the work undertaken under day-labour.

P. B. WALKER, 17/9/95.

Recommended.—S.H.L., 17/9/95. Approved.—J.C., 18/9/95. Inform. Acct. to note.—P.B.W., 18/9/95. Mr. George Donald. Journal.—S.B.E., 19/9/95. Noted.—W.H.M., 21/9/95.

A 3.

APPROVAL FOR CONSTRUCTION OF MOORE-STREET TUNNEL.

Town Clerk's Office, Sydney, 7 January, 1892.

Sir,

I am directed by the Right Worshipful the Mayor to request that as the construction of Moore-street is about to be proceeded with, all wires and other overhead provisions passing over the thoroughfare may be carried through a subway; the work could be conveniently carried out simultaneously with the formation of the roadway, and with obvious advantage.

Yours, &c.,

JNO. R. PALMER,

For HENRY J. DANIELS,

Town Clerk.

The Secretary, General Post Office, City.

Superintendent, Electric Telegraphs, for report.—S.H.L., B.C., 8/1/92. Acknowledge. The Town Clerk, Sydney.—G.H.A., 8/1/92. Mr. Rutherford to see me in reference to this matter.—E.C.C., 9/1/92.

Sir,—I quite agree with this application, and would strongly recommend that a subway be constructed from the east side of Castlereagh-street to a convenient point at the Pitt-street end of the General Post Office, where access could be obtained to the telephone room for receiving cables. A subway similar to the one under George-street would be most suitable; distance, 440 feet.—R.R., 12/1/92. Superintendent.

WITH reference to the attached letter from the Town Clerk, requesting that all wires passing along Moore-street be carried through a subway, and pointing out that the work in connection therewith could be carried out simultaneously with the formation of the new roadway, and with obvious advantage, I desire to submit for the approval of the Postmaster-General a proposal to construct a tunnel, or conduit, similar to the one in George-street, to extend from the Pitt-street front of the General Post Office, along Moore-street, to the footway on the east side of Castlereagh-street. The total length is 495 feet, or thereabouts, and the estimated cost, exclusive of the Supervising Engineer's charges, about £1,750.

We have a large number of cables leading into the central telephone exchange, and, as they are a disfigurement to the building, and in their present position liable to damage, I would strongly urge the construction of this tunnel to carry the whole of them across Pitt-street, and all wires now erected overhead in Moore-street.

I have consulted with Messrs. McCredie Bros., a firm of civil engineers, of high reputation, in this city, and they are willing to prepare plans and specification, and to supervise the work for the usual charge of 5 per cent. on the total cost. They are also prepared to have everything ready for inviting tenders within ten days from receipt of instructions.

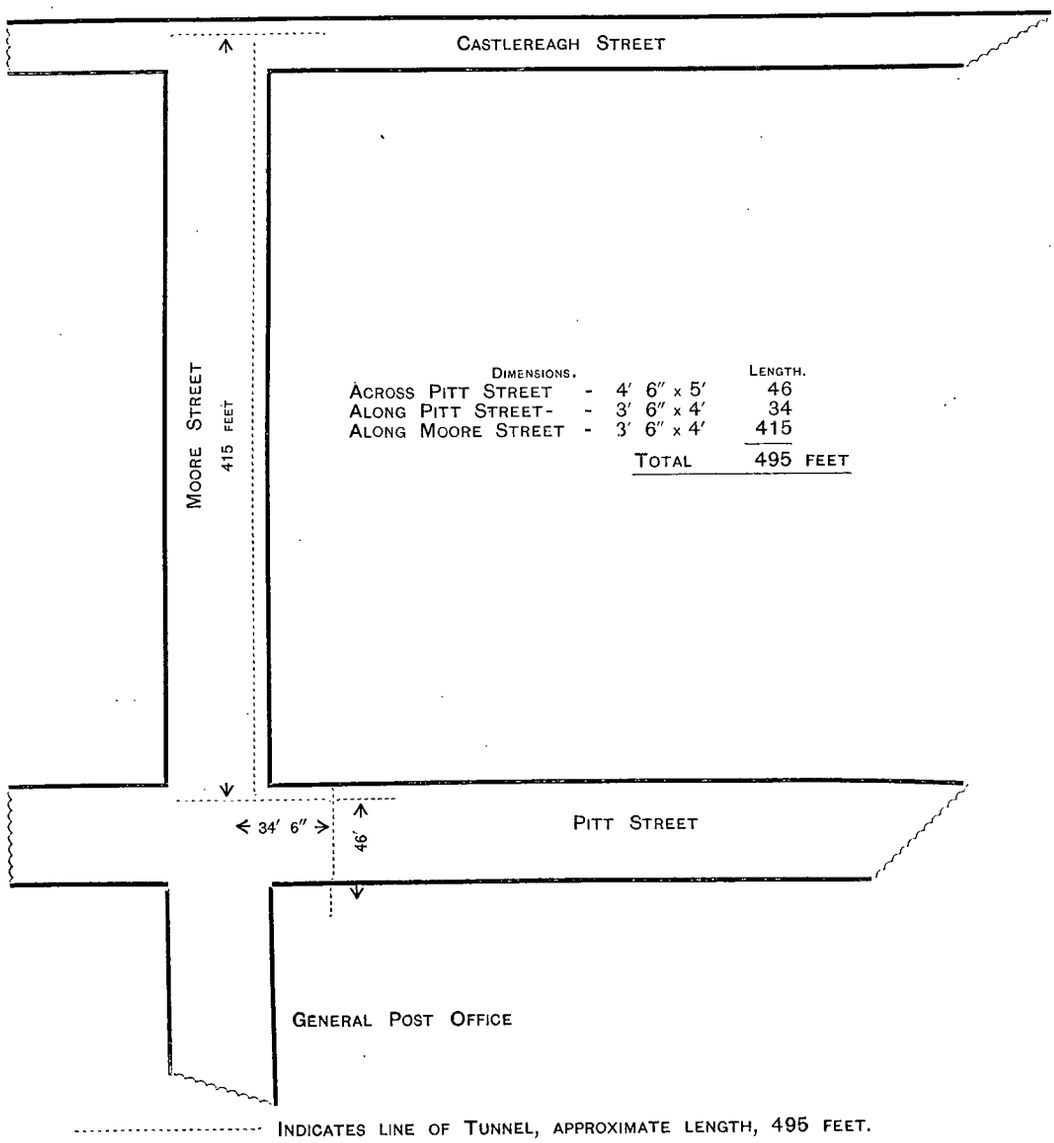
It certainly would be most advisable to take advantage of the opportunity now afforded to build this tunnel during the formation of the street, and, in my opinion, this plan of carrying it out would be quicker and cheaper than any other, and therefore I beg to request the authority of the Postmaster-General for the work to be placed in hand at once.

The Town Clerk should be advised of the decision arrived at, so as to prevent any complication in connection with the formation of the street and construction of the tunnel.

E. C. CRACKNELL,

26/2/92.

Submitted.—S.H.L., 27/2/92. Approved.—J.K., 29/2/92. Town Clerk.—M.M., 29/2/92. Superintendent Electric Telegraphs.—S.H.L., 1/3/92. Messrs. M'Credie Bros.—T.S., 2/3/92.



[Ten Plans and Ten Plates.]

Sydney: William Applegate Gullick, Government Printer.—1898.

1.

Photograph taken by W. F. Hall on Saturday, 15th May, 1897, showing Telephone Tunnel at Civil Service Co-operative New Stores, Pitt-street, as seen by His Worship the Mayor, the Postmaster-General, also Messrs. McCredie (engineer), Donald (overseer), Assistant Town Clerk, and Acting City Surveyor.

I. E. Ives, Mayor. W. M. Gordon, Acting City Surveyor.

Produced by W. M. Gordon, Acting City Surveyor, before the Select Committee on "Construction of the Telephone Tunnels."—W.S.M., 20/7/97.

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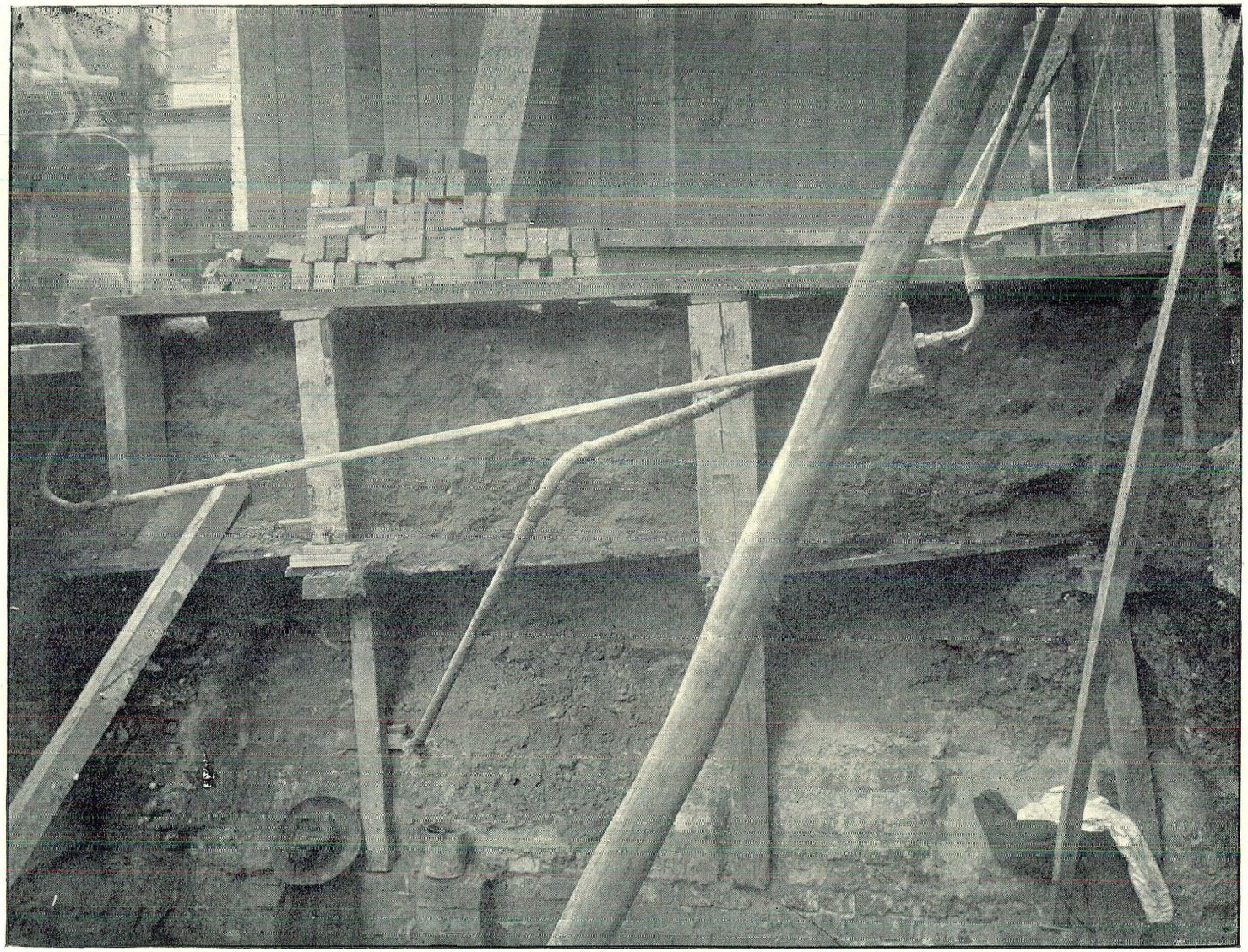

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C C

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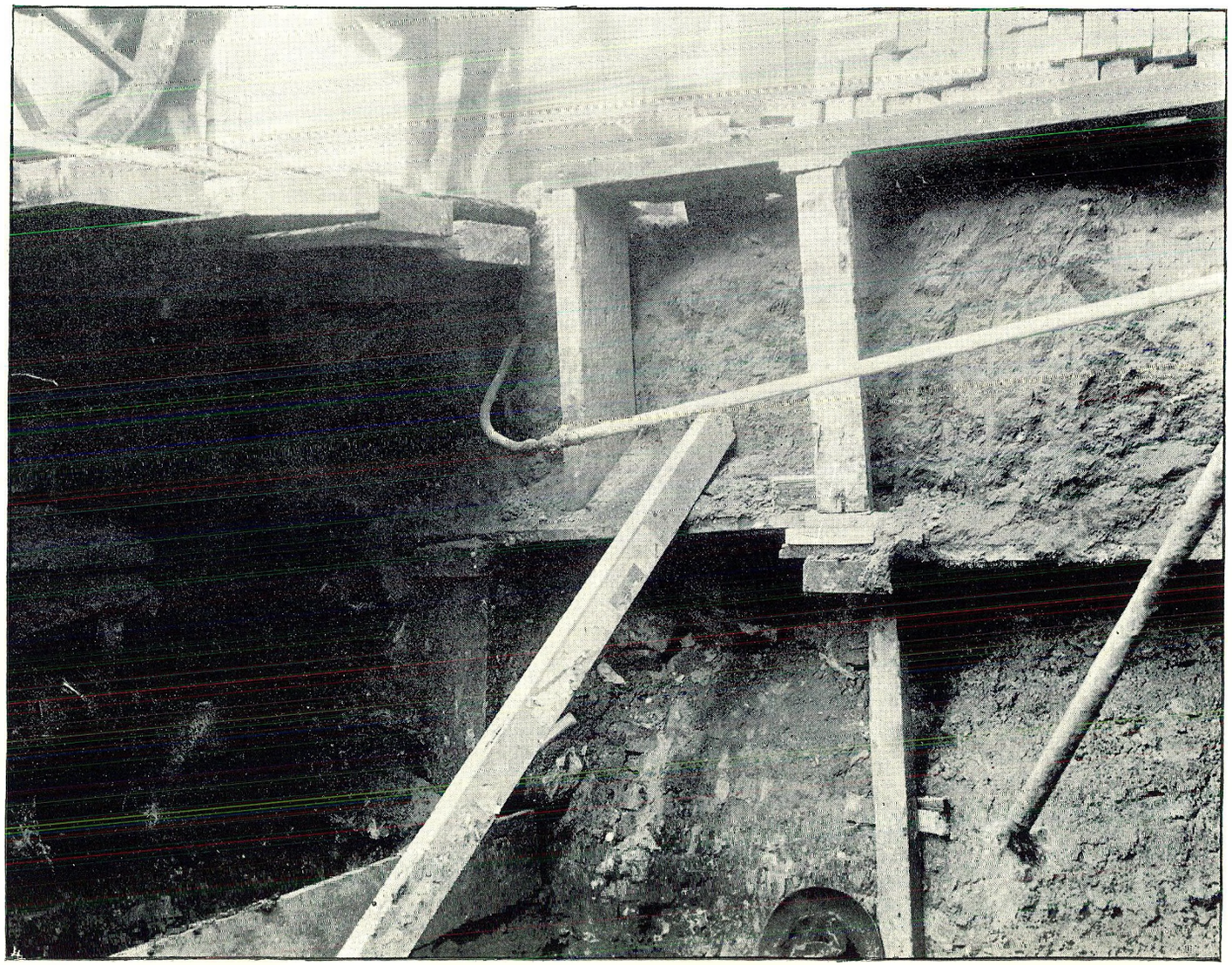

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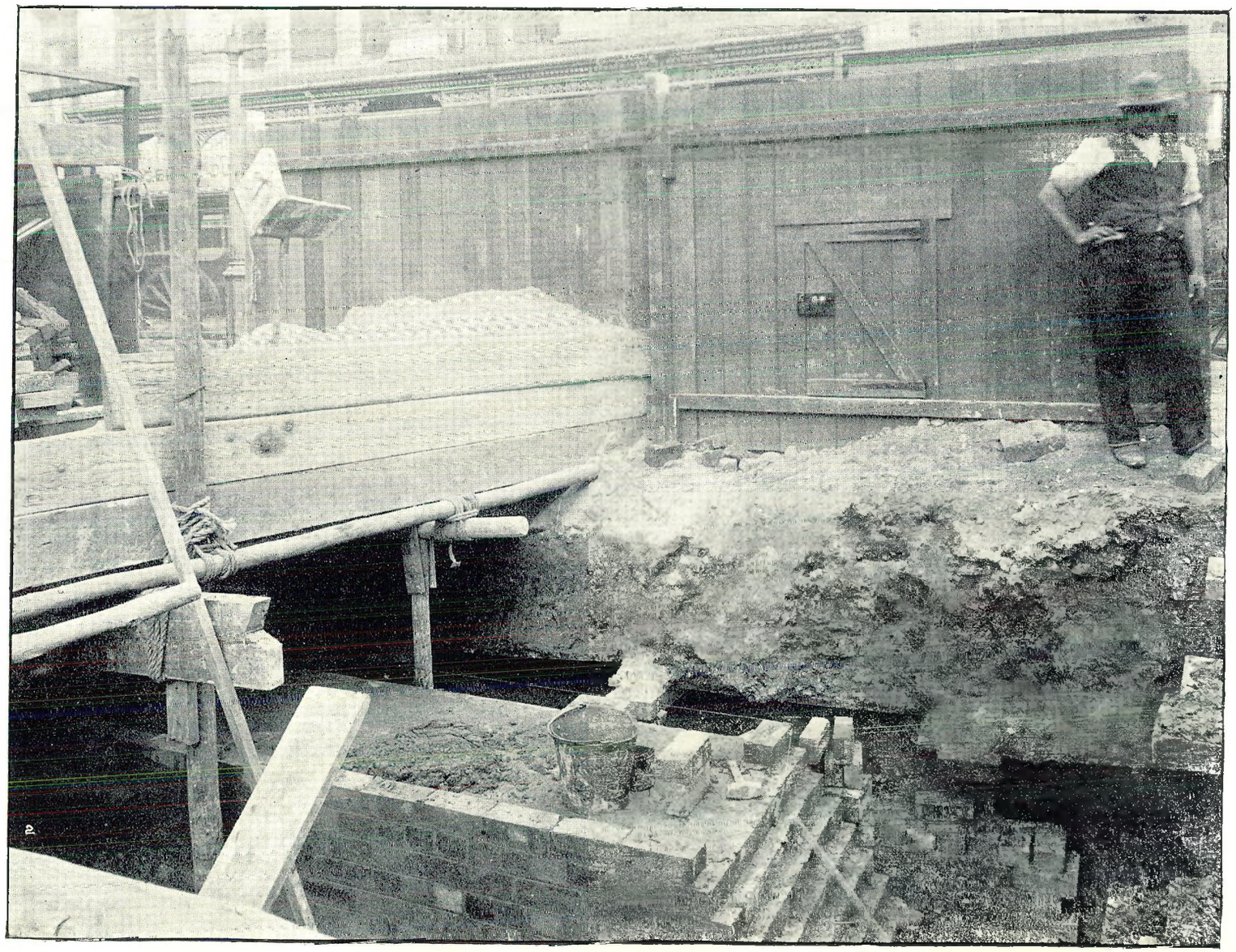
I. E. Ives, Mayor. W. M. Gordon, Acting City Surveyor.

Produced before the Select Committee on "Construction of the Telephone Tunnels," by W. M. Gordon, Acting City Surveyor.—W. S. M., 20/7/97.



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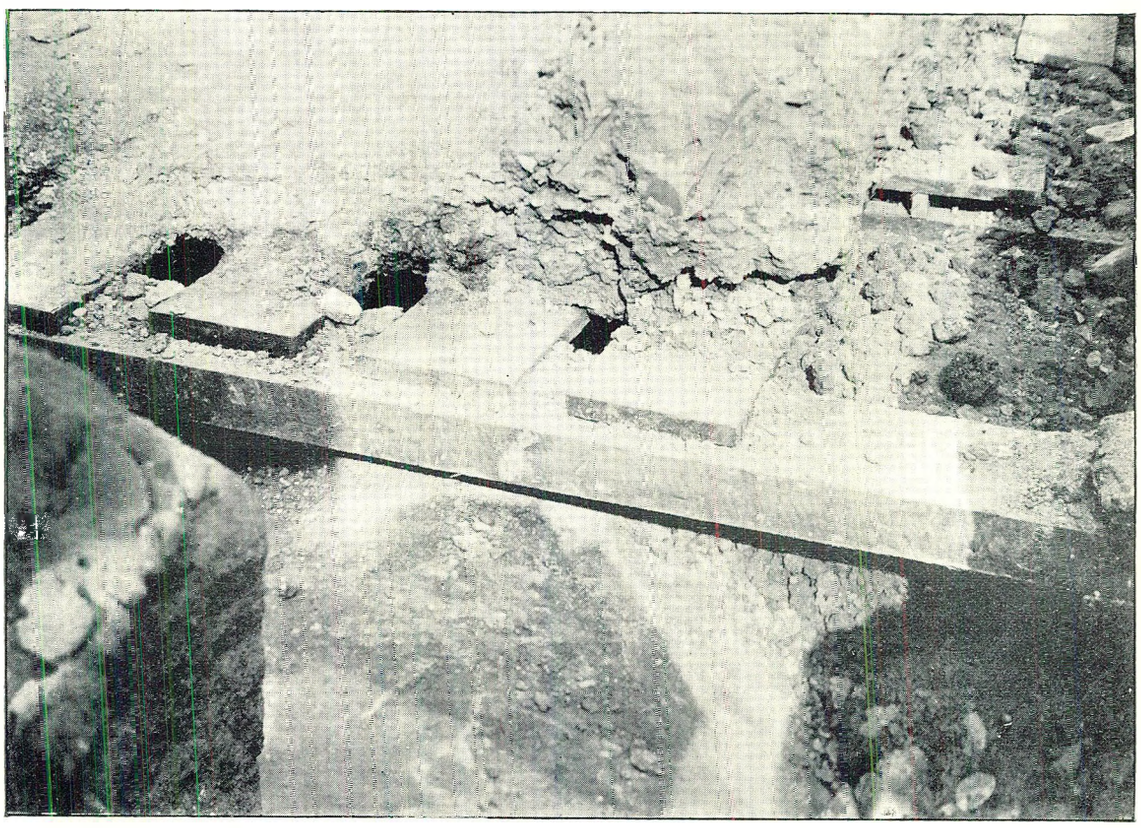
5.

Photograph of part of Excavation made over Telephone Tunnel, opposite No. 372, Pitt-street, looking southerly. Taken by City Architect's Department.

L. E. IVES, Mayor. W. M. GORDON, June 11, 1897.

Produced before the Select Committee on "Construction of the Telephone Tunnels" by W. M. Gordon, Esq., Acting City Surveyor.—W.S.M., 20/7/97.



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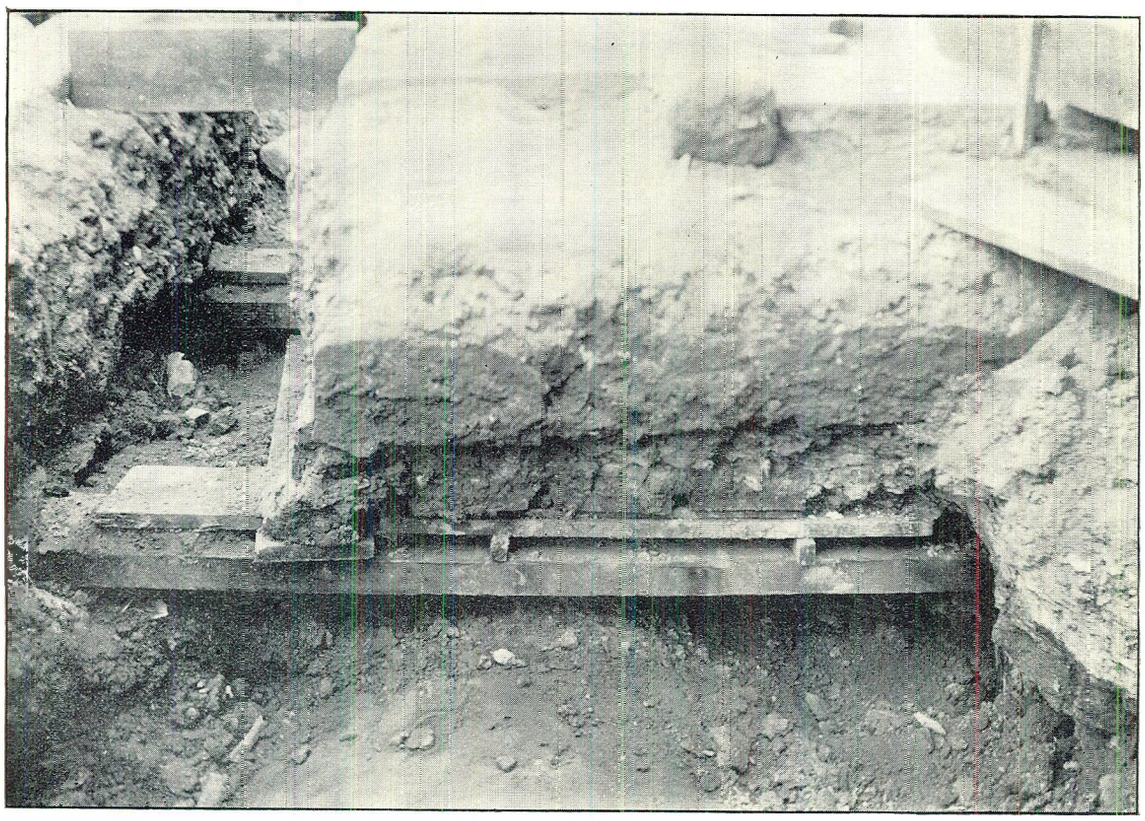
6.

Photograph of part of Excavation made for Telephone Tunnel, opposite No. 372, Pitt-street, looking northerly. Taken by City Architect's Department.

I. E. IVES, Mayor. W. M. GORDON, June 11, 1897.

Produced before the Select Committee on "Construction of the Telephone Tunnels" by W. M. Gordon, Acting City Surveyor.—W.S.M., 20/7/97.



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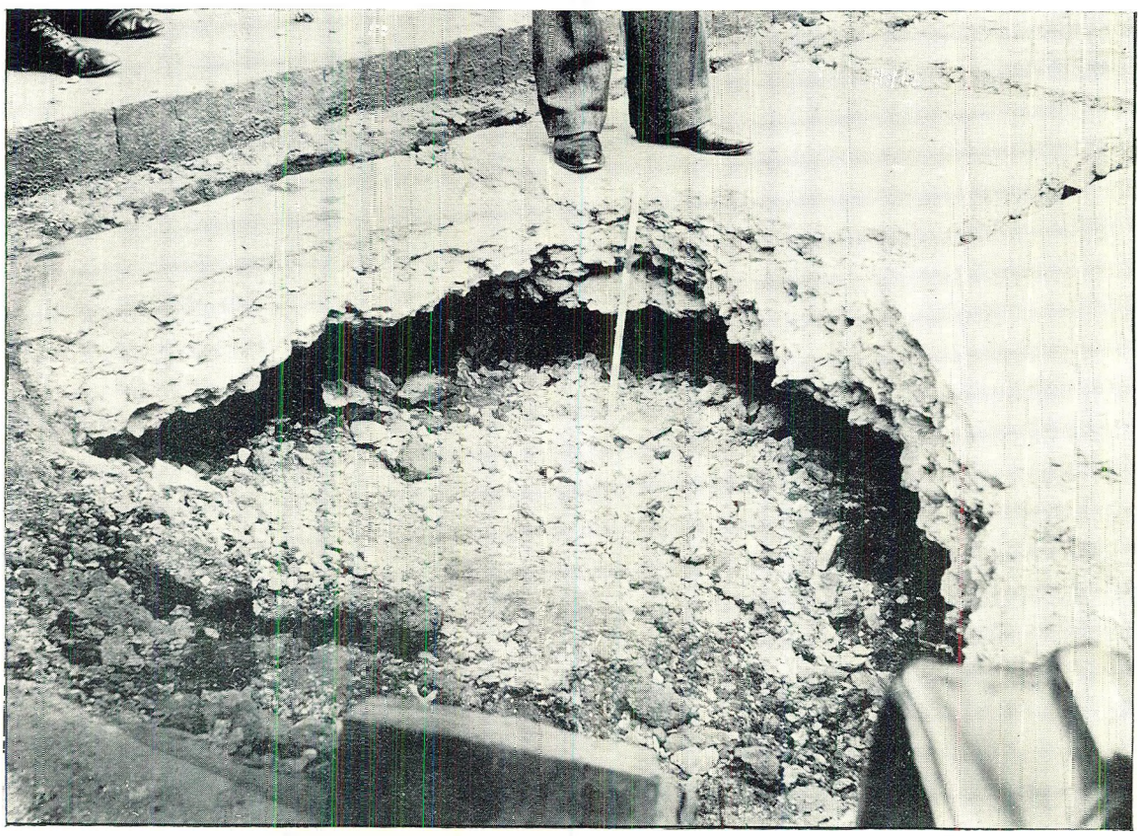
7.

Hole at north-east corner of Pitt and Park Streets, looking south-easterly.

I. E. Ives, Mayor. W. M. Gordon, 13/7/97.

Produced before the Select Committee on "Construction of the Telephone Tunnels" by W. M. Gordon, Acting City Surveyor.—W.S.M., 20/7/97.

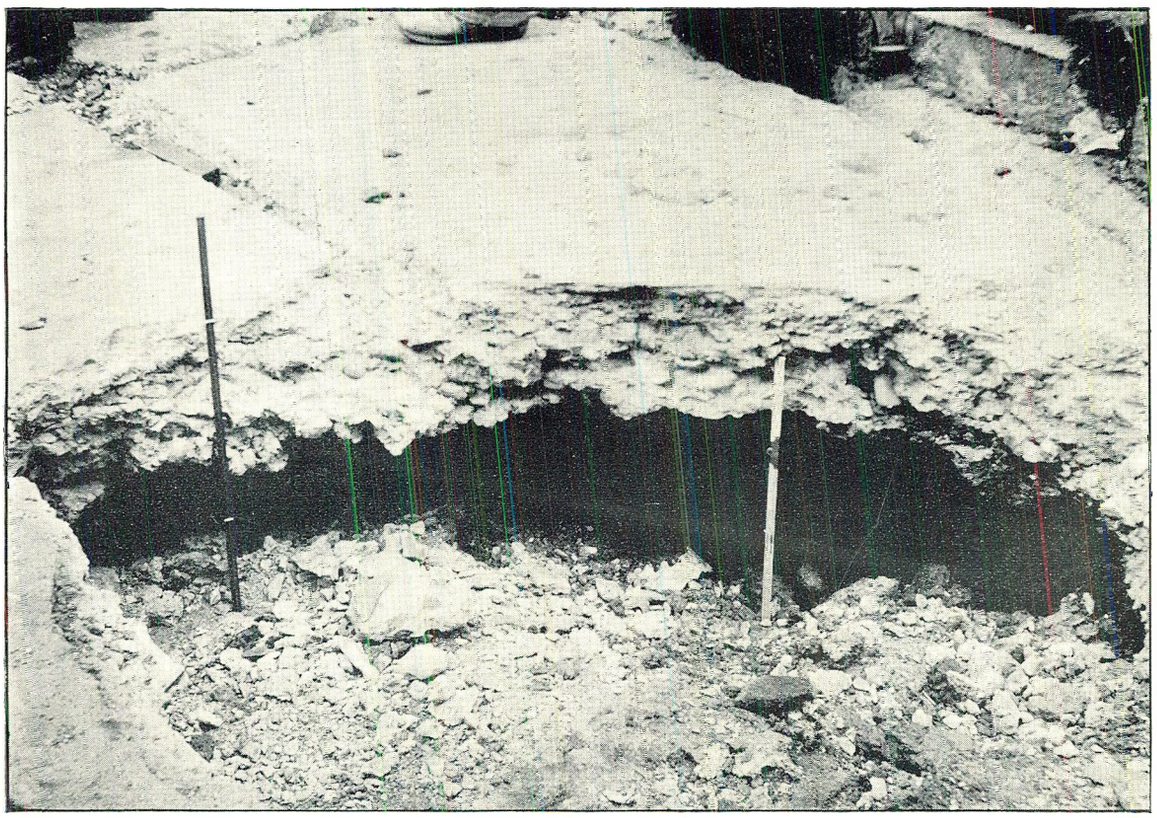


8.

Looking south-westerly from north-east corner, Pitt and Park Streets.

I. E. Ives, Mayor. W. M. Gordon, 13/7/97.

Produced before the Select Committee on "Construction of the Telephone Tunnels" by W. M. Gordon, Acting City Surveyor.—W.S.M., 26/7/97.

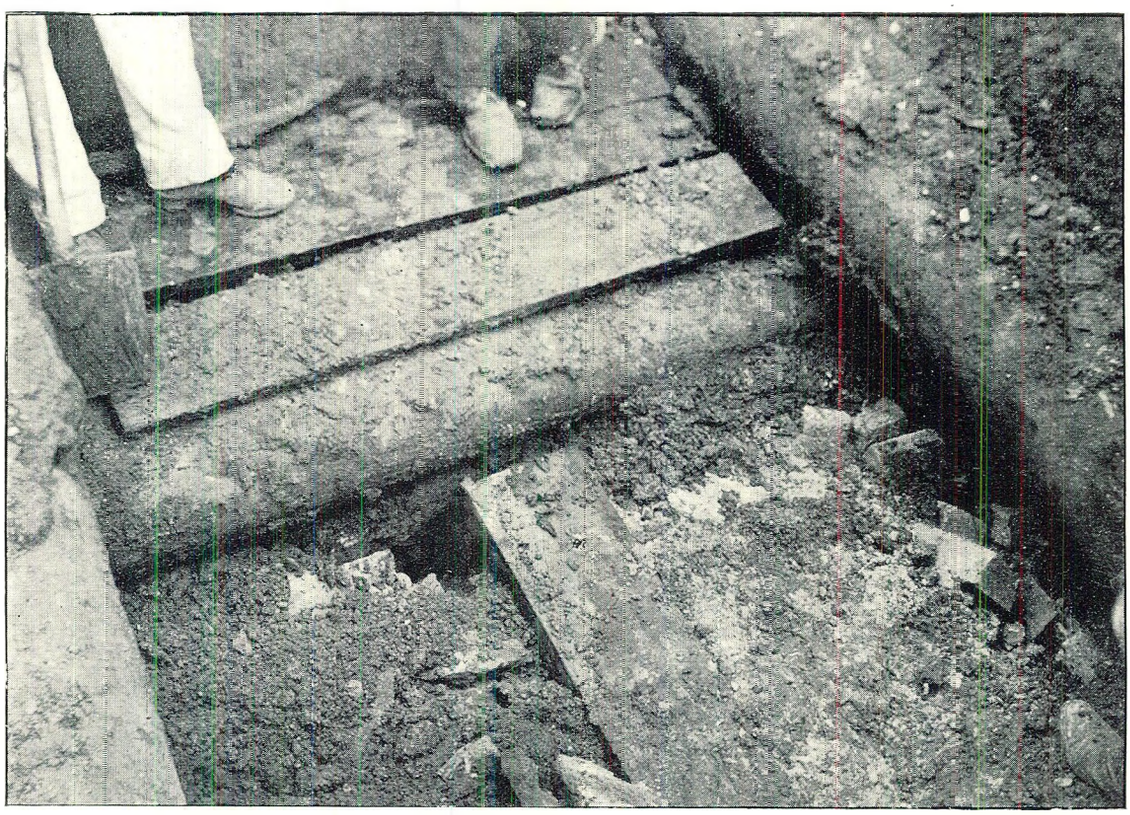


9.

Looking westerly, hole at top of upright.

L. E. Ives, Mayor. W. M. Gordon, July 13, 1897.

Produced by W. M. Gordon, Acting City Surveyor, before the Select Committee on "Construction of the Telephone Tunnels."—W.S.M., 20/7/97.



10.

Showing subsidence under concrete.

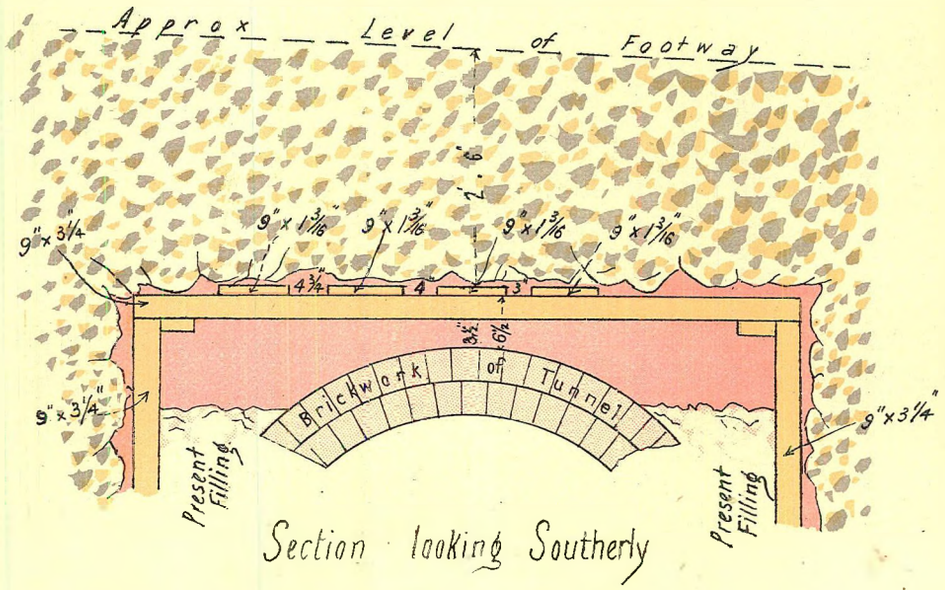
I. E. Ives, Mayor. W. M. Gordon, July 13, 1897.

Produced by W. M. Gordon, Acting City Surveyor, before the Select Committee on "Construction of the Telephone Tunnels."—W.S.M., 20/7/97.

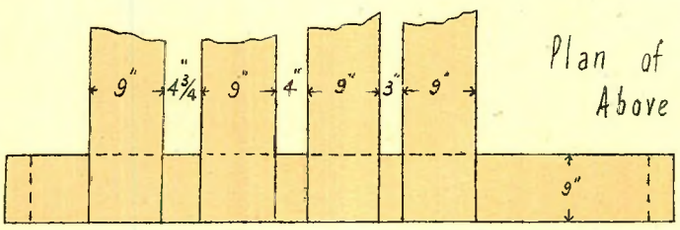


Pitt Street opposite Nº 372
Measurements taken 8th June 1897.

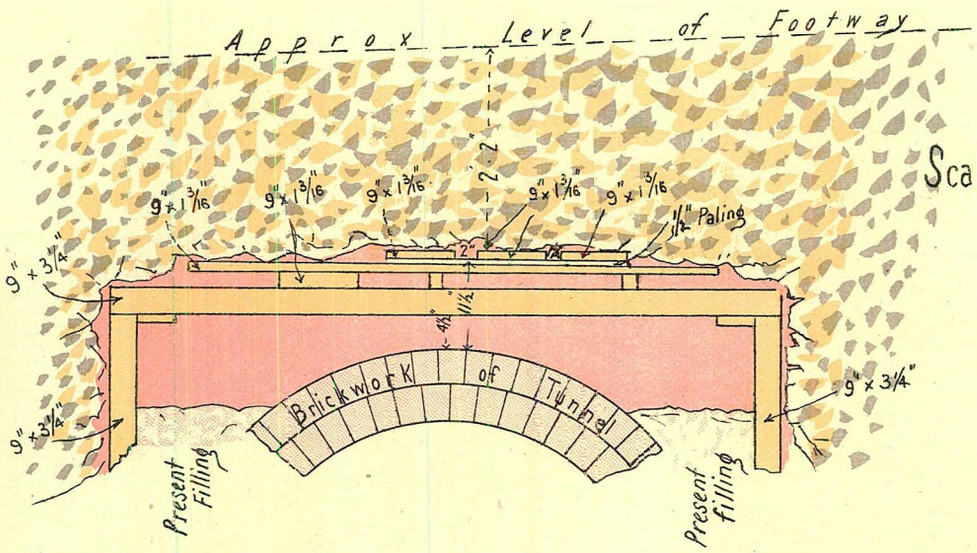
Produced by W.M. Gordon, Acting City Surveyor, before the Select Committee on "Construction of Telephone Tunnels"
W.S.M.
20·7·97.



Section looking Southerly



Plan of Above Section



Scale ½" to the foot

Section looking Northerly

Red colour denotes open space over Tunnel which was never packed.
Brown colour shows Timbering of Tunnel left in.

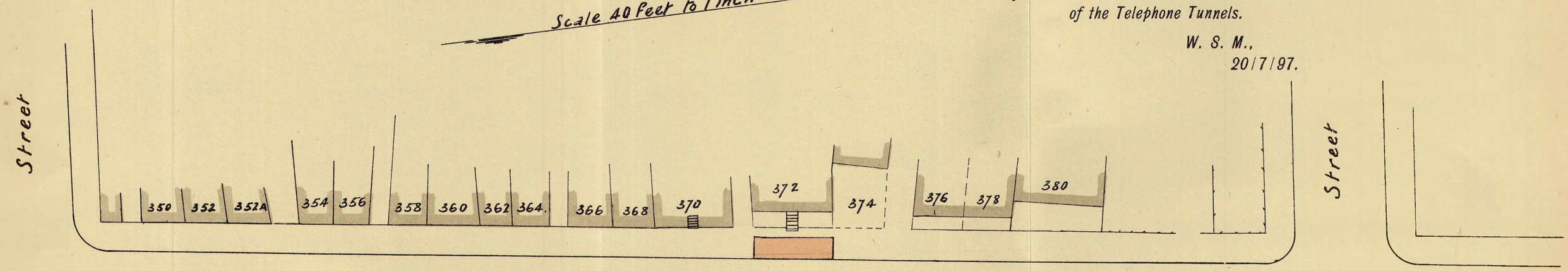
W.M. Gordon
Acting
City Surveyor

Plan 2.

Produced by W. M. Gordon, Acting City Surveyor, before the Select Committee on "Construction of the Telephone Tunnels.

W. S. M.,
20/7/97.

Scale 40 Feet to 1 inch



SIG. 198.

7586

W. M. Gordon Acting City Surveyor
July 15th 1897

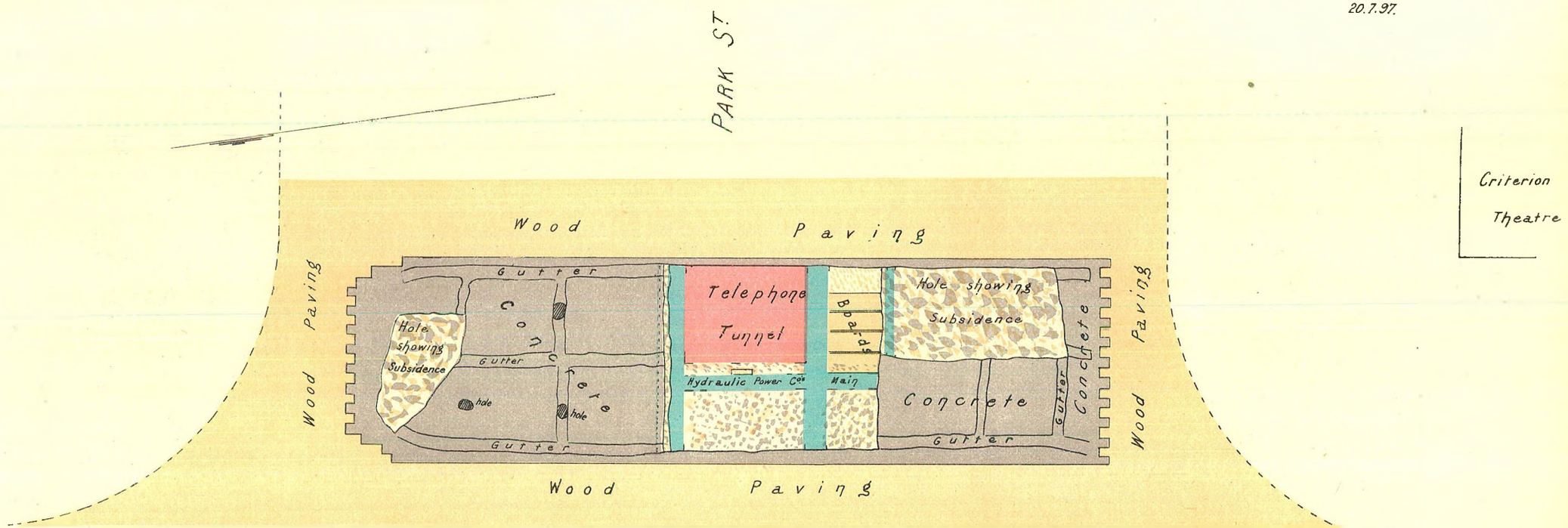
PHOTO-LITHOGRAPHED AT THE GOVT. PRINTING OFFICE,
SYDNEY, NEW SOUTH WALES.

PLAN Nº 3.

Scale of feet
0 4 8 12 16

Produced by W. M. Gordon, Acting City Surveyor, before the Select Committee on "Construction of the Telephone Tunnels"

W. S. M.
20.7.97.



(Sig. 198) 7586

L. W. Gordon
Acting City Surveyor
July 15th 1897

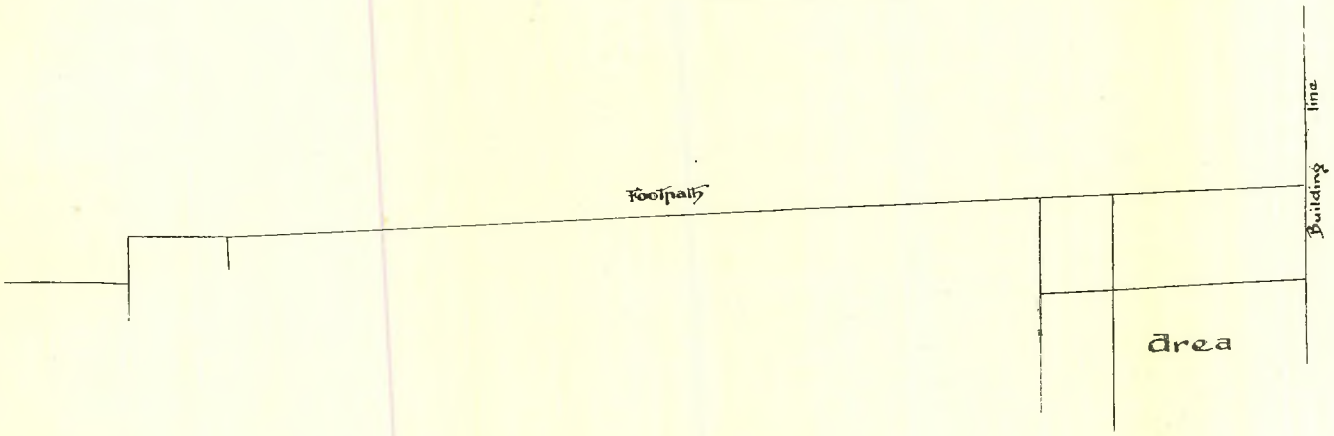
PHOTO-LITHOGRAPHED AT THE GOVT. PRINTING OFFICE, SYDNEY, NEW SOUTH WALES.

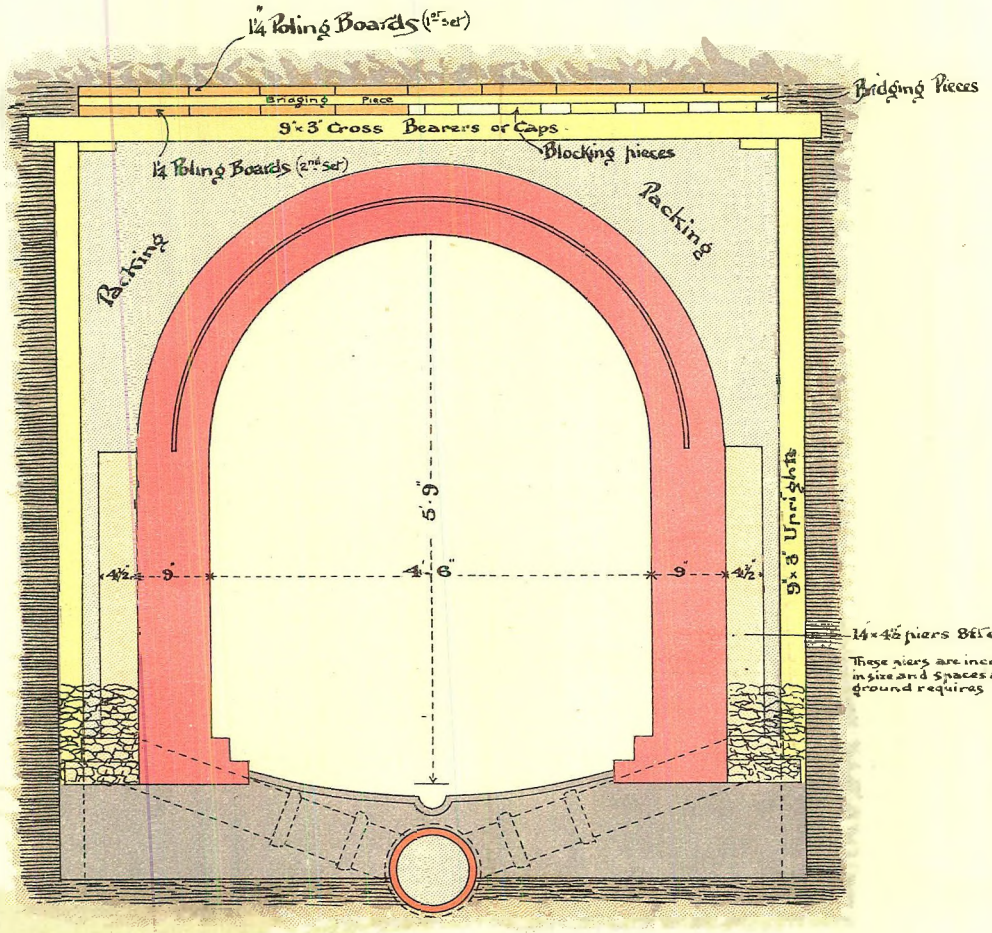
Handed in before the Select Committee on "Construction of the Telephone Tunnels"
W. S. M.
21/7/97.

• TELEPHONE • TUNNELS •
• ELECTRIC • TELEGRAPH • DEPARTMENT •
• SYDNEY •

Scale







SECTION

A. L. & G. McCredie
Architects & Consulting Engineers
Martin Place
Sydney

PHOTO-LITHOGRAPHED AT THE GOVT. PRINTING OFFICE,
SYDNEY, NEW SOUTH WALES.

E

(Appended by the Committee)

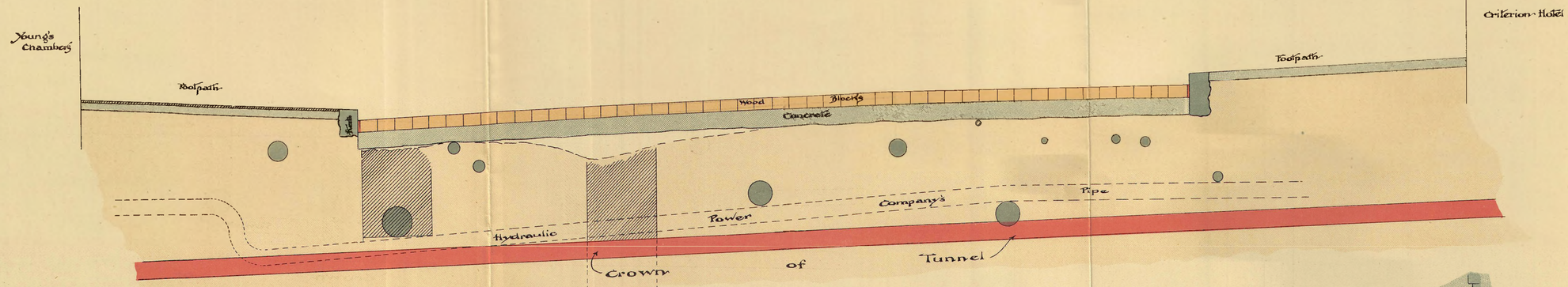
2

TELEPHONE TUNNELS

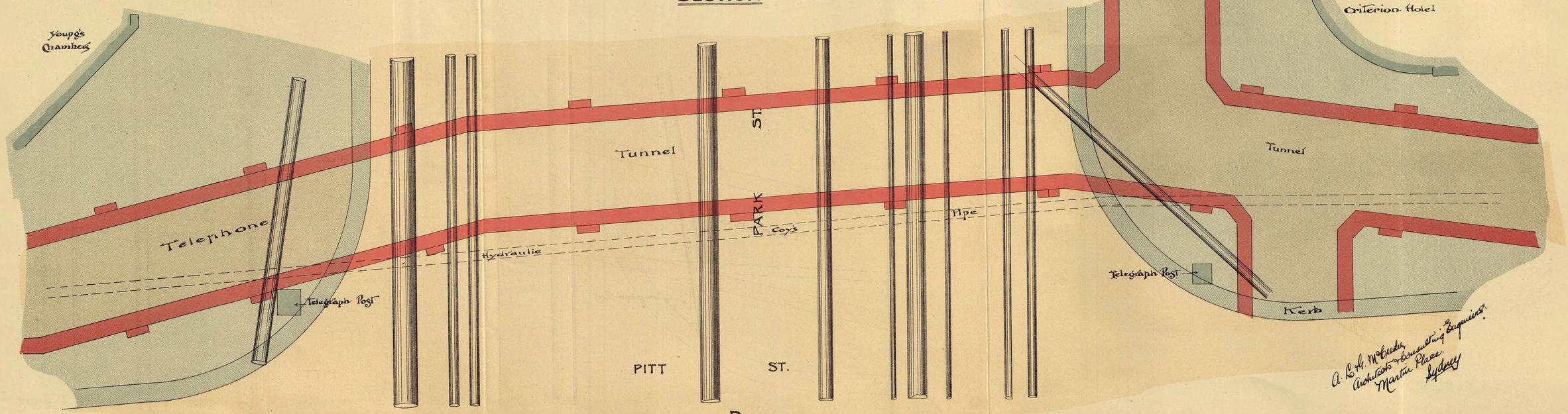
ELECTRIC TELEGRAPH DEPARTMENT

SYDNEY

Park Street Crossing showing positions of pipes &c above Tunnel



SECTION



PLAN

A. E. H. McCredie
Architects & Consulting Engineers.
Martin Place.
Sydney

(Sig. 198) 7586

PHOTO-LITHOGRAPHED AT THE GOVT. PRINTING OFFICE,
SYDNEY, NEW SOUTH WALES.

B²

(To Evidence of A. L. Mc Credie Esq.)

APPENDIX

81

Handed in before the Select Committee on "Construction of the Telephone Tunnels"

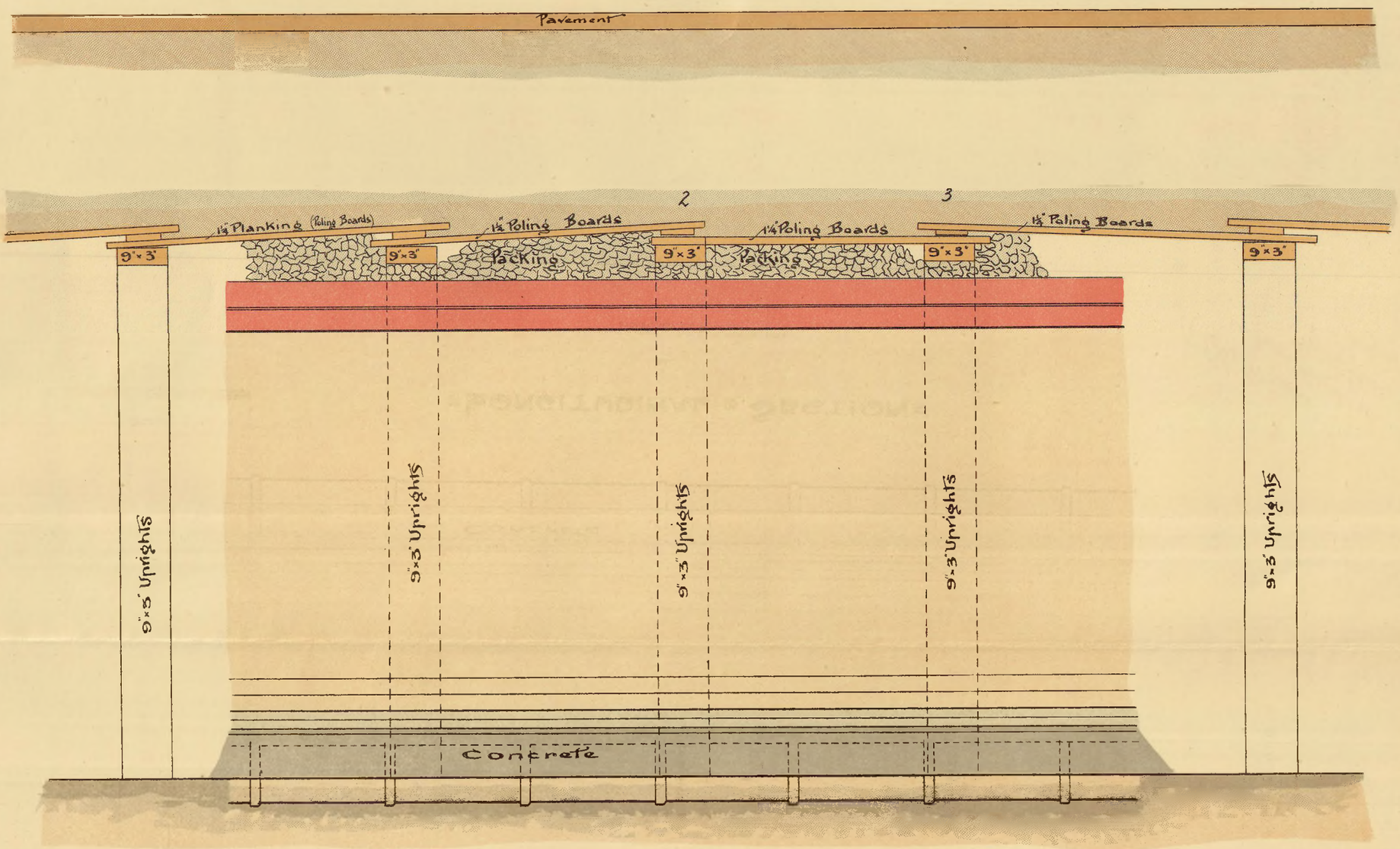
W. S. M.

21.7.97

◎ TELEPHONE ◎ TUNNELS ◎

◎ ELECTRIC ◎ TELEGRAPH ◎ DEPARTMENT ◎

◎ SYDNEY ◎



◎ LONGITUDINAL ◎ SECTION ◎

Sid 198.

7586.

PHOTO-LITHOGRAPHED AT THE GOVT. PRINTING OFFICE, SYDNEY, NEW SOUTH WALES.

A. L. & W. McCredie
Architects & Consulting Engineers.
Martin Place
Sydney

B²

(To Evidence of A. L. Mc Credie Esq.)

APPENDIX

B1.

Handed in before the Select Committee on "Construction of the Telephone Tunnels"

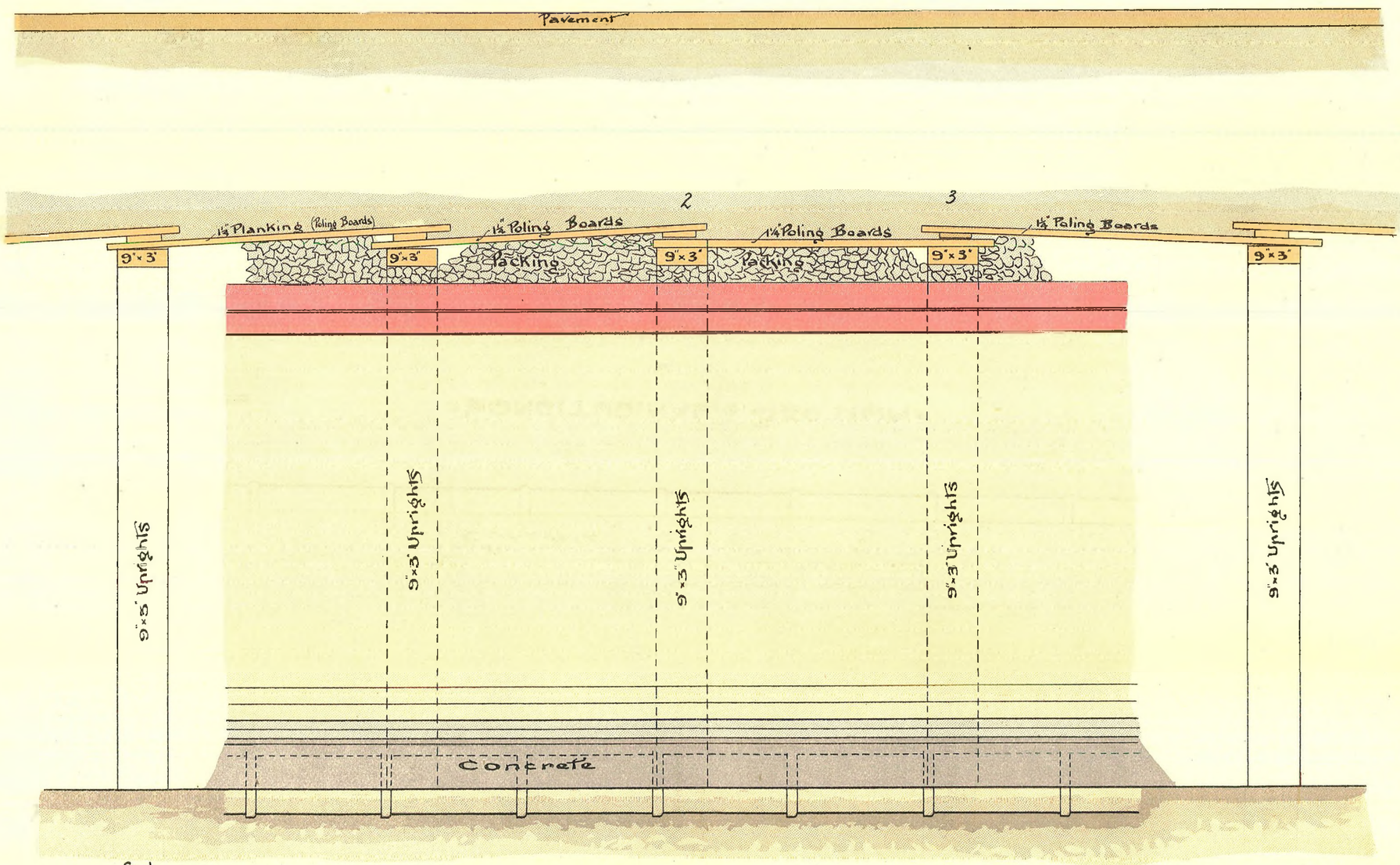
W. S. M.

21.7.97.

TELEPHONE TUNNELS

ELECTRIC TELEGRAPH DEPARTMENT

SYDNEY



LONGITUDINAL SECTION

Sid 198.

7586.

PHOTO-LITHOGRAPHED AT THE GOVT. PRINTING OFFICE, SYDNEY, NEW SOUTH WALES.

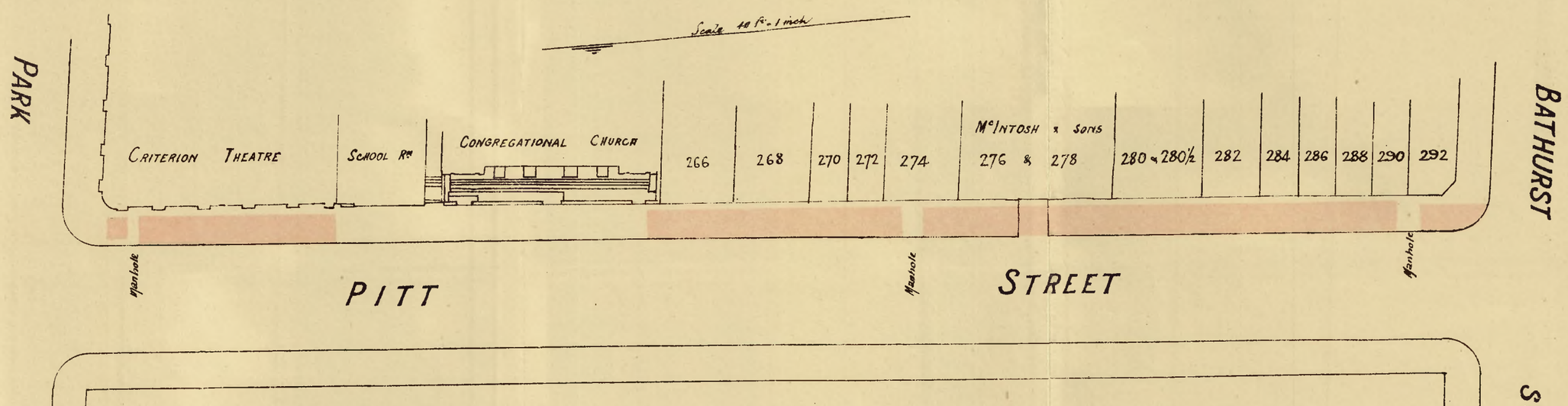
A. L. & W. McCredie
Architects & Consulting Engineers.
Martin Place
Sydney

C 1.

[To Evidence of Mr. Henry Brown.]

Handed in before the Select Committee on
"Construction of the Telephone Tunnels."

W. S. M.,
18/8/97.



Note—
Area tinted Pink shews extent of Excavation
Approx width 8ft 6in Depth 3ft Approx no of yards excavated 313

102 Loads.

SIG. 198. 7586

[signature]
acting City Surveyor
Sydney. July 1st 1897

PHOTO-LITHOGRAPHED AT THE GOVT. PRINTING OFFICE,
SYDNEY, NEW SOUTH WALES.

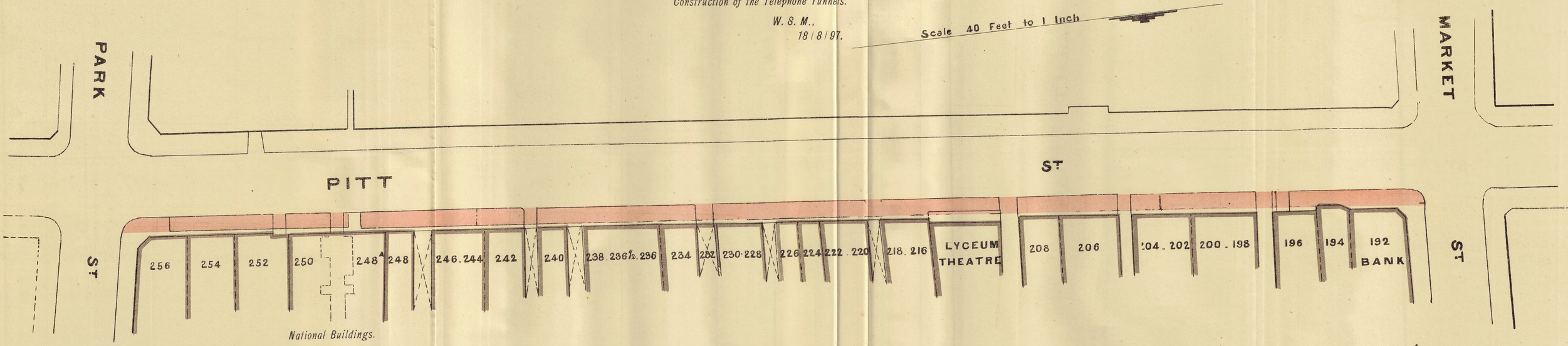
C 2.

[To Evidence of Mr. Henry Brown.]

Handed in before the Select Committee on "Construction of the Telephone Tunnels."

W. S. M.,
18/8/97.

Scale 40 Feet to 1 Inch



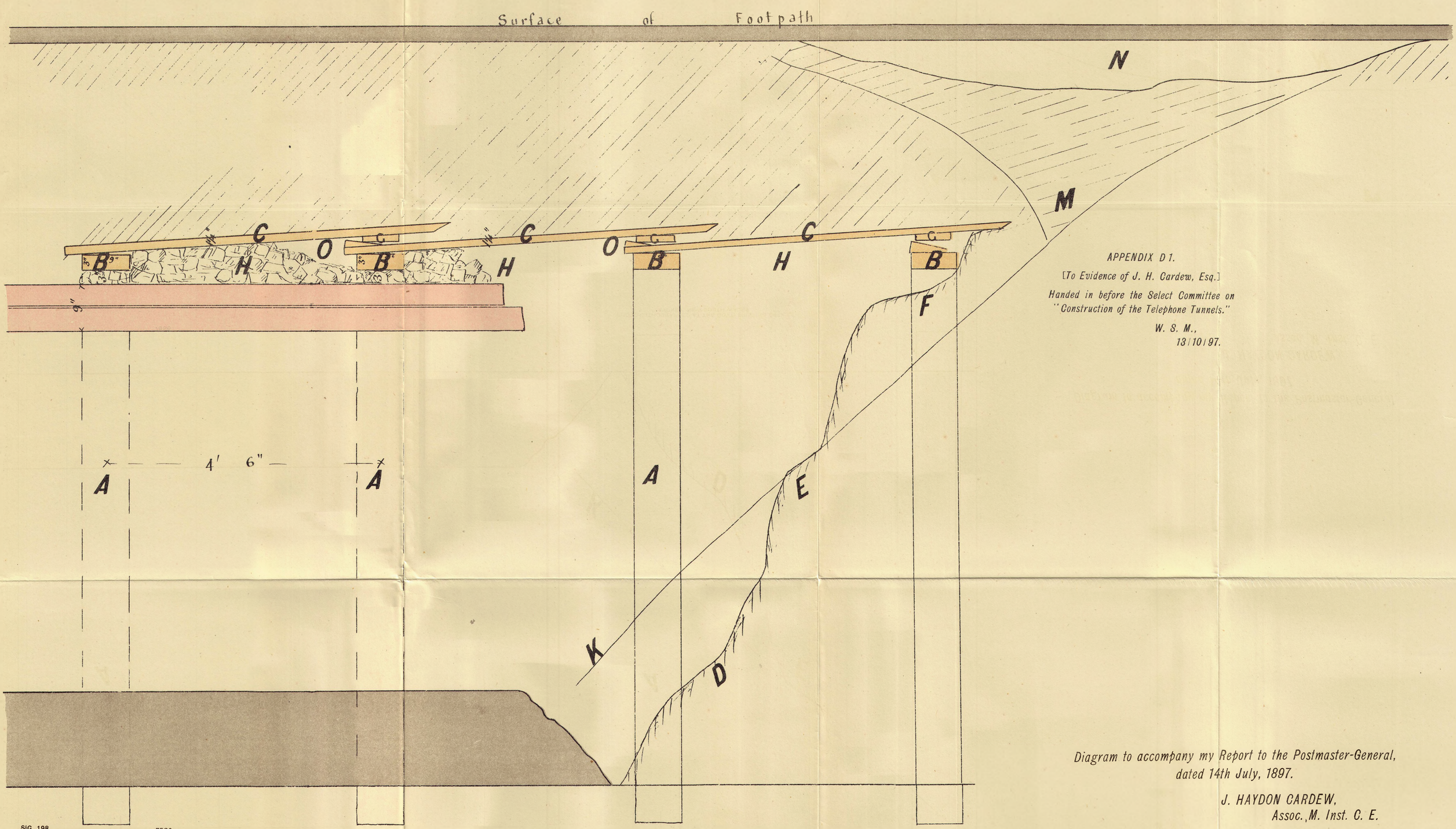
National Buildings.

229 Loads extra filling.

City Surveyor
11th Aug 97

PHOTO-LITHOGRAPHED AT THE GOVT. PRINTING OFFICE, SYDNEY, NEW SOUTH WALES.

SIG. 198. 7586



APPENDIX D 1.

[To Evidence of J. H. Cardew, Esq.]

Handed in before the Select Committee on "Construction of the Telephone Tunnels."

W. S. M.,
13/10/97.

Diagram to accompany my Report to the Postmaster-General, dated 14th July, 1897.

J. HAYDON CARDEW,
Assoc., M. Inst. C. E.

SIG. 198. 7586

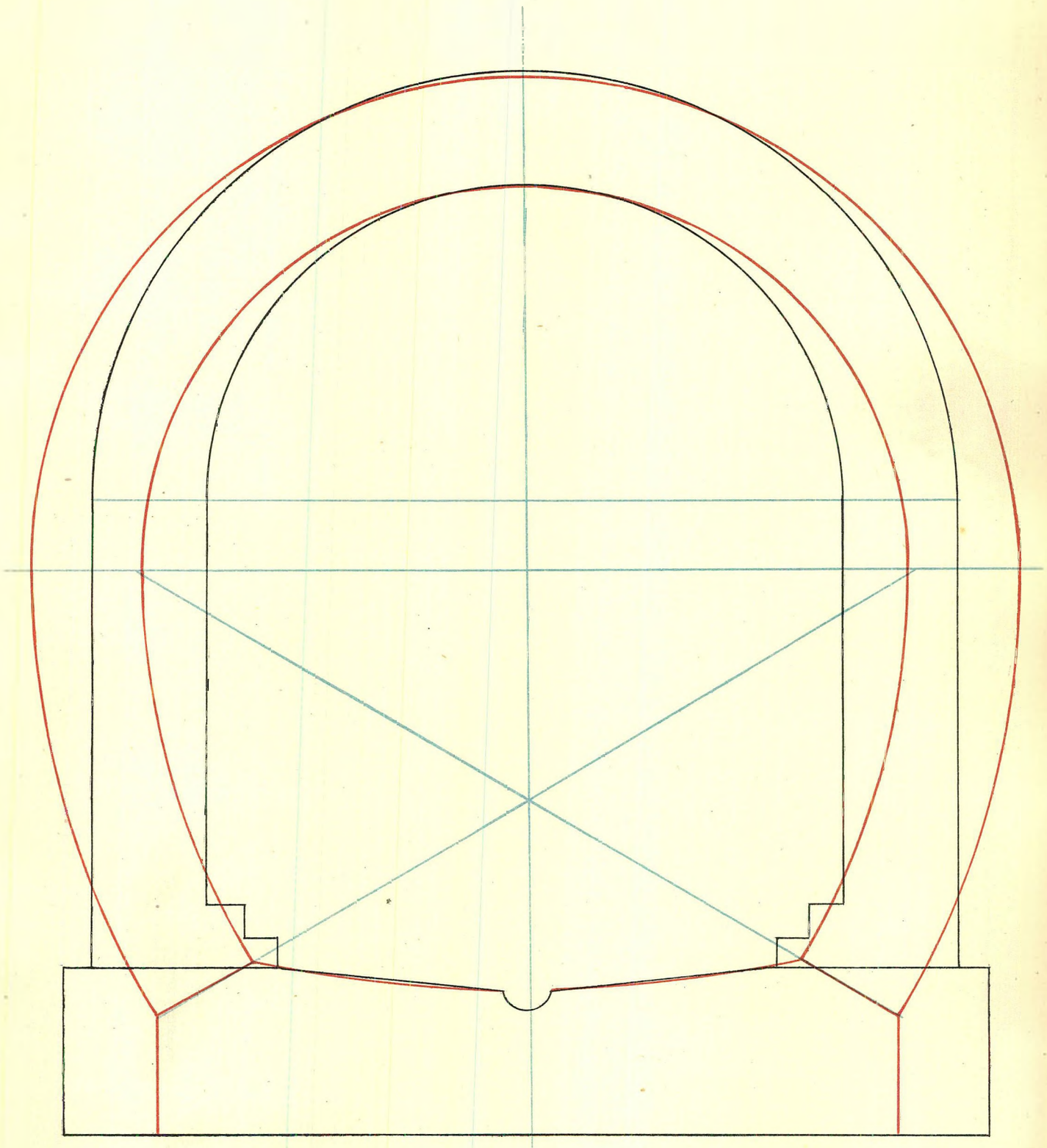
PHOTO-LITHOGRAPHED AT THE GOVT. PRINTING OFFICE, SYDNEY, NEW SOUTH WALES.

D 2.

[To Evidence of J. H. Cardew, Esq.]

Handed in before the Select Committee on "Construction of the Telephone Tunnels."

W. S. M.,
13/10/97.



SIG. 198. 7585

PHOTO-LITHOGRAPHED AT THE GOVT. PRINTING OFFICE,
SYDNEY, NEW SOUTH WALES.

1897.

LEGISLATIVE ASSEMBLY.

NEW SOUTH WALES.

CONSTRUCTION OF THE TELEPHONE TUNNELS.

(PETITION FROM ARTHUR LATIMER McCREDIE, OF SYDNEY, ARCHITECT AND CONSULTING ENGINEER, PRAYING TO BE REPRESENTED BY COUNSEL, OR ATTORNEY, OR IN PERSON, BEFORE SELECT COMMITTEE ON.)

Received by the Legislative Assembly, 21 *July*, 1897.

To the Honorable the Speaker and Members of the Legislative Assembly of New South Wales in Parliament assembled.

The Petition of Arthur Latimer McCredie, of Sydney, in the Colony of New South Wales, Architect and Consulting Engineer,—

HUMBLY SHOWETH:—

1. That on the thirtieth of June, in the year of our Lord one thousand eight hundred and ninety-seven, your Honorable House appointed a Select Committee to inquire into and report upon the construction of the telephone tunnels.

2. That your Petitioner humbly prays that he may be represented by counsel, or attorney, or in person, before the Select Committee appointed to inquire into and report upon, with the right to call witnesses and adduce evidence and to examine and cross-examine such witnesses as may give evidence before the said Committee.

And your Petitioner, as in duty bound, will ever pray.

A. L. McCREDIE.

Sydney, 21st July, 1897.

1897.

LEGISLATIVE ASSEMBLY.

NEW SOUTH WALES.

CONSTRUCTION OF THE TELEPHONE TUNNELS.

(PETITION FROM GEORGE McCREDIE, OF SYDNEY, CONSULTING ENGINEER AND ARCHITECT, PRAYING TO BE REPRESENTED BY COUNSEL, OR ATTORNEY, OR IN PERSON, BEFORE SELECT COMMITTEE ON.)

Received by the Legislative Assembly, 29 *July*, 1897.

To the Honorable the Speaker and Members of the Legislative Assembly of New South Wales in Parliament assembled.

The Petition of George McCredie, of Sydney, in the Colony of New South Wales, Consulting Engineer and Architect,—

HUMBLY SHOWETH:—

1. That on the thirtieth day of June, in the year of our Lord one thousand eight hundred and ninety-seven, your Honorable House appointed a Select Committee to inquire into and report upon the construction of the telephone tunnels.

2. That your Petitioner humbly prays that he may be represented by counsel, or attorney, or in person, before the Select Committee appointed to inquire into and report upon the said matter, with the right to call witnesses and adduce evidence and to examine and cross-examine such witnesses as may give evidence before the said Committee.

And your Petitioner, as in duty bound, will ever pray.

GEORGE McCREDIE.

Sydney, 22nd July, 1897.

[3*d*.] 227—

1897.

LEGISLATIVE ASSEMBLY.

NEW SOUTH WALES.

GOVERNMENT PRINTING OFFICE.

(DEPARTMENTAL REPORTS RELATIVE TO THE ADDITIONS AND IMPROVEMENTS TO, RECENTLY CARRIED OUT BY "DAY LABOUR.")

Printed under No. 3 Report from Printing Committee, 13 May, 1897.

Department of Public Works,
Government Architect's Branch, Sydney, 21 April, 1897.

Minute Paper.

GOVERNMENT PRINTING OFFICE—ADDITIONS.

IN accordance with your instructions, I have the honor to report upon the above works, which, during the last twenty-one months, have been carried out by day labour.

Tenders received.

Tenders were originally called for the work, and were received on the 7th June, 1895. They ranged from the lowest, £10,835, to the highest, £16,112, the office estimate for the work being £12,000. No tender was accepted, the Minister having decided to carry out the work by day labour.

Staff.

On receipt of instructions, the staff lately employed upon the additions to the Chief Secretary's and Public Works Offices was removed to the Printing Office; additional men being obtained in the order of priority of application as and when required.

Increased Floor Space.

Before commencing operations upon the building, in consequence of representations of the Government Printer, it was deemed advisable to make certain alterations in the plans; those drawn originally gave an increased floor space of 16,757 feet. Fresh plans were drawn, introducing improvements and giving increased floor space of 18,517 feet, or 1,760 feet more than proposed by the original plans. Notwithstanding the increased accommodation, and the expense necessarily attending the provision of same, it was estimated that the work could still be carried out for the amount of the estimate.

Additional Works.

As the works proceeded various works have, upon the requisition of the Government Printer and with the approval of the Minister, been carried out. The total estimated amount of these approved extras is £2,672 15s. 8d., a detail statement of which I append.

Statement of Expenditure.

The following is a statement of expenditure to date:—

	£	s.	d.	£	s.	d.
Wages	8,410	5	5			
Materials and plant	8,778	9	7			
Outstanding liabilities	467	5	0			
				17,656	0	0

For

For the purposes of comparison of actual cost as shown above with estimates previously supplied, the following statements may be of use:—

	£	s	d.	£	s.	d.
No 1—Office estimate for original plans	12,000	0	0			
,, northern end	3,500	0	0			
,, miscellaneous works . .	2,672	15	8			
Plant, &c., in hand	550	0	0			
				18,722	15	8
No. 2—Amount of lowest tender received	10,835	0	0			
Estimates as above	6,172	15	8			
Plant, &c.	550	0	0			
				17,557	15	8
No. 3—Amount of average of all tenders received ...	13,358	15	3			
Estimates as above	6,172	15	8			
Plant, &c	550	0	0			
				20,081	10	11

Wages.

The workmen engaged upon the work have received upon an average 1s. per day more than the amount provided by the minimum wage clause attached to all contracts.

Materials

The materials used upon the works have to a large extent been procured under the annual contracts of the Department, those not provided for under same having been obtained by public tender.

Generally

The works have been carried out in a satisfactory manner A slight difficulty only having been felt at the commencement, when the system of obtaining the men required from the office list was in vogue. Latterly, however, the non-suitable men have been weeded out, and reliable men known as good workmen only employed—the whole responsibility of the men engaged being suitable being thrown upon the foreman and leading men of the various trades. This arrangement, I feel strongly, is the only one possible where the work is to be done to compare favourably, both with regard to cost and workmanship, with contract work.

Perhaps it will not be out of place to mention that no extra cost has been incurred for office staff in connection with this work. Mr. Grace's services have certainly been utilised in connection with the necessary clerical and accountant work pertaining to such an undertaking, but, on the other hand, no clerk of works has been employed upon the building, the duties of clerk of works having been performed by Mr Bruce, foreman of works

A S COOK,
Assistant Architect.

GOVERNMENT PRINTING OFFICE

Miscellaneous Approvals for Works Extra to Original Proposals

Reference Nos	Matter			Amounts £	s	d
96 100	The Government Printer—requisition for two extra w c s (for his personal use)			5	0	0
\ 96–161	Water supply ..			100	0	0
A 96–180	Shoes for stanchions .			28	15	0
\ 96–621	Alterations in design of corner			616	0	0
A 96–767	Stairway from yard to upper floors			120	0	0
A 96–895	Ventilation of basement .			100	0	0
A 96–1,535	Substituting iron lintels for cracked brick arches facing lane			50	0	0
A 96–1,753	Fittings for photographer's gallery .			150	0	0
A 96–1,127	Lining under slates of attic storey roof with felt to minimise heat in composing room			30	0	0
96–2,079	Alterations to speaking tubes in photographer's gallery			7	0	0
A 96–4,873	Increased latrine accommodation			400	0	0
A 96–2,983	Contract for zinc dressings (Bush's contract), viz —					
	Total cost as per final account	£390 12 9				
	A 96–2,983 amt appd. for this	388 0 0				
				2	12	9
A 96–5,535	Fittings and gas and water connections for photo mechanical branch			130	0	0
A 96–5,577	Lining ceilings, photo mechanical branch			275	0	0
A 96–5,665	Lavatory and retiring room for female employees			140	0	0
A 96–6,083	Fanlight openers			16	0	0
A 96–7,185	Lining ceilings, stamp room			47	0	0
A 96–7,467	Substituting concrete for wood floors in machine and press rooms, the latter being attacked by white ants			150	0	0
96 8,051	Making good worn floor in Parliamentary composing room			3	0	0
	Cast iron nosings for stair treads .			7	7	11
A 96–9,813	Government Printer—requisition for various works, viz —Painting in stamp room, white washing walls, ruling branch, brick up openings, platforms in numbering branch, &c			30	0	0
A 96–9,893 & 10,583	Government Printer—requisition for various works, viz —Ceiling in photo gallery, iron door on stairs, lining strong room ceilings, moving and refixing furnaces, fixing timbers to suit machinery, &c			152	0	0
96–10,243	Requisition for removing and refixing rails for camera			6	0	0
99–10,967	Requisition for various works			9	10	0
96–11,555	Gas in railway ticket room			1	10	0
	Overhauling drains in basement			6	0	0
A 96–11,319	Kiln dried tallow-wood for staircase			30	0	0
A 97–3,543	Raising walls of water tower			60	0	0
				£2,672	15	8

Department of Public Works,
Government Architect's Branch, Sydney, 23 April, 1897.

Minute Paper.

GOVERNMENT PRINTING OFFICE—ADDITIONS.

I HAVE the honor to submit, for the Minister's information, the accompanying statement and report upon the result of the works recently carried out on the above buildings under the "day work" system.

These may be classified as follows:—

1st. The improvements included in the original plans and specification, as shown on sketch "A,"* and for which tenders were invited.

2nd. Various additional work and improvements in accordance with sketch "B."*

3rd. Alterations and additions generally to the northern portion of the building.

The result is seen in the following comparative statement:—

	£ s. d.	£ s. d.
No. 1. Actual expenditure	17,656 0 0	
Authorised work held in abeyance	200 0 0	
	17,856 0 0	
Less proceeds of sale of old materials and plant, in hand	550 0 0	
Net cost		17,306 0 0
No. 2. Office estimates...		18,172 15 8
No. 3. Amount of lowest tender, with office estimates of the additional works		17,007 15 8
No. 4. Average of the tenders, including office estimates of the additional works		19,531 10 11

It is not possible to state whether the contractor would have made a profit or a loss on his tender; at the same time it is highly probable that he would have required a larger sum for the extra works estimated at £6,172 15s. 8d., and very possibly compensation for the disadvantage entailed by the mode in which the work was carried out; he would also have carried on his undertaking in the face of a rising market.

The actual expenditure includes no sum equivalent to ordinary contractors' "establishment charges"; it includes, however, salary for clerical assistance, but not for the extra professional assistance involved. Materials have been purchased on rates obtained by public competition; wages have been paid generally at an advance of 1s. per day over minimum rates.

When the works were commenced the building trade generally was passing through a period of unusual depression, and, as a consequence, employment of a large amount of skilled and unskilled labour on these works was, in one form or another, urged upon the Minister; accordingly it became necessary to establish a system by which applicants obtained employment in the order of their date of application, and without actual knowledge as to their individual capacity—gradually the few incompetent men were weeded out, and, as times became better, the pressure for employment became less.

The experience gained in this undertaking has shown the desirability of entrusting the employment of men absolutely in the hands of the working foreman—in all respects in a similar manner to that employed by any outside firm of contractors. The foreman, if an experienced man, knows competent and industrious men, and makes his choice accordingly.

It may be pointed out that the adoption of such an arrangement would virtually resolve itself into the engagement of a staff of men on more or less constant employment, as the natural outcome of selection; and that the general expectation of employment on Government works of this character would necessarily be reduced to the smallest compass.

The whole of the work is of the highest class and has been faithfully carried out in all particulars, while it has been possible to study the convenience of the Government Printer in a series of operations that under any other system would probably have entailed serious dislocation of the business of his establishment.

W. L. VERNON.

To the Under Secretary for Public Works and Commissioner for Roads.

Submitted

---

* Omitted by the Printing Committee.

Submitted for the information of the Minister, who will, I think, be pleased at the satisfactory completion of this work by Mr. Vernon. The cost of the work has been as follows:—

			£ s. d.
Actual expenditure			17,656 0 0
Authorised work not yet carried out			200 0 0
			£17,856 0 0
Less proceeds of sale of old material	£96 0 0		
Value of plant in hand to be used on other works ...	454 0 0		
			550 0 0
Net cost			£17,336 0 0
The lowest tender received for the original work was			10,835 0 0
To which would have to be added office estimate of additional works...			6,172 15 8
			£17,007 15 8
The office estimate for the whole work was			18,172 15 8
And the average of the tenders, adding office estimate for extras, is			19,531 10 11

Assuming that the contractor would have carried out the extras at the office estimate—a most unlikely contingency—and that no dispute arose, then the work has cost about £328 more by day labour than if the lowest tender had been accepted; but against that must be placed the great advantage of being able to carry out the work with the least possible inconvenience to the work of the Printing Office, and the inevitable claims that the contractor would have had for the inconvenience he would have been put to in carrying out the work so as to suit the convenience of the officers.—R.H., Under Secretary for Public Works and Commissioner for Roads, 5/5/97.

Seen, with much pleasure. Prepare copy of these reports to lay on Table of the House, as promised by me.—J.H.Y., 5/5/97.

Sydney: William Applegate Gullick, Government Printer.—1897.

[3*d*.]

1897.

LEGISLATIVE ASSEMBLY.

NEW SOUTH WALES.

PROGRESS REPORT FROM SELECT COMMITTEE

ON

ADDITIONS AND ALTERATIONS TO THE GOVERNMENT PRINTING OFFICE;

TOGETHER WITH THE

PROCEEDINGS OF THE COMMITTEE,

MINUTES OF EVIDENCE,

AND

APPENDIX.

Printed under No. 26 *Report from Printing Committee,* 9 *December,* 1897.

SYDNEY: WILLIAM APPLEGATE GULLICK, GOVERNMENT PRINTER.

1897.

[3*s.* 6*d.*] 193—A.

1897.

EXTRACTS FROM THE VOTES AND PROCEEDINGS OF THE LEGISLATIVE ASSEMBLY.

VOTES No. 26. THURSDAY, 24 JUNE, 1897.

15. ADDITIONS AND ALTERATIONS TO THE GOVERNMENT PRINTING OFFICE:—Mr. McLean moved, pursuant to Notice,—

(1.) That a Select Committee be appointed to inquire into and report upon the cost of the recent additions and alterations to the Government Printing Office under the system of day labour as compared with the cost of performing the same work by contract.

(2.) That such Committee consist of Mr. Young, Mr. Wilks, Mr. Parkes, Mr. Bavister, Mr. Ball, Mr. McGowen, Mr. Lyne, Mr. Nelson, Mr. Schey, and the Mover.

Debate ensued,

And Mr. Miller requiring that the Committee be appointed by Ballot,—

Question put,—

(1.) That a Select Committee be appointed to inquire into and report upon the cost of the recent additions and alterations to the Government Printing Office under the system of day labour as compared with the cost of performing the same work by contract.

The House divided.

Ayes, 29.			Noes, 3.
Mr. Brunker,	Mr. Cook,	Mr. Hawthorne,	Mr. Miller,
Mr. Sydney Smith,	Mr. Alexander Campbell,	Mr. Millard,	*Tellers*,
Mr. Young,	Mr. Gillies,	Mr. Carroll,	Mr. Fegan,
Mr. Robert Jones,	Mr. Watson,	Mr. Reymond,	Mr. J. C. L. Fitzpatrick.
Mr. Garrard,	Mr. Ball,	Mr. McGowen.	
Mr. Thomas Brown,	Mr. Wilks,	*Tellers*,	
Mr. Sleath,	Mr. Law,		
Mr. Affleck,	Mr. Dacey,	Mr. Lonsdale,	
Mr. Anderson,	Mr. Wheeler.	Mr. Jessep.	
Mr. McLean,	Mr. Chanter,		
Mr. Bavister,	Mr. Willis,		

And so it was resolved in the affirmative.

Whereupon the House proceeded to the Ballot; and Mr. Speaker declared the following to be the Committee duly appointed:—Mr. McLean, Mr. Lyne, Mr. McGowen, Mr. Bavister, Mr. Young, Mr. Nelson, Mr. Ball, Mr. Willis, Mr. Parkes, and Mr. Wilks.

VOTES No. 37. WEDNESDAY, 21 JULY, 1897.

5. ADDITIONS AND ALTERATIONS TO THE GOVERNMENT PRINTING OFFICE:—Mr. McLean (*by consent*) moved, without Notice, That the Select Committee now sitting on "Additions and Alterations to "the Government Printing Office" have leave to make a visit of inspection to the Government Printing Office.

Question put and passed.

VOTES No. 81. THURSDAY, 9 DECEMBER, 1897.

4. ADDITIONS AND ALTERATIONS TO THE GOVERNMENT PRINTING OFFICE:—Mr. McLean, as Chairman, brought up a Progress Report from, and laid upon the Table the Minutes of Proceedings of, and Evidence taken before, the Select Committee for whose consideration and report this subject was referred on 24th June, 1897; together with Appendix.

Referred by Sessional Order to the Printing Committee.

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1897.

ADDITIONS AND ALTERATIONS TO THE GOVERNMENT PRINTING OFFICE.

PROGRESS REPORT.

THE SELECT COMMITTEE of the Legislative Assembly, appointed on 24th June, 1897, "*to inquire into and report upon the cost of the recent additions and alterations to the Government Printing Office, under the system of day labour as compared with the cost of performing the same work by contract*"; and to whom was granted on 21st July, 1897, "*leave to make a visit of inspection to the Government Printing Office,*"—have agreed to the following Progress Report.

Your Committee, having examined the witnesses named in the List,* have resolved, owing to the advanced period of the Session, to report the evidence to your Honorable House, and to recommend that the inquiry be resumed early next Session.

*See List, page 7.

F. E. McLEAN,
Chairman.

No. 3 *Committee Room,*
Legislative Assembly,
9th December, 1897.

PROCEEDINGS OF THE COMMITTEE.

THURSDAY, 1 *JULY*, 1897.

MEMBERS PRESENT:—

Mr. McLean,	Mr. Parkes,
Mr. McGowen,	Mr. Bavister,
Mr. Ball,	Mr. Wilks.

Mr. McLean called to the Chair.

Entry from Votes and Proceedings, appointing the Committee, *read* by the Clerk.

Committee deliberated.

Resolved (*on motion of Mr. Wilks*),—That the Committee meet on Wednesday in each week at 2 p.m.

Ordered,—That the Under Secretary for Public Works be summoned to give evidence next meeting.

[Adjourned till Wednesday next at *Two* o'clock.]

WEDNESDAY, 7 *JULY*, 1897.

MEMBERS PRESENT:—

Mr. McLean in the Chair.

Mr. McGowen,	Mr. Ball,
Mr. Wilks,	Mr. Bavister.

Robert Hickson (*Under Secretary for Public Works and Commissioner for Roads*) called in, sworn, and examined.

Witness *produced* papers in connection with the calling for tenders, the original tenders received, the plans and specifications upon which the tenders were based, and the bill of quantities supplied to the contractors.

Witness withdrew.

Arthur Stanton Cook (*Assistant Architect, Government Architect's Department*) called in, sworn, and examined.

Witness withdrew.

Ordered,—That Messrs. J. A. Eaton and D. T. Brown, Contractors, Mr. H. F. Norrie, Bonds and Contracts Clerk, Public Works Department, and Mr. A. S. Cook, Assistant Architect, Government Architect's Department, be summoned to give evidence next meeting.

[Adjourned till Wednesday next, at *Two* o'clock.]

WEDNESDAY, 14 *JULY*, 1897.

MEMBERS PRESENT:—

Mr. McLean in the Chair.

Mr. Parkes,	Mr. Ball,
Mr. Wilks,	Mr. Lyne,
Mr. Willis,	Mr. McGowen,

Mr. Bavister.

Arthur Stanton Cook recalled and further examined.

Witness *produced* original specifications and original plans on which the tenders were called for, Bill of quantities, schedule of prices for stores and services, Public Works Department, copy of all vouchers paid in connection with the work.

Witness withdrew.

Harold Francis Norrie (*Clerk-in-Charge of Bonds and Contracts, Public Works Department*) called in, sworn, and examined.

Witness withdrew.

James Andrew Eaton (*Contractor*) called in, sworn, and examined.

Witness withdrew.

David Turnbull Brown (*Contractor*), called in, sworn, and examined.

Room cleared.

Committee deliberated.

[Adjourned till Wednesday next, at *Two* o'clock.]

WEDNESDAY, 21 *JULY*, 1897.

MEMBERS PRESENT:—

Mr. McLean in the Chair.

Mr. Wilks,	Mr. McGowen,
Mr. Bavister,	Mr. Ball,

Mr. Parkes.

The Clerk, by direction of the Chairman, read the following letters:—(1.) From John White, President of the Builders' and Contractors' Association of New South Wales, asking that three members of the Association be allowed to inspect the work at the Government Printing Office; also that copies of the original plans be supplied to them. (2.) From J. A. Eaton in reference to the transcript of the evidence given by him at the last meeting of the Committee, and asking to be supplied with a true copy.

James

James Andrew Eaton recalled and further examined.
Room cleared.
Committee deliberated.
Witness recalled; examination continued.
Witness withdrew.
David Turnbull Brown recalled and further examined.
Witness withdrew.
Resolved (on motion of Mr. McGowen),—That the Committee meet on Thursday next week.
Resolved (on motion by Mr. Wilks),—That the Chairman obtain leave of the House for the Committee to make a visit of inspection to the Government Printing Office.

[Adjourned till Thursday, 29th instant, at *Two* o'clock.]

THURSDAY, 29 *JULY*, 1897.

MEMBERS PRESENT:—

Mr. McLean in the Chair.

Mr. Wilks, | Mr. McGowen,
Mr. Ball, | Mr. Parkes,
Mr. Bavister.

Entry from Votes and Proceedings, granting leave to the Committee to make a visit of inspection to the Government Printing Office, *read* by the Clerk.
The Clerk, by direction of the Chairman, read the following letters:—(1.) From John White, President of the Builders and Contractors' Association, intimating that Messrs. John White, J. M. Pringle, D. Stuart, and R. D. Syme, were willing to give evidence before the Committee. (2.) From J. A. Eaton, in reference to the evidence given by him on the 21st instant.
Arthur Stanton Cook recalled and further examined.
Witness withdrew.
William Thompson (*Quantity Surveyor*), called in, sworn, and examined.
Witness withdrew.
Arthur Foster Evans (*Quantity Surveyor, Government Architect's Department*), called in, sworn, and examined.
Witness withdrew.
Committee deliberated.
Resolved (on motion of Mr. Wilks),—That the Committee make a visit of inspection next meeting.

[Adjourned till Thursday, 12th August, at *Half-past Two* o'clock.]

THURSDAY, 12 *AUGUST*, 1897.

MEMBERS PRESENT:—

Mr. McLean in the Chair.

Mr. McGowen, | Mr. Ball,
Mr. Parkes, | Mr. Wilks.

Arthur Stanton Cook recalled and further examined.
Witness *produced* Bill of Quantities of work actually carried out at the Government Printing Office.
Committee then proceeded on a visit of inspection to the Government Printing Office.
The Committee having returned.

[Adjourned till Thursday next at *Two* o'clock.]

THURSDAY, 19 *AUGUST*, 1897.

MEMBER PRESENT:—

Mr. McLean.

In the absence of a Quorum, the meeting called for this day lapsed.

THURSDAY, 26 *AUGUST*, 1897.

MEMBERS PRESENT:—

Mr. Ball, | Mr. McLean.

In the absence of a Quorum, the meeting called for this day lapsed.

THURSDAY, 7 *OCTOBER*, 1897.

MEMBERS PRESENT:—

Mr. McLean in the Chair.

Mr. Ball, | Mr. Wilks.

Arthur Foster Evans recalled and further examined.
Witness withdrew.

[Adjourned till Thursday, 21st October, at *Two* o'clock.]

THURSDAY,

THURSDAY, 21 *OCTOBER*, 1897.

MEMBERS PRESENT:—

Mr. McLean in the Chair.

Mr. Ball, | Mr. Bavister,

Mr. Parkes.

John White (*President of the Builders' and Contractors' Association*) called in, sworn, and examined.

Witness withdrew.

Frederick Trenchard Smith (*Secretary to the Builders' and Contractors' Association*) called in, sworn, and examined.

Witness withdrew.

[Adjourned till Thursday next at *Two* o'clock.]

THURSDAY, 28 *OCTOBER*, 1897.

MEMBER PRESENT:—

Mr. McLean.

In the absence of a Quorum, the meeting called for this day lapsed.

THURSDAY, 11 *NOVEMBER*, 1897.

The House continuing to sit during the time appointed for the sitting of the Committee, no meeting could be held.

TUESDAY, 16 *NOVEMBER*, 1897.

MEMBER PRESENT:—

Mr. McLean.

In the absence of a Quorum, the meeting called for this day lapsed.

TUESDAY, 23 *NOVEMBER*, 1897.

MEMBERS PRESENT:—

Mr. McLean in the Chair.

Mr. Ball, | Mr. Bavister.

John White recalled and further examined.

Witness *produced* Bill of Quantities furnished by the Government Quantity Surveyor duly priced by himself.

William Stuart (*Contractor*) called in, sworn, and examined.

Witness withdrew.

James Milne Pringle (*Contractor*) called in, sworn, and examined.

Witness withdrew.

[Adjourned till to-morrow at *Eleven* o'clock.]

WEDNESDAY, 24 *NOVEMBER*, 1897.

MEMBERS PRESENT:—

Mr. McLean in the Chair.

Mr. Ball, | Mr. Bavister.

Arthur Foster Evans recalled and further examined.

Witness withdrew.

[Adjourned till Tuesday next at *Eleven* o'clock.]

TUESDAY, 30 *NOVEMBER*, 1897.

MEMBERS PRESENT:—

Mr. McLean in the Chair.

Mr. Bavister, | Mr. Wilks.

Arthur Foster Evans recalled and further examined.

Witness *produced* Bill of Quantities for *extra work* in connection with additions and alterations to Government Printing Office.

Witness withdrew.

Alfred William Whittaker Pate called in, sworn, and examined.

Witness withdrew.

[Adjourned till Tuesday next at *Eleven* o'clock.]

TUESDAY,

7

TUESDAY, 7 DECEMBER, 1897.

MEMBERS PRESENT:—

Mr. Ball, | Mr. McLean.

In the absence of a Quorum, the meeting called for this day lapsed.

THURSDAY, 9 DECEMBER, 1897.

MEMBERS PRESENT:—

Mr. McLean in the Chair.

Mr. Ball, | Mr. Bavister,
Mr. McGowen, | Mr. Wilks.

Committee deliberated.

The following were ordered to be appended:—

(1.) Sketch showing Government Printing Office as originally proposed by plans upon which tenders were called. [*Appendix* A.]

(2.) Sketch showing Government Printing Office building as carried out. [*Appendix* B.]

(3.) Specification of work—adding two additional stories to the Government Printing Office, Sydney. [*Appendix* C.]

(4.) Bill of Quantities for additions and alterations to the Government Printing Office, priced by J. A. Eaton, contractor. [*Appendix* D.]

(5.) Bill of Quantities for additions and alterations to the Government Printing Office, priced by Arthur Foster Evans, Quantity Surveyor, Government Architect's Department. [*Appendix* E.]

(6.) Bill of Quantities for additions and alterations to the Government Printing Office, priced by John White, President of the Builders' and Contractors' Association. [*Appendix* F.]

(7.) Bill of Quantities for "Extra Work," in connection with additions and alterations to the Government Printing Office, priced by A. W. W. Pate, Quantity Surveyor. [*Appendix* G.]

Chairman submitted Draft and Progress Report.

Same read and agreed to.

Chairman to report to the House.

LIST OF WITNESSES.

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1897.

LEGISLATIVE ASSEMBLY.

NEW SOUTH WALES.

MINUTES OF EVIDENCE

TAKEN BEFORE

THE SELECT COMMITTEE

APPOINTED TO INQUIRE INTO THE

ADDITIONS AND ALTERATIONS TO THE GOVERNMENT PRINTING OFFICE.

WEDNESDAY, 7 JULY, 1897.

Present:—

MR. BALL, MR. BAVISTER,
MR. McGOWEN, MR. McLEAN,
MR. WILKS.

F. E. McLEAN, ESQ., IN THE CHAIR.

Robert R. P. Hickson, called in, sworn, and examined:—

R. R. P. Hickson. 7 July, 1897.

1. *Chairman.*] You are Under Secretary for Public Works and Commissioner for Roads? Yes.
2. Did you hold that position when tenders were called for alterations and additions to the Government Printing Office? No; it was held by Mr. Barling.
3. Are you familiar with the papers in connection with the calling for tenders? Yes; I produce them.
4. Upon what date were the tenders received? 8th May, 1895.
5. Do you produce the original tenders received? Yes, and the plans and specifications upon which the tenders were based.
6. Do you also produce the bills of quantities supplied to the contractors? Yes.
7. How many tenders were received on that occasion? Twenty-four; the first six lowest tenders were as follows:—J. A. Eaton, £10,835; D. J. Brown, £11,223; James Bonar, £11,831; H. P. Hamilton, £11,995; Parry and Farley, £12,578 13s.; W. B. Johns, £12,672.
8. What was the amount of the highest tender? £16,112.
9. Can you tell us from the papers before you what was the departmental estimate for this work? £12,000.
10. Was the lowest tenderer known to the Department as a contractor for public works? Yes.
11. Was he well known to the Department? Yes.
12. Was there any question in the mind of the Department as to the contractor being able to carry out the work at the price tendered? Not that I am aware of; I cannot tell what was in Mr. Vernon's mind.
13. That is not one of the reasons why the tender was not accepted? Apparently not, judging from the papers.
14. What period elapsed between the receipt of the tenders and the determination of the Minister to proceed with the work by day-labour? There is the following minute by Mr. Barling, on 17th June, 1895:—"Instructions have already been issued to Mr. Vernon to carry out the work by day-labour." The tenders were received on the 8th May.
15. Can you tell us the amount of the cash deposited with the tenders? It would be according to the regulations. The deposit with the lowest tender was £110. The tenderer complied with that condition.

R. R. P. Hickson. 7 July, 1897.

16. Were the deposits of the contractors held by the Department for any length of time? I cannot say from my own knowledge, but they were no doubt returned when the Minister gave those instructions. That is the usual custom.
17. *Mr. Ball.*] Would not that have reference only to the lowest tender? Yes; the others would be returned the day after tenders were received.
18. Were tenders provided for the supply of stone, bricks, timber, and the other materials used by the Government in carrying out this work? I think so, but I would not like to say positively.
19. Can you tell from your own knowledge whether the Government have annual contracts for the supply of bricks, stone, or timber? For timber we have, but not for stone or bricks.
20. What is the name of the officer under whose supervision the work was carried out? Mr. Cook.
21. Is the salary of that officer charged to the cost of the work? No; because he supervised a lot of other works; he was not exclusively employed on this one.
22. *Mr. McGowen.*] Would work have been found for him at some other place if this work had not been going on? Yes; there was plenty of other work going on.
23. *Chairman.*] In any case would it not have been necessary to employ a clerk of works? Yes; his salary would be charged to the works.
24. *Mr. McGowen.*] Would Mr. Cook have any supervision to do if the lowest tenderer had carried out the work? Yes.
25. *Chairman.*] Do you produce a schedule of the quantities of work as actually carried out? No; it is not yet quite ready.
26. Are there any other papers material to the inquiry which are not produced? I think that is the only one.
27. *Mr. McGowen.*] Were there any extras that you know of in this work not estimated by the Government when they started? I could not say.
28. What was the ultimate cost of the work to the Government? A return was laid on the Table of the House giving all the particulars. It would perhaps be convenient if I now made a statement giving the history of the affair. Apparently the first thing that took place after the tenders were received was the writing of a minute by the Minister, Mr. Secretary Young, as follows:—

> Works at Government Printing Office.—Urged that it should be done by day-labour like the Works Office. Watson, Griffith, Bavister, Thomas.

Then on the 8th May, 1895, there is the following minute by the Minister:—

> The proposed additions to the Printing Office.—I promised Messrs. Watson, Griffith, Bavister, and Thomas, M's.P., that I would inquire into the feasibility of a request made by them, namely, that the works at the Government Printing Office should be carried out by day-labour, as has been done in the case of the additions to the Public Works Office. This morning I inquired into the matter, and find that tenders are to be received to-day for the work in question; that the estimated cost is £12,000, and that the money was voted on the Loan Estimates for 1891. I find also that these tenders have been opened, and that a Mr. Eaton is the lowest tenderer—£10,835.
>
> Mr. Vernon being out of town, I sent for Mr. Drew to ascertain whether the suggestion of the Members referred to was feasible, and I then learnt that in estimating for the work very grave doubts existed as to whether the present walls were sufficiently strong to permit of two more storeys being added to the building, and that in all probability a very much larger additional expense would be necessary in the event of these walls being found insufficiently strong for the purpose.
>
> As so large a sum of money was involved, I thought it desirable to inquire further into the matter, and I accordingly sent for Mr. Potter to ascertain whether some better arrangements, perhaps of a temporary character, could not be carried out. It was then suggested that it might be desirable to put up temporary buildings on the land in Phillip-street belonging to the Government, which is now used as a coal-yard. Mr. Drew pointed out that at a comparatively small cost a galvanised-iron building could be erected, and be lighted by means of a saw-tooth roof, which would really afford better accommodation than the additions proposed to be carried out.
>
> This suggestion struck me to be such a valuable one that I directed the tenders to be withdrawn, and asked Mr. Potter to inspect the land in company with Mr. Drew, to see whether it would be suitable for the purpose. Mr. Potter informed me that the inconvenience of such a building as that suggested being situated a short distance from the main building would not prove to be a very great one.
>
> I, therefore, wish inquiries to be made at once as to the tenure of the occupants of the land in question; and after this has been done it is my intention to bring the matter before my honorable colleague, the Treasurer. In the meantime Mr. Drew can pursue his inquiries as to what a temporary building of the kind suggested would cost.

There is a further paragraph about the rent of the land proposed to be taken, but as the suggestion was not carried out it is not necessary to refer to it again.
29. *Mr. McGowen.*] On the 8th May the Minister directed that the tenders be withdrawn;—were the Minister's instructions carried out? I presume that what the Minister meant was that they should be temporarily withdrawn until the whole question was decided.
30. After the tenders were withdrawn in compliance with the Minister's minute, was the deposit money refunded to the lowest tenderer? I cannot say, but the papers will no doubt show. I do not know what was in the Minister's mind; but my impression is that he meant that tenders were to be temporarily withdrawn.
31. *Mr. Ball.*] The object of the withdrawal was not that the work should be done by day-labour, but that the Department should erect a building at another place? Partly that; and it was also thought that the walls were not strong enough.
32. *Chairman.*] But, as a matter of fact, had not a deputation asked that the work should be carried out by day-labour before he decided to withdraw the tenders? Yes.
33. *Mr. Ball.*] Is there not a reference to the erection of a building on another piece of land? That suggestion was not carried out. The next minute is one by Mr. Vernon, the Government Architect. It is almost entirely in reference to the temporary building which was proposed, and it is perhaps not worth while reading it; but he also deals with the question of the stability of the walls.
34. *Mr. McGowen.*] Was the stability of the walls proved? Yes, on the 4th June, 1895, Mr. Vernon wrote the following minute, which bears directly on the question of contract *versus* day-labour basis:—

> With reference to the steps that have been taken to bring before the Minister the desirability of adopting a day-work basis for the proposed alterations in lieu of the acceptance of the lowest of the tenders now under consideration, I have the honor to place before the Minister circumstances which may possibly assist him in determining as to which course shall be adopted.
>
> The contractors' tenders are based upon a specification and bill of quantities which it is believed cover all the necessary works that may be reasonably anticipated in dealing with this particular building. But at the same time it is obvious that while on the one hand some difficult building operations will have to be carried out, and on the other the Government

R. R. P. Hickson. 7 July, 1897.

Printer and his large and extensive plant and machinery and number of employees have to be closely considered and provided for, a contract would present unusual openings (no matter how carefully matters are conducted) for ulterior claims by the contractor. It is quite possible that either the cost might be eventually increased or litigation anticipated.

As regards day-work, this office is now undergoing an experience in the construction of the new roof over this building, and my officers join with me in expressing the opinion that in this particular case the proper course was adopted; and although it is too early to report the financial result, I am fully expecting that it will prove satisfactory.

I have been fortunate in obtaining the services of a first-rate overseer and also foreman of carpenters, and while they have to some extent been handicapped by the plethora of applications by workmen and influences brought to bear in many quarters, they have pursued a straight course by engaging workmen in their order of application, continuing their engagement if found to be good, and discharging without hesitation those found to be incompetent. If the Minister determines to carry on this projected operation in the same way, I shall, at any rate, ask his permission to continue the engagement of these two men.

The difficulties already referred to which might crop up with the contractor, especially in dealing with the Government Printer, would not exist when every workman is under the direct control of this office.

Unpleasantness may occur in dealing with the probable large number of applicants for work. At the present moment I have no less than 480 on my list, and as soon as it is known that this work is to be carried out I have no doubt this number will be doubled. At the same time, when everything is in full working order, I do not think room can be found for more than 60 or 70. The question would then have to be decided whether those men who have proved satisfactory on the Works Office roof should have the prior re-engagement, or whether they should make way for a second contingent on the existing list. In either case a large number must necessarily be disappointed.

It may be perhaps noted that within twelve months from December last, upwards of 100 contracts for the erection of public buildings have been and are expected to be entered into with recognised contracting firms, while but one work, and that of a special character, has been carried out on a day-work basis. The contractors, therefore, need not fear that the recognised system of contracting is being departed from in any material way.

35. *Mr. McGowen.*] Will you be able, from the records of the Department, to furnish us with instances of what Mr. Vernon calls unusual openings for claims by contractors;—can you cite cases in which this has been done, and how it can be done? By some little searching we can put our hands on such cases, but I can vouch for the fact that there have been several. I will have inquiries made.

36. *Mr. Ball.*] Were the two men referred to by Mr. Vernon engaged on this work? I believe they were. Mr. Cook will tell you.

37. *Mr. Wilks.*] Reference is made in the minute to influences brought to bear from many quarters to introduce employees;—were those influences totally ignored? I believe so; but from my own knowledge I cannot say. I only came in when the work was practically finished. A deputation was introduced to the Minister, by Mr. McLean, M.L.A., consisting of builders and contractors, and if the Committee desire it I will read the report.

38. *Chairman.*] As it will give the other side of the question, perhaps it would be as well if you read it? It is as follows:—

Sydney, 6 June, 1895.

DEPUTATION.

Subject:—Proposed Additions—Government Printing Office.

Mr. McLean, M.P., introduced a deputation, representing the Builders and Contractors Association, to the Minister this morning, to urge that the proposed additions to the Government Printing Office should be carried out as originally intended by contract, instead of by day-labour as now proposed.

The deputation pointed out that the tenderers for the work in question had been put to a considerable amount of expense in preparing their tenders. Some twenty-four tenders in all had been sent in. Deposits to the extent of about £2,500 had been made. That by the establishment of minimum rates of wages—which the Association thought was an admirable arrangement—the working classes were protected as far as possible in the direction of the prevention of sweating. Their contention was that the carrying out of works of this character by day-labour meant a considerable expense to the Government, while the work could not be done better in that way than under the contract system; that they desired to protest against any departure from the established system of the Department of having works carried out by contract, and that if the system of day-labour were introduced it would open very widely indeed the door to political influence. They desired to urge that one of the tenders which had been received for the work in question should be accepted, and that the work should not be carried out, as proposed, by day-labour.

The Minister, in replying, said he was very glad to have heard the views of the deputation on the subject, and admitted their perfect right to interview him in regard to the matter. He liked to hear every side of the question before arriving at a decision. The deputation appeared to interview him upon two grounds—on the general question, and on the one question as to how the additions to the Government Printing Office were to be carried out. With reference to this work, at the time tenders were called for there was no idea of having it carried out in any other way than by giving it to the lowest tenderer. But at the same time it was too good to blame the Department in respect of the whole of the twenty-four contractors who had tendered, as only one could have been successful. Of course, the gentlemen of the deputation would recognise that the Department were not compelled to accept the lowest or any tender that might be submitted. With regard to estimates of cost, he might remark that it was somewhat peculiar to see the different amounts submitted by contractors for the same work, so if sometimes Departmental estimates were exceeded it was not to be wondered at, considering that at times contractors themselves did not know the value of work. In the case of the Printing Office additions the lowest tender, he found, was for £10,835, and the highest £16,112. There was thus a difference of 50 per cent. between the one and the other; but, of course, this had nothing to do with the question of the non-acceptance of a tender. It was as he had told Mr. McIntyre, the President of the Association. At the eleventh hour it was represented to him that the walls of the existing building would be found to be insufficiently strong to bear the superstructure, and he was compelled to put the work off until this question had been inquired into. It had, however, been found that the walls were quite strong enough to carry the proposed additions. In the meantime he was requested to have the work carried out by day-labour, and it was also pointed out to him that this particular work could be more satisfactorily carried out in this way than by contract, as by day-labour, if it were found necessary to stop the work for a few days, this could be done, while if a contractor had the work in hand he would naturally claim for any cessation of work it might be convenient to have from time to time, while the additions were being carried out. And he had an intimate knowledge of contractors claiming. He found they had to watch contractors almost as much as day-labourers, and with regard to the matter of the introduction of political influence he did know this, that in ninety-nine cases out of 100 where contractors had not carried out their contracts in a proper way, or within the contract time, they used just as much political influence as possible to induce him to remit whatever fines had been imposed upon them. The only answer he could give the deputation was that he would consider it his duty to use his best judgment as to how works should be carried out in every individual case in the interests of the country. Under the circumstances of this particular case, taking into consideration the fact that the business of the Printing Office could not be carried on if a contractor were allowed to go on with the work day by day, and that it would be necessary to have stoppages, he thought that in the interests of all concerned this work should be carried out by day-labour.

39. Then, on the 17th June, it actually had been decided to proceed with the work? On the 17th June, there is a minute by Mr. Barling that instructions had already been issued to Mr. Vernon to carry out the work by day-labour.

40. *Mr. McGowen.*] I have already referred to the expression used by Mr. Vernon as to "unusual openings for claims by contractors." There might also be claims for cessation of work, and I should like to know how many times a cessation of work occurred in this building? I cannot speak of my own knowledge, but Mr. Cook will be able to give that information.

41.

R. R. P. Hickson. 7 July, 1897.

41. *Mr. Ball.*] Do I understand that when the deputation waited on the Minister the members of that deputation approved of the minimum rate of wages? Yes; they said they thought it was "an admirable arrangement."

42. *Mr. Wilks.*] The Minister, in his reply to the deputation, said that political influence was brought to bear in the interests of contractors as often as it was brought to bear in the interests of workmen;—has that also been your experience? Yes, certainly.

43. *Chairman.*] Have you any knowledge of any serious accident having occurred in connection with these works during their progress? I have no knowledge, but I do not think any such accident has occurred.

44. Has there not been an accident in other works, and was there not money voted in consequence? Yes; an unfortunate man fell off the roof of the Works Office. I cannot recollect any occurrence of the kind in connection with the Printing Office.

45. *Mr. McGowen.*] In the case you referred to where a man lost his life, was it not his own fault, and was not the money paid by way of a grant? Yes. The next paper I have in connection with the works at the Printing Office is a minute from the Government Architect, after the work was finished, giving the financial result. It is to this effect:—

Department of Public Works, Government Architect's Branch, Sydney, 23 April, 1897.

MINUTE PAPER.

Government Printing Office—Additions.

I HAVE the honor to submit, for the Minister's information, the accompanying statement and report upon the result of the works recently carried out on the above buildings under the "day-work" system.

These may be classified as follows:—

1st. The improvements included in the original plans and specification, as shown on sketch "A,"* and for which tenders were invited.
2nd. Various additional work and improvements in accordance with sketch "B."*
3rd. Alterations and additions generally to the northern portion of the building.

The result is seen in the following comparative statement:—

	£ s. d.	£ s. d.
No. 1. Actual expenditure	17,656 0 0	
Authorised work held in abeyance	200 0 0	
	17,856 0 0	
Less proceeds of sale of old materials and plant in hand	550 0 0	
Net cost		17,306 0 0
No. 2. Office estimates		18,172 15 8
No. 3. Amount of lowest tender, with office estimates of the additional works		17,007 15 8
No. 4. Average of the tenders, including office estimates of the additional works		19,531 10 11

It is not possible to state whether the contractor would have made a profit or a loss on his tender; at the same time it is highly probable that he would have required a larger sum for the extra works estimated at £6,172 15s. 8d., and very possibly compensation for the disadvantage entailed by the mode in which the work was carried out; he would also have carried on his undertaking in the face of a rising market.

The actual expenditure includes no sum equivalent to ordinary contractors' "establishment charges"; it includes, however, salary for clerical assistance, but not for the extra professional assistance involved. Materials have been purchased on rates obtained by public competition; wages have been paid generally at an advance of 1s. per day over minimum rates.

When the works were commenced the building trade generally was passing through a period of unusual depression, and, as a consequence, employment of a large amount of skilled and unskilled labour on these works was, in one form or another, urged upon the Minister; accordingly it became necessary to establish a system by which applicants obtained employment in the order of their date of application, and without actual knowledge as to their individual capacity—gradually the few incompetent men were weeded out, and, as times became better, the pressure for employment became less.

The experience gained in this undertaking has shown the desirability of entrusting the employment of men absolutely in the hands of the working foreman—in all respects in a similar manner to that employed by any outside firm of contractors. The foreman, if an experienced man, knows competent and industrious men, and makes his choice accordingly.

It may be pointed out that the adoption of such an arrangement would virtually resolve itself into the engagement of a staff of men on more or less constant employment, as the natural outcome of selection; and that the general expectation of employment on Government works of this character would necessarily be reduced to the smallest compass.

The whole of the work is of the highest class, and has been faithfully carried out in all particulars, while it has been possible to study the convenience of the Government Printer in a series of operations that under any other system would probably have entailed serious dislocation of the business of his establishment.

W. L. VERNON.

To the Under Secretary for Public Works and Commissioner for Roads.

In submitting that to the Minister, I wrote as follows:—

Submitted for the information of the Minister, who will, I think, be pleased at the satisfactory completion of this work by Mr. Vernon. The cost of the work has been as follows:—

		£ s. d.
Actual expenditure		17,656 0 0
Authorised work not yet carried out		200 0 0
		£17,856 0 0
Less proceeds of sale of old material	£96 0 0	
Value of plant in hand to be used on other works	454 0 0	
		550 0 0
Net cost		17,336 0 0
The lowest tender received for the original work was		10,835 0 0
To which would have to be added office estimate of additional work		6,172 15 8
		£17,007 15 8
The office estimate for the whole work was		18,172 15 8
And the average of the tenders, adding office estimate for extras, is		19,531 10 11

Assuming

* Omitted by the Printing Committee.

Assuming that the contractor would have carried out the extras at the office estimate—a most unlikely contingency—and that no dispute arose, then the work has cost about £328 more by day-labour than if the lowest tender had been accepted; but against that must be placed the great advantage of being able to carry out the work with the least possible inconvenience to the work of the Printing Office, and the inevitable claims that the contractor would have had for the inconvenience he would have been put to in carrying out the work so as to suit the convenience of the officers.—R.H., Under Secretary for Public Works and Commissioner for Roads, 5/5/97. R. R. P. Hickson. 7 July, 1897.

On that, Mr. Young wrote the following:—

Seen, with much pleasure. Prepare copy of these reports to lay on Table of the House, as promised by me. - J.H.Y., 5/5/97.

46. *Chairman.*] Before you leave that paper I see you put down the office estimate for extra work at £6,172 15s. 8d. If the lowest tender had been accepted, would the contractor have been compelled to do that extra work in accordance with the prices in his own schedule or bill of quantities, or would he have been given an opportunity of tendering again? If the work had been let by contract, and these additions were carried out, it would have to be a matter of arrangement between the Department and the contractor as to what the price would be.

47. Could you not have compelled him to go on with the northern wing at the prices in his own bill of quantities? I think not.

48. *Mr. Ball.*] Was there not a schedule of rates? Yes; but there was such a vast alteration in the design that a great many of those items would not apply, so that it would have to be a matter of arrangement.

49. In other words, they would not be considered extras in the ordinary sense of the term? No.

50. *Chairman.*] Would you explain exactly what the system is with regard to issuing bills of quantities, and getting those bills duly priced by the contractors when their tenders are accepted? In the Government Architect's branch it is so different from the other branches of the Department. I should like you to get the explanation from Mr. Cook.

51. *Mr. Ball.*] Do I understand that the work carried out at the Printing Office was not done according to the original plan on which tenders were called? No; a great many alterations were made. The additions were in a different style altogether. The original work, I believe, was practically carried out according to the plan on which the tenders were sent in.

52. Was the original work carried out in accordance with the plans and specifications on which the tenders were called? I believe so.

53. *Mr. McGowen.*] I see that about £6,000 are put down for extras. The original tender was about £10,000;—in making up that estimate, did your officers make any allowance for the charge which would be legitimately made by a contractor for cessation of work? None whatever.

54. *Mr. Bavister.*] Has it ever occurred in your experience that where a contractor had an opportunity of charging for extra work in connection with the contract that that work has cost as little as the office estimate? I do not know a single case in my experience in dealing with extras not covered by specifications where the work which we proposed to do was not, in the contractor's opinion, the most expensive work that he could be put to do. You cannot help yourself in such a case; you are in his hands, because it is impracticable to bring in another contractor.

55. In the specifications and conditions under which tenders were called for in connection with the Printing Office, were any conditions inserted as to the protection of machinery, and the continuance of the office work during the progress of building operations? I cannot answer that question, because I was only brought into contact with the work quite lately. There is an item on which it would be impossible to put a money value on. That is the interference with the working in a going concern like the Printing Office, or, in fact, any other public building in daily use. If you have your own men you can shift them about from room to room or from place to place, which you cannot do in the case of a contract.

56. During the operations, did any friction occur between the officer in charge and the officers in the Printing Office? I believe not. I believe the two departments worked together hand in hand, and the convenience of the Printing Office was considered.

57. *Mr. Ball.*] Having had an opportunity of going through all the papers in connection with these works, and knowing all the conditions, is it your opinion that the additions and alterations have been carried out under the day-labour system more advantageously to the Government than if they had been carried out by contract? I am quite certain of it.

58. *Mr. McGowen.*] In every way? Yes.

59. *Mr. Bavister.*] Is it not a fact that wherever it becomes necessary to depart from the plans and specifications, not only does delay arise, but it is also the practice of contractors to take the greatest advantage of that delay and of the alterations? Certainly; it is only human nature.

60. But that sort of thing has had no existence in carrying out the work at the Government Printing Office? No; because there was no contractor. I believe generally that where you cannot fully specify every portion of a work that has to be done, such as in the case of repairs to buildings or bridges, or additions to bridges or buildings, it can be done better by day-labour than by contract. That is my experience, which has been very large with regard to the repair of bridges.

61. Every departure from the original plans and specifications involves difficulty for those who have to carry out the work, and frequently friction between the contractor and the authority carrying out the work? Yes; in nearly all cases.

62. *Mr. Ball.*] Does that apply to a new work? In all work where you can specify and show by drawings the complete work I think the contracting system is the best.

63. They give a schedule according to the work done, and they are paid accordingly? Yes.

Arthur Stanton Cook, called in, sworn, and examined:— A. S. Cook. 7 July, 1897.

64. *Chairman.*] What position do you occupy? Assistant Architect.

65. Have you been in charge of the work carried out by day-labour at the Government Printing Office? Yes.

66. At what date did you enter upon that position? About June, 1895.

67. How long were you in charge of these works, and how long were the works in progress? The works are not completed yet.

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68. Are you familiar with the specifications and the terms and conditions of the contract upon which tenders were invited for these works in the early part of 1895? I have read them.
69. Were you in the Government Architect's Department at that time? Yes; but I had nothing to do with this particular specification.
70. Are you familiar with the general terms and conditions of Government contracts for buildings? Yes.
71. Is it customary for the Government to furnish tenderers with bills of quantities which are guaranteed? About June, 1895, the system was first commenced in the Government Architect's Office of supplying bills of quantities for all works over £2,000.
72. Is it the practice of the Department to call for those bills of quantities duly priced by the contractor when they accept his tender? Yes.
73. If there is any extra work to be performed in connection with a contract do you hold the contractor bound to do the work at the prices contained in his schedule? Yes; extra work attached to the contract.
74. Are you familiar with the minute or paper which Mr. Vernon wrote to the Minister estimating the cost of the work carried out at the Government Printing Office? Yes.
75. Do you remember that over £6,000 is set down there as the departmental estimate of the work beyond the amount of the original contract? Yes.
76. In your opinion, would that work fairly come under the head of extra work to be done according to the schedule, or would it be necessary to call for fresh tenders, or to make a special arrangement with the contractor? It would be absolutely impossible to price those items out as a whole from the schedule of quantities.
77. Then the contractor would not have been bound by the schedule in doing those works? No; we would have been obliged to ask for a tender. The items of extra work would not in the great majority of cases be contained in the schedule of quantities. For instance, there is a staircase which is altogether an extra. It is at the northern end, and it goes from the top to the bottom of the building. There would be nothing in the schedule to describe that staircase, and we should have to ask for a price list for it.
78. Would not ordinary brick and stone work in the northern end come under the schedule, or would it be contracted for? Take the stonework for instance. The contractor might very fairly say, "This stonework is much higher up than the work tendered for. I cannot take it at the same schedule rate," and he would have right on his side.
79. Is it your opinion that the extra work done would not come within the term "extras" as generally understood by the Department? In a great number of instances it would not have come under that heading.
80. *Mr. McGowen.*] Therefore, you would have been at the mercy of the contractor with regard to any price he might put in? Undoubtedly.
81. *Chairman.*] There is rather an important question with regard to the liability of the Government in the case of accidents to employees;—has there been any serious accident during the progress of these works, and has there been any claim for compensation? Not one accident.
82. Has there been any serious friction between you and the officers and men in the Government Printing Office? No; we have worked with them in the easiest manner possible.
83. *Mr. McGowen.*] Did you ever interfere with them in doing your work? No; they did their work practically all the time. Of course they must have felt it a little, but we took all sorts of precautions. We took precautions that no contractor would have taken. We really added to the cost against ourselves; we added tremendously to the cost of day-labour by the precautions which we took.
84. *Mr. Bavister.*] Might any of those precautions have been considered unnecessary? They would not be considered unnecessary by the Printing Office Staff.
85. Were they such as a contractor would have evaded? We could not have called upon a contractor to take such precautions.
86. *Mr. McGowen.*] Supposing a contractor had to take those precautions, and could not go on with a portion of the work until the Printing Office people finished their work, would he have a claim for cessation of work? Undoubtedly he would if he were stopped longer than is provided for in the specifications. They provide that the contractor must study the convenience of the Printing Office in every possible way.
87. What would you consider a reasonable time for stopping the work of carpenters, bricklayers, stonemasons, and so on, in order to enable the Printing Office people to carry on their work? I do not think we would have a right to stop any of the contractor's men from working after they had once started. It would be our business to find out what they could go on with uninterruptedly.
88. Were there times when you had to stop operations in consequence of the exigency of the Government Printing Office work? Yes.
89. Would you have had to pay a contractor for that? Yes.
90. In making up this estimate of about £6,000 for extras, did the officers of your Department make any allowance for such cessation of work if a contractor had been engaged? No. I do not know that in the extra work there was so much delay as there was in the original work.
91. *Chairman.*] How did you arrive at what is called the office estimate of £6,172 15s. 8d. for that extra work? We estimated the actual net cost price.
92. Have you any papers or computations showing how you arrived at that amount of £6,172 15s. 8d.? We have some of them; we have the details of some.
93. Is this amount of over £6,000 your own estimate? Yes.
94. Are you responsible for this estimate? Yes.
95. Did you simply furnish this to the Minister as your estimate, or did you furnish him with the data on which your estimate was founded? We simply put it forward as a statement of what we considered it would cost.
96. Will you be in a position to furnish data to the Committee showing what your estimate was founded upon? In some cases I can, but not in others. In this list of extras there are all sorts of amounts—I think the highest is £3,500; but if it was an amount involving, say, £200 or £300, I would hand that to the foreman, or perhaps my assistant, and tell him, "Go and see what that work is, and give me the notes of it." They would give me their idea as to what it would cost; I would look over their report, examine it, and, if I thought it was a fair price, send it in. If I thought it appeared to be too high, I would reduce it and then send it to the Minister.
97. You have given in your statement an estimate that the work altogether cost £17,336;—can you divide

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divide that amount, showing what the work, according to the original plans and specifications, actually cost the Government, and what the extra work carried out also cost? To a great extent I can. When we sent in the amended plans the Government Architect, at my suggestion, said he estimated that the amended plans could be carried out for the amount of the lowest tender. That was about £10,000. That is the basis on which we have gone. Anything which we found went beyond £10,835, we reported on and obtained approval for it.

98. *Mr. Bavister.*] You say that £6,172 for additional works was the net cost;—of course, it covered labour and material, but was any allowance made for the use and depreciation of plant? I think not.

99. *Chairman.*] Can you furnish us with the data on which that estimate was founded, and produce it at another meeting of the Committee? I will endeavour to do so.

100. Do you produce the original bills and quantities, specifications, and plans? The original plans are in the room; the specifications and quantities were taken out to be sent here, but they have not arrived. I will produce them when called upon to do so.

101. Have you any details of the expenditure of £17,336 which it is estimated has been spent on the work? Yes.

102. Do you keep an account in the books of the Department of all that you spend on a work, and will you produce that account? I can produce an account of the whole expenditure.

103. Would it entail a very large amount of office work to produce an account of the whole expenditure, showing the quantities and materials? We thought the best way to show at a glance a comparative statement of the two schemes was to take out the quantities of the work actually carried out. Immediately this Committee was given notice of, instructions were given to some of the officers to take the quantities of the work actually carried out. I am afraid, however, that that statement will not be ready for three weeks.

104. With regard to the amount that has been spent, how long will it take you to produce an account showing the details of that expenditure? That can be done within the three weeks.

105. We want the vouchers paid by the Government, the quantities of cement, the quantities of timber, and so on, used in the work, also the wages for labour;—will you produce all those particulars with other information? Yes.

106. When was the bulk of the work at the Printing Office finished—that is, the heavy work in which the most of the bricks, cement, and timber were used? I think it was about the date of that report.

107. Was this work proceeding in the year 1896? Yes.

108. Have you ever computed how much the Department saved by the remission of duties upon imported materials used in connection with the work? No.

109. Are those materials supplied by annual contract, or are tenders called? Tenders were called for stone, bricks, cement, and steel joists.

110. Are you aware that there was a duty of 2s. a barrel on cement prior to 1st January, 1896, and can you tell, roughly, what quantity of cement was put into the building after the remission of duty? No; but my impression is that the price of cement went up after the duties were off.

111. Can you speak with certainty on that point? I am not prepared to speak positively, but I think that is correct.

112. The same thing would apply to timber;—under your annual contract the contractor would have to reduce the prices by the amount of duty remitted since 1st January, 1896? Yes; there was a provision of that kind made in the annual contract.

113. As a matter of fact, the Department reserved power to deduct from the contractor the amount remitted in duty on the materials? Yes.

114. Are you in a position to give us any information as to what was saved by those remissions? No.

115. *Mr. McGowen.*] Supposing the lowest tenderer had received the contract at £10,000 for the ordinary alterations, not counting the extras, would he have been bound to finish within a specified time? Yes.

116. Did the Department finish it in that specified time? No; I am sure we did not.

117. *Mr. Bavister.*] Would you have done so if there had been no extension of the work? No; and I do not think the contractor would have done so either.

118. *Mr. McGowen.*] If the contractor were under a penalty would he have had to pay a fine, or would he have had legitimate cause for an extension of time? It is almost certain that he would have had the penalties remitted. He would have been allowed time, especially as it would have been for the convenience of a Government Department.

119. *Chairman.*] Do you attribute the extra time taken entirely to the needs and requirements of the Printing Office? Yes, and also to the fact that the scheme was altered considerably.

120. Had you any difficulty in obtaining labour or material, or in proceeding with the work during the year? No.

121. Was the delay entirely due to departmental reasons? The delay was due to the fact that there was nothing to be gained by hurrying the work. In fact, there was a good deal to be lost by hurrying, because we would have inconvenienced the Printing Office and would have upset their work. We made that the first consideration; we did not consider the question of time.

122. *Mr. Ball.*] Under the circumstances, could you only put on a limited number of men, as you had to work in with the Printing Office? Yes.

123. *Chairman.*] Did you have any experience outside the Government Department in architectural work and in supervising buildings? Yes. Before I joined the Government Service I had eighteen years' experience. I have been in the Government Service seven and a half years.

124. In your experience, have you found that works involving alterations and additions are more expensive to carry out, and more unsatisfactory both to the contractor and the proprietor, than the erection of new buildings? I think they are much more unsatisfactory to the proprietor, but I am not quite so sure about the contractor. If a contractor gets into an old building like this he thinks he has a very good chance of making money.

125. Would there be considerable difficulty in estimating his price for a job of that kind, in the first instance? He has quantities, and if they are not correct he will have a claim.

126. *Mr. Ball.*] Was this contract called for on a bill of quantities? Yes; I will produce them at the next meeting.

A. S. Cook, Esq.

7 July, 1897.

127. *Mr. McGowen.*] Do you think, beyond a doubt, that this work was done cheaper and was more satisfactory to the Government than it would have been if carried out by a contractor? Decidedly so to the Government.

128. What are your reasons for thinking so? The conditions of contract now contain a minimum wage clause. They also contain a clause against subletting labour. Once these two conditions are attached to a contract, I do not see how it is possible for a contractor to do work cheaper than it can be done by the Government.

129. *Mr. Bavister.*] That is, if they supply material of the quality and quantity specified? Certainly. The Government buy under annual contracts cheaper than the average contractor can purchase. The Government buy large quantities ridiculously cheap.

130. *Chairman.*] Do you believe that there is more competition for the Government trade, and that material contractors cut prices? Yes; and there is the sureness of the money to be considered. There is no allowance to be made for bad debts. It is nonsense for a contractor to say that one man is not as good as another for carrying out the work. One foreman is as good as another if you pick him. The mere fact of his working for a contractor does not make him better than if he is working for the Government.

131. *Mr. Ball.*] That is if he does not do the Government stroke? He is not likely to do that.

132. *Chairman.*] Were you satisfied with the men employed, and did you make the selection of the mechanics and labourers? Yes, with the foreman. The foreman would have the selection to a great extent. A workman might come to the office introduced by anyone—from the Under Secretary downwards. He might come with a letter written, say, by a Member. It would be sent on, and, eventually, come to us. When we first started this work there was a regulation that all names should be entered in a list, and that the labour required should be taken from that list according to the order of precedence. That went on until, I think, the end of 1896, when there was something like 2,000 names on the list, and there was no probability of anyone upon it being employed. The Government Architect then got the Minister's approval to do away with the list. It was of very little use, because a supply of labour had been obtained, and there were very few changes.

133. Would there be many names on the list of men who were not actually unemployed, but who were desirous of getting on Government work? Yes; and towards the end of the period, if we wanted four men we might send three telegrams and not get them. They gradually got on to something else or went up country, so that the list was a nuisance.

134. *Mr. McGowen.*] Did you reserve to yourself the right, if a man was not up to the standard, to dispense with his services? Yes; that man went at a moment's notice.

135. As a matter of fact, did you get the very best men procurable for the money? Yes.

136. *Mr. Ball.*] Did you find a difficulty in getting men? Yes; a great number had left the country or had got work, and the list was of very little use.

137. *Mr. Bavister.*] Is it not a fact that the men understood they were not to leave private employment to go into this Government employment, and that if they did such a thing they would be discharged? It was done in one case. I think there were two masons working at the city markets, and there was a case of that sort. We finally put on the telegrams "if not otherwise at work."

138. *Mr. Ball.*] In carrying out this work did you go according the specifications, just as a contractor would have done? No; we had no formal specifications. We had the original specifications, but the plans were all altered.

139. What was there to guide you? We had a pretty full set of plans.

140. But you must have had a specification? No; there were one or two sub-contracts where specifications were necessary. There was a sub-contract for the construction of an iron roof, and also for metal coverings.

141. In carrying out the work, you had to carry it out according to some plan or specification;—was it carried out rigidly according to the original plan and specification which a contractor would, of course, have to work to? No; a specification in the case of a contract is absolutely necessary, but with day-labour it is not so necessary, because everyone connected with the work knows what has to be done by the plan, and they do it in the best manner possible.

142. Did they do it in the best manner possible? That will be best seen by a visit to the work.

143. But is not a great deal of the work now covered up? None of it has been scamped.

144. *Mr. Bavister.*] Are not joists of a specific kind named in the conditions;—was the same weight put in the work as actually carried out? No; we used steel all through instead of iron joists.

145. While the material was of lighter construction, was it as strong and serviceable for the purpose as iron, and was it as valuable on the market? Yes; and it was more expensive on the market.

146. *Chairman.*] The cost of the work as carried out is put down as £17,306; in the comparative statement you put down the lowest tender at £10,835, and the office estimate of additional works, £6,172, making a total of £17,007;—I want to know if the whole of the work specified in the original contract was carried out, or if, in computing the cost of extras, allowance has been made for any deductions from the work originally specified? No; we considered ourselves bound by the Government Architect's report, in which he said that the amended plans could, in his opinion, be carried out for the amount of the lowest tender—£10,835. We considered that £10,835 was thus made our estimate of the amended plans.

147. Can you tell us now whether the whole of the work which the tenderer offered to do for £10,835 was actually carried out by you? I cannot tell you until we get the quantities. I do not know what the quantities were; but I feel sure in my own mind that we have done a great deal more work than was contemplated in the original specifications. The quantities are being taken out of all the work done at the Printing Office, except the extras.

WEDNESDAY,

WEDNESDAY, 14 *JULY*, 1897.

Present:—

MR. BALL,	MR. WILKS,
MR. LYNE,	MR. BAVISTER,
MR. McGOWEN,	MR. PARKES,

MR. WILLIS.

F. E. McLEAN, ESQ., IN THE CHAIR.

Arthur Stanton Cook recalled and further examined:—

A. S. Cook. 14 July, 1897.

148. *Chairman.*] Do you produce the original specifications? Yes, with the original plans on which the tenders were called for, also the bill of quantities. I also produce a copy of the schedule prices for stores and services, Public Works Department. I produce a copy of all vouchers paid in connection with the works at the Government Printing Office, showing a total expenditure of £18,749 7s. 10d. The vouchers are taken from the Accountant's books. That, of course, includes items not in the day-labour at all. It includes items in connection with "Grinnell's" Sprinkler and the electric light installations.

149. Do you specify any items included in these accounts that are not fairly chargeable against the work? Yes; I have not extracted them.

150. At present you cannot point out the items, but this is the whole account of moneys expended on the job up to the present time? Yes; up to yesterday, that is all the expenditure.

151. Do you remember that I asked you a question with regard to the data upon which the estimate for additional work—£6,172 15s. 8d.—was based? Yes.

152. Are you able to furnish us with that information to-day? No; I will get you some particulars of some of the estimates.

153. I understand that this amount is composed of items that have been furnished to the Minister from time to time, as the works were required to be done, and as sanction was required to carry out those works? Yes.

154. In what way did you furnish that to the Minister;—did you just give a lump sum required for the work? The original papers have all been put in; the Government Printer requisitioned for anything that he thought was required. We reported that the estimate for that work would be so much. That went on to the Minister, and if it was approved we got it back. If the Minister wanted further information, he got it.

155. Have you got any account showing the actual cost of that additional work as compared with the office estimate? No.

156. Would it be possible for you to get information showing what these additional works really cost? No; we always considered that we must keep as closely as possible to those estimates. We always kept as closely as possible to them, and we have always regarded them as the actual cost of the works carried out.

157. Did you furnish an estimate before you obtained a price from the contractor for doing these additional works. For instance, in some cases I understand there was ironwork and other material obtained from outside? There were two or three sub-contracts for ironwork. Before approval was asked for any of these extra works estimates were prepared as to what it would be, and we obtained tenders from the contractors. If they were reasonably near the estimate we recommended them.

158. Do you know of any case where the actual cost of the work was less than the estimate? I am not prepared with any instance.

159. Would it be impossible to show the cost of every separate work as compared with the office estimate? No; but it would require a great many more hands than I have had to keep the accounts like that. It would really require an accountant.

160. As a matter of fact, have you not an Accountancy Branch which does this work for you? Not for that sort of work.

161. The lowest tender was £10,835; I think you were asked at the last meeting whether you could show what should be deducted from that amount to allow for work that was not carried out? Yes; that will be shown by the actual measuring up which is now taking place.

162. *Mr. Parkes.*] In your contracts do you not make provision for the cessation of work at the contractor's risk? Yes.

163. Would that be in the specification? Yes.

164. Was this a contract by a schedule? By bills of quantities.

165. If a contractor carried out this work, would all the extra work which you put upon him be governed by that schedule of quantities? Only within a certain limit.

166. Is there not a condition in the contract that that is all covered by the quantity schedule? If the items would come under the heading of extra to the contractor that would be governed by the schedule, but if there were extra items which were not in the schedule at all they could not be priced by the prices in the schedule.

167. *Mr. Lyne.*] But if they were material such as bricks, timber, cement, such as were in the schedule, would not the schedule prices govern that? Yes.

168. *Chairman.*] Referring to clause No. 16 in the general conditions attached to this specification, headed "extra works" and omission of works, are you of opinion that the extra work carried out, known as the northern wing, could not have been carried out under the schedule of prices as furnished by the contractor in the bill of quantities? I do not say that it could not have been carried out under the schedule of prices, but allowances would have had to be made for the different class of work and the greater height of the building from the ground. Then again there were a good many things which were not included in the original schedule at all in the northern end, for which prices would have had to be obtained from the contractor, or the contractor would have had to be given carte-blanche, and the matter would have had to be fought out afterwards.

169. *Mr. Parkes.*] For instance, if you lightened the weight of iron in the joists, would not deduction be made from the contractor? Yes.

A. S. Cook. 14 July, 1897.

170. *Chairman.*] Was there any diminution in the weight of the ironwork or girders? If steel is substituted for iron, less steel will do the same work, but then steel is more costly to purchase in the market.
171. As a matter of fact, was there any diminution of weight? I am not in a position to say until the bills of quantities and the actual work carried out are made up.
172. Do you expect that these bills of quantities will be ready next Wednesday week? Yes.
173. *Mr. Ball.*] Was steel used in this case instead of iron? Yes.
174. Consequently there was a reduction in weight? If the steel did the same work as the iron that would be the case, but the plans were very materially altered.
175. Would there be any diminution in value? No; the iron would cost about £9 per ton, and steel about £11 per ton. The steel would do more work than the iron.

Harold Francis Norrie called in, sworn, and examined:—

H. F. Norrie. 14 July, 1897.

176. *Chairman.*] What position do you occupy in the Public Service? Clerk-in-charge of Bonds and Contracts.
177. Does it come within the range of your duty to prepare all the bonds and contracts which are carried out in the Colonial Architect's Department and in other Public Works branches? Yes; in the whole of the Public Works Department.
178. Are you familiar with the conditions that were attached to the tenders for the work at the Government Printing Office? I do not recollect having seen the specifications, but I have no doubt the general conditions are those which have been enforced for some years past.
179. Do you know clause No. 16 in the general conditions relating to extra works? Yes.
180. Does the Department hold that a contractor is bound under that clause to carry out any additional work that may be required at the schedule prices furnished with the tenders? Not necessarily at the schedule prices. If the class of work proposed to be done is an addition covered by the schedule of prices, then the schedule rate will apply; but if it is not of that class provided for in the schedule prices with the original contract, the architect or engineer, as the case may be, enters into a separate contract with the contractor,—I think it is set out in the latter portion of the clause. They arrive either at rates or a lump sum for the work.
181. Do you know that it is the practice of the Colonial Architect's Department to issue bills of quantities? I do not know that it is the practice; it has been done in some cases.
182. Do you know if it was done in this case? No.
183. But in cases where bills of quantities are supplied, the contractor's prices in that bill of quantities are binding upon him in carrying out extra work under the conditions you have already stated? Yes; I think that it is provided in the contract that any additions or deductions shall be paid for in accordance with the prices in the bill of quantities.
184. Would the magnitude of the alteration or addition release the contractor from any obligation to carry out the works according to the schedule prices? I think it might. If a building were specified in the first instance to cost £500, and you put up as an addition a building which would cost £10,000, I do not think that in such a case that clause should apply.
185. *Mr. Parkes.*] Then the contract would be no good? I do not think an addition of that kind where practically a new building is erected alongside the building originally designed could fairly be met by the clause referred to.
186. After a man signs the contract is not that the contract? If that were so, according to the illustration I have given, you might put up a third building under that clause.
187. Must not the contractor take the risk when he signs the contract? I do not think a Court of Equity would hold him to it.
188. What is your experience with regard to extras;—have they been based on the original contract with the schedule? On most works of magnitude there is a schedule of prices, and the extras are based on that.
189. *Mr. Ball.*] In this particular case was the contract sent in with the bill of quantities? I do not know anything about this case as a matter of fact.
190. Do you know if this case is similar to that of the Kenmore Asylum, at Goulburn, where the work was done on a bill of quantities? At Kenmore work was carried out on a bill of quantities, but I do not know anything about this case. The practice is that tenders are invited; they are opened and sent on to the Board of Reference, and if the Board of Reference recommends the acceptance of a tender, it comes on to me to prepare a letter of acceptance and to carry the contract through; but if a tender is not accepted I do not see it and do not bother about it.
191. Where a tender is accepted, and there is a bill of quantities, is the contractor paid according to that bill of quantities? The contract is really not accepted on the bill of quantities; a lump sum is named in the tender.
192. Is not that only for comparison;—do they not send in a bill of quantities on which they are paid? No; the contractor may carry out less work, deductions are made from the lump sum, and if more work is carried out, an addition is made.
193. *Mr. Lyne.*] Is not this the usual course: That tenders are invited for a contract; it is specified what the work is; the contractor estimates what it will cost; he sends in his tender on that estimate, with a provision that, according to the schedule rates, if there is not so much work done, or if more work is done, there shall be a decrease or an increase? Yes, that is the course.
194. *Mr. Ball.*] But that is not the course under a bill of quantities? Yes.
195. *Chairman.*] Is not this the difference: That with a bill of quantities the contractor's own prices in his bill of quantities are the basis on which he is paid? Yes, as a schedule of prices. In most cases there are arbitrary prices fixed in the office, the contractor tenders at a lump sum, and he is to be paid for any extras, additions, or deductions either at the office prices or at a percentage above or below; but with a bill of quantities he fixes his own prices.
196. *Mr. Lyne.*] Does it not work out in the same way? Precisely.
197. *Chairman.*] But it is not usual to obtain that bill of quantities priced until you accept the tender? The tenderer undertakes when he sends in his tender to send in a bill of quantities with the tender, so that he shall not make up his prices after he knows his tender is accepted.

198.

198. As a matter of fact, has it been a practice of the Department to receive a bill of quantities duly priced with the tenders? I do not know; I am never in the tender room. H. F. Norrie. 14 July, 1897.
199. *Mr. Parkes.*] At all events the quantities are not made up after the tender is sent in? No.
200. *Chairman.*] Do you mean the quantities are not made up after the tender is furnished, but the prices are not furnished as a rule until the tenderer has received notice of the acceptance of his tender? We always have a bill of quantities in before the tenderer gets an acceptance of his tender.
201. You do not get it with the tender? I do not know, because I am not present. I have nothing to do with tenders until they are recommended for acceptance by the Board of Reference, and are approved of by the Minister. As soon as that is done they come on to me.
202. *Chairman.*] Have you any knowledge of the particular subjects under inquiry, and the carrying out of the work? No, except with regard to the material. I remember preparing some contracts for material. The girders were obtained by contract from Barre, Johnstone, & Co. I think Mr. Saunders had the contract for the stone. The bricks were also contracted for, or quotations were obtained so as to get them at the lowest price.
203. *Mr. Lyne.*] Was there any contract for cement? I cannot say from memory.
204. *Mr. Parkes.*] I presume the timber, cement, stone, and iron were contracted for? I have no doubt that that was the case.
205. *Mr. Ball.*] As a matter of fact, is there any limit with regard to deductions or additions in a bill of quantities;—that is to say, can the Department take off or add as much as they like;—could they reduce a building by one-half, or could they make it double the size? I think so. With respect to deductions, I would draw your attention to clause 17 of the general conditions.
206. The contractor will still be bound by the quantities? Yes.

James Andrew Eaton called in, sworn, and examined:—

207. *Chairman.*] Are you a contractor by occupation? Yes. J. A. Eaton. 14 July, 1897.
208. Do you remember tendering for a certain work at the Government Printing Office some time ago? Yes; I put in a tender for about £10,835.
209. Have you a bill of quantities duly priced in connection with that tender? Yes, I have a bill of quantities; I will produce it at a subsequent meeting.
210. Are you familiar with the conditions and terms of that contract? I was willing to contract under the terms of that contract, but I cannot remember them now.
211. Have you read clause 16 of the general conditions dealing with extra works and omissions? Yes; that is in the bill of quantities. According to the tender sent in the plans, specifications, and bill of quantities all form the contract.
212. No bill of quantities priced has yet been furnished to the Department? No; if my tender had been accepted I had to furnish a bill of quantities according to the terms.
213. Would you consider yourself bound under that clause of the conditions to carry out any extra works that might have been found necessary at the rates mentioned in your bill of quantities? Yes; I consider I would have to do them, and that I would be paid at those rates.
214. Have you had much experience in Government contract work? Not a great deal.
215. Have you ever carried out a Government contract under similar conditions? No.
216. Have you carried out any private work under conditions like those in the bill of quantities? No; private architects never give bills of quantities like that. A private architect will make you give a schedule for extra works; for instance, concrete, stone, or brick foundation. No matter what you have to do, you are paid by that. If I have to go 4 or 5 feet deeper in making a foundation, I only get paid at my schedule rates.
217. When you tendered at £10,835, did you regard the market as being a favourable one? I tendered at the market rates.
218. Did you regard it as a rising or falling market? I do not think it has risen or fallen much, or that the price of labour is altered.
219. Supposing that you are not bound by any schedule prices, and you had to submit a fresh tender for extra work, was there any alteration in the regular wages or the price of material which would make that tender proportionately higher than the old one? No; there was no rise in prices; I would have agreed to obtain all materials at a certain price as soon as I got an acceptance of my tender.
220. Take some leading line, such as cement;—was there not a considerable reduction in the price of cement about the middle of 1896? I do not think there was any reduction; the price I put in my tender was 10s. 6d. a cask.
221. Is that about the price to-day? I am buying the dearest cement in Sydney at that price now.
222. Do you think there is any material alteration in the rate of wages? No; because there is a minimum rate of wages specified. Wages have not gone up since.
223. *Mr. Wilks.*] The minimum is the maximum? Yes, whatever you like to call it.
224. Do you pay higher wages than the minimum rate? I am paying higher rates than the minimum ever was, and I was paying higher rates then to some of my men.
225. *Chairman.*] What I wish to get at particularly is whether there was any movement in the market with regard to wages or materials which would have made that building more expensive during the progress of the works? No; except in the case of bricks, which have gone up about 2s.; but only very lately. Of course that would not have made any alteration to me, because I would have made my arrangements for the completion of the job.
226. Have you any knowledge of the work carried out at the Printing Office? No; I have taken no notice of it.
227. *Mr. Wilks.*] With regard to the price of materials which would have been used, would you not have arranged for a supply beforehand, and is not that the practice of all contractors? Yes.
228. If there was any fluctuation of prices during the progress of the works, that would not affect you? No; the majority of contractors arrange at the beginning for cement, iron and bricks, timber, and articles of that kind.
229. *Mr. Parkes.*] When you applied for your tender, were you given a schedule form? Yes.
230. What did that schedule form contain, was it quantities without prices, or prices without quantities? Quantities without prices, with a money column, to be filled in.

J. A. Eaton. 14 July, 1897.

231. When you filled up those prices did you do it on the sheet which you intend to produce to the Committee? Yes.
232. Will you swear that you did not alter it since? Yes; it is the original one.
233. If you signed a contract under a Government bond, and there were extra works to the amount of 100 per cent., would you have been content to carry them out at the schedule rates? Yes. I am bound by the schedule attached to the specification.
234. Are you aware that in your contract there was a clause in the specification given to you making it obligatory on the part of the contractor to finish the work within a certain time in spite of all obstacles? Yes.
235. So that if the Government Printer interfered with the contractor he was still bound to time? Yes. He was bound to finish one end in six months, and he had to stop his men and his staff when requested. He was not to interfere in any way with the business of the Government Printing Office.
236. When you sent in your tender what occurred? Some three or four weeks passed before I received a reply. I called and got back my deposit money.
237. Did you ever ask the reason why the Government did not accept the tender? No. When I got a notice from the Government to come and get my deposit I inquired at my Bank when my cheque for £110 had been put through. It was put through about two days after the tender was put in. I went down to my solicitor to see if I could not force the Government to give me the job as they had cashed my cheque and held it for some time.
238. Did you remonstrate with the Government at all? No; when I went down to the Department for the cheque they wanted to know if I had anyone who would recognise me as Eaton, and I said I would not get anyone; that I wanted the job as they had held my money. They said they had nothing to do with it, and that I would have to go to higher quarters.
239. Did you ever make an appeal to get the work? No.
240. Were you ever in correspondence with the Department? No.
241. Would you have been content to take up the work for the price you tendered? Yes. I went to my solicitor to see if I could not force the Government to give me the work.
242. If there had been a reduction in the material in your original contract would not that be reduced? Yes, according to my schedule.
243. Here is a sketch marked "A"—is that the plan you tendered from? I cannot say unless I had the original plan.
244. Have you a copy of the original specification? No; only my quantities.
245. Looking at these plans, are they, in your opinion, the plans you tendered from? They are very much like them, but I do not think this is the elevation I saw in the office.
246. If you saw the works would you be able to make a comparison between them and the works you tendered for? Yes.
247. If you had the specification could you tell if that was the same specification you tendered for? No.
248. If you had time to peruse it do you think you could tell? Yes, with the bill of quantities.
249. *Chairman.*] Do you really know nothing about what has been done at the Government Printing Office? Yes.
250. *Mr. McGowen.*] When there are extras on the contract do the bill of quantities and the specification generally cover them, and is the contractor compelled to charge for those extras according to his bill of quantities? Yes.
251. Did you ever carry out a contract where the schedule or the bill of quantities did not cover all the extras. For instance, in this building there is a staircase from the top to the bottom which is not covered by the schedule or bill of quantities by specification;—what would you do with regard to that? If it was a wooden staircase on the same principle as was mentioned in my bill of quantities, I would have to do it at the schedule rates.
252. We have evidence that these stairs were not covered;—what would be the case then? If the staircase were of iron I do not think the bill of quantities would cover it, but if it was a wooden stairs the bill of quantities would cover it.
253. Suppose the staircase were a circular one and we have evidence that it would not be covered by the bill of quantities? The only way in which I can answer is, that if they were a wooden stairs and similar to the one shown on the plan, it would be covered by the bill of quantities. If there is a landing or the stairs are circular going right up, it would not be covered by the bill of quantities, because it would be quite a different kind of stairs, although made of wood
254. Under such circumstances what would take place? They generally agree about a price before they go on. I would do so in my own interests.
255. Have you ever done any Government contracts before? No.
256. Have you ever heard of the contractor doing the work and putting in his claim afterwards without an agreement with the officers of the Department? Yes.
257. *Mr. Lyne.*] Was that where work had been ordered by the Department? Yes; when there is a schedule they generally agree as to what shall be charged.
258. *Mr. McGowen.*] We are talking of a case where the schedule does not cover the work. I have given an illustration in connection with the staircase. Have you known of cases where the contractor taking the risk, because he has got the order, would erect, say a staircase not covered by the schedule purely an extra and then make his charge afterwards fixing the price after the work is done? Yes.
259. We will take another illustration. The contractors would put up in a certain price for ordinary brick or stone work in the northern end of the building. That would come under the schedule, but an addition might be made to the work much higher up than the work was tendered for;—would that be an extra or would your schedule cover that, or would you put in a fresh tender, or would the Government be at the mercy of the contractor? If the new work joined in any way with the work tendered for it would come under the schedule.
260. He could not claim for an extra although the work would be higher up? If it joined the work done under the schedule it would be covered by the schedule.
261. *Chairman.*] Suppose you had to put an additional storey to the building, and the brick and stone had to be carried much higher, would you still be bound by the price in the schedule? I do not think so in the case of a clear additional storey.

J. A. Eaton. 14 July, 1897.

262. *Mr. McGowen.*] Suppose a case of this kind: The schedule covers two rows of stonework, but a third row of stonework is ordered;—what would you do there? I say that would be covered by my schedule.
263. Supposing that in the carrying out of this contract the exigencies of the Government Printing Office were such that the Government Printer would say to you, "Your men cannot work in a certain place to-morrow or this week,"—would you have a claim against the Government? I would not, according to the agreement under the conditions.
264. *Mr. Lyne.*] On account of that having been provided for in the conditions? Yes.
265. If it had not been provided for, would you have had a claim? Yes.
266. *Chairman.*] Did you put that in in your bill of quantities as a risk to be provided for? Yes.
267. Did you place a value upon it? I do not think I did. I reckoned that the job was large enough to enable me to shift my men from one place to another.
268. Can you tell whether the risk of employers' liability was an item in the schedule? I believe it was.
269. Can you say from memory what you would value a risk like that? I always insure my men against contractors' liability to the amount of £500 individually. I never charge for that in my contract; I would sooner pay it out of my profits than run the risk.
270. Do you take it as an ordinary trade risk? Yes.
271. You were asked with reference to a staircase which would not be covered with by the bill of quantities;—in such a case do you consider the Department would be bound to accept your price whatever it might be, or would they not have the right to call for other tenders and do it at the lowest tender? Yes; they have that right.
272. They could not really be at your mercy in a matter of that kind? No. Even supposing they told me to do it, and I did it, and afterwards charged more than what they considered would be a fair value, according to my experience the architect would say, "Let me look at your quantities; I will go through them"; then he will say, "I estimate this as worth so much, and that is all I am going to pay."
273. *Mr. McGowen.*] Would you accept his estimate and withdraw your claim? Generally; I have never had any trouble.
274. *Mr. Parkes.*] Does not the Government Architect under these contracts act as final judge with regard to value? I believe so; he has more power than a private architect.
275. You must abide by his decision as sole arbitrator? Yes; the Government Architect is final judge as to price and quality.
276. *Mr. Ball.*] In arranging to do this work, I presume you contemplated doing it in your own way—that is to say, in putting a man on a job you would put him on that class of work which he is best able to carry out, and you would carry out the work in your own way? Yes.
277. You would not anticipate that the Department would interfere as to how you would carry out the work? I anticipated that the Department could stop the men for a time if they were making too much noise or interfering with the machinery.
278. You did not contemplate that the Department would have power to say that you should work your men in any particular manner, but that you should do the work in your own way? No; I always carry out the work in the way which I think will be to the best advantage.
279. You anticipated no interference by the Department except that they would have power to say that you should stop work for a time? Yes; they might say in the evening, "You cannot make a noise here after 9 o'clock in the morning." Of course I would only have to pay the men for the time they were working.
280. *Mr. Parkes.*] Is it the custom of the Government to exact a money bond or personal surety for the safe and proper conduct of the works? In this contract I had to pay 1 per cent. with the tender. I put in a cheque for £110. If my tender had been accepted I would have had to furnish 5 per cent. cash bond for the due fulfilment of the work.
281. That was to cover any carelessness on your part? Yes; and there was also a big percentage.
282. How long would the Government hold that money after the contract was completed? I had to guarantee the work for twenty-six weeks. They had power to hold 5 per cent., and also 20 per cent. until that time.
283. *Mr. Lyne.*] Have they power to hold that money until your work is passed? For six months.
284. *Mr. Parkes.*] Have you, as a contractor, any anxiety as to the carefulness of the working men? No I do not think there is much anxiety.
285. You have to keep careful supervision? I always have a foreman over each department.
286. You are careful, because there are times when men are careless? Yes; for instance, in erecting scaffolding. In matters of that kind you have to be careful.
287. If a work is carried out by the clerk of works solely, and there is carelessness on the part of workmen, causing heavy loss on account of the necessity for repairs or rebuilding, the contractor has to make that good in every case? Yes.
288. No matter who has charge of the works? Yes; no matter who is clerk of works, or anything else.

David Turnbull Brown called in, sworn, and examined:—

D. T. Brown. 14 July, 1897.

289. *Chairman.*] Are you a contractor? Yes.
290. Did you tender for the work in connection with the alterations and additions to the Government Printing Office? Yes; it was about £11,200.
291. Do you remember the terms and conditions of the contract? Yes; they were in the schedule.
292. Have you a copy of the specification? No; I have a copy of the schedule and the quantities, but I have not got them with me.
293. Can you produce a bill of quantities with the prices attached? Yes; the one upon which my tender was based.
294. You do not produce it now? No.
295. Will you produce it at next meeting? Would not Mr. Eaton, the lowest tenderer, give sufficient evidence on that point?
296. You were the next lowest, and it is possible, if the work were carried out at your prices, it might be less than if carried out at Mr. Eaton's prices? It is a question.

D. T. Brown. 14 July, 1897.

297. Is it not possible for even the second or third lowest tenderer to be lower in the absolute carrying out of the work than the man whose lump sum was the lowest? Not unless there was a lot of extra work put on to the original contract; then it might work out in that way.
298. *Mr. McGowen.*] Would the schedule govern it? Suppose £10,000 or £12,000 extra stonework was carried out, my tender for stonework might be 2s. 3d., whilst the tender of the lowest tenderer might be for 2s. 6d.; in that case my tender might be the lowest.
299. We shall require your schedule at next Wednesday's meeting, and I ask you to produce it. I want to ask you another question with regard to the terms and conditions;—have you ever carried out Government works? I have never had a Government contract.
300. Have you ever supervised any Government contracts? No; I have been the lowest tenderer, but the works have not been proceeded with.
301. Have you carried out private works at schedule prices? No; it has always been done at lump sums. I have never been bound to a schedule or bill of quantities. I have tendered on these, but I have never been successful.
302. Have you any general experience as to the practice of paying for extras? I thoroughly understand extras. In Government work I understand they are always left to the Department or the architect.
303. Can you give any evidence, from your own experience, as to the practice in adjusting accounts for extras? Yes; if there are extras, for instance, in a foundation, when I start the work I inform the architect that there will be extras—it may be a rod or half a rod. I am allowed for it at the current rate according to the prices in the city at the time.
304. *Mr. Lyne.*] Do you always trust to the architect? Those I have worked with have always adjusted my work fairly.
305. *Mr. Parkes.*] Is it not the system with private architects' work to call together the proprietor, the builder, and the architect, and adjust accounts? No; that is a mistake. I will give an instance. I had a contract for about £2,000 from Mr. Wilson, now of the Public Service Board. The extras and the balance of my contract came to about £700. The Chairman said, "Mr. Brown, did Mr. Ellis check this?" I said, "Yes; the red ticks show that." He said, "Very well." He put the account in the drawer and he paid me the amount.
306. In that case the architect was the final adjuster? Yes. If a man has no confidence in his architect he has no right to employ him.
307. What you mean is that the architect is the final arbitrator? Yes.
308. *Chairman.*] Do you know that under these terms and conditions the Government Architect was the final arbitrator in paying for extras? Yes; it would be passed by the Government Architect.
309. Did you tender upon a bill of quantities? Yes.
310. Have you still got that bill of quantities in your possession? Yes.
311. When you tendered did you understand, reading those conditions, that you would be compelled to carry out any extra work at the prices named in your schedule? Yes.
312. If you have to put up an additional storey on the building at a greater height than was shown in the plans and specifications, would you be bound by the prices named in your schedule for the brick and stone work? Yes.
313. The height or the question of raising the stone and bricks to a greater height would not enter into the arrangements? No.
314. You would consider yourself absolutely bound to do the work at the schedule prices? Yes.
315. You believed that thoroughly when you tendered? Yes.
316. If you went up two or three additional storeys, you could not charge more? They could go up as much as they liked and I could not charge any more, but, practically, we know that they do not do such a thing. In a bill of quantities, if that sort of work had to be carried out, and it was not included in a bill of quantities, I could fix my own price. If the architect gave me any work to do which was not in the quantities at all, I could fix my own prices; but the Government Architect would check same, so that I could only charge a fair price.
317. *Mr. McGowen.*] You could go on as long as they made you do the work, and you could charge them what you liked afterwards? Yes, because they had not got them in the quantities.
318. *Chairman.*] Have you had much experience in doing work without the prices being fixed beforehand? I have been doing contract work for eleven years.
319. Have you ever had any experience in carrying out large extras without any price being stipulated beforehand? No.
320. *Mr. McGowen.*] Did you ever hear of a Government contractor putting in his own charges for extra work not governed by the schedule? The duty of a contractor as soon as there is extra work is to inform the Inspector of the Department of it, otherwise he is not doing his duty.
321. Has a contractor any other duty to perform beyond complying with the conditions of his contract? As soon as there is an extra work it is his duty to inform the Inspector of the Department.
322. *Mr. Bavister.*] Can you inform us how the question of extra work arises in private work where no quantities are supplied? That is an easy matter—you draw a plan, and if it is an extra work it can be seen at once.
323. Taking you back to your original illustration of an extra in a foundation, would not that small amount of work be scattered over a large area of foundation;—how would the question arise, and how would you decide the question where there are no quantities? We have a plan which shows a height of 6 feet at the front; then we find there are 6 feet 6 inches. I point it out to the architect, and he says he will measure it. If he finds there is less, he will make a reduction; if there is extra he will make an allowance for it.
324. Are your tenders always subject to a reduction in the event of a less quantity of work being done? Yes.
325. Even when you have given a lump sum in your tender? Yes.
326. *Chairman.*] As a matter of fact, that was so in this case—the reductions were to be made or the extras to be paid for at the schedule prices? Yes.
327. Have you any knowledge of the carrying out of the work at the Government Printing Office? Nothing beyond seeing the front of it. I know nothing about the inside of it.
328. From your observations of the building as the work is being carried out, is it the same as was originally designed and shown in the plans? No.

329. What considerable alterations do you notice? In connection with the parapet and balusters. D. T. Brown.
330. Do you recognise the sketch marked "A" as the work originally specified? Yes.
331. Do you recognise sketch "B" as being a true sketch of the work as carried out? Yes. 14 July, 1897.
332. Can you show us anything in the work as carried out which you do not think fairly comes within the original plan? The original balusters are not in the work as carried out; the labels on the pediments are not carried out.
333. *Mr. Lyne.*] These things were in the plan on which you tendered, but they are not carried out? Yes.
334. *Mr. Parkes.*] Do you produce a rough sketch? Yes.
335. Is it a tracing of the plans? Yes.
336. Therefore it is a true copy? Yes, of a portion of it.
337. *Mr. Bavister.*] Seeing that in this work provision had to be made to enable the operations of the institution to be carried on without interruption, and that machinery had to be protected, was any specific sum included in your tender to meet that contingency? We did not allow anything for that.
338. *Chairman.*] But the contract provided that you were to protect the machinery, and not to interfere with the work of the Department? Yes. According to our contract we had to build one half first, and the other half afterwards. The Department were over the whole building at once.
339. *Mr. Parkes.*] Were you bound to complete the work within a certain time? Yes.
340. *Mr. McGowen.*] You were not to interfere with the workmen? No.
341. Yet, in putting in your tender, you did not make any allowance for being stopped for a week or a fortnight? No; there was plenty of room there for the workmen if they were stopped at one part to go to another. Of course there is a contingency fund of £500 to meet any unforeseen work.

WEDNESDAY, 21 *JULY*, 1897.

Present:—

MR. BALL, MR. BAVISTER, MR. WILKS, MR. McGOWEN, MR. PARKES.

F. E. McLEAN, ESQ., IN THE CHAIR.

James Andrew Eaton, recalled and examined:—

342. *Chairman.*] Is there anything you wish to add to the evidence you gave last week, or any explanation which you desire to give in connection with that evidence? The only addition is with reference to the statement I made that I could not give evidence unless I had full permission to go all over the place with some assistance to measure up. J. A. Eaton. 21 July, 1897.
343. Have you visited the Government Printing Office since the last meeting of this Committee? I have not been inside.
344. Have you made any measurements or any inspection of the work as done? I have made an inspection of the outside; but it was of no use to me to go inside to measure unless I had assistants to help me.
345. *Mr. McGowen.*] Did not the Committee give you permission to get the assistance of your foreman? No, the letter was for myself. I said at the time that I could not afford to take my foreman with me and that I wanted a builder.
346. *Chairman.*] From your observation of the outside of the building, did you see any considerable deviation from the original plans and specifications? Yes.
347. Can you give the Committee a general idea what alterations there have been in carrying out the work? There are nine windows to each street with a square head, according to the plans and specifications and the quantities. They had to be cut off below what we call the knee, but they have left that on and have just planked on a piece on the top. There is a difference of 55s. to 60s. per opening of saving. There are nine on each street.
348. There are eighteen openings altogether? Yes; that is including the brickwork they would have to alter, and the difference in the work on the stone that would have to be done.
349. Anything further? It is specified that the roof is to be of interlocking zinc tiles. Instead of that, they have put on old slates, which, I suppose, they have taken off the roof.
350. How many slates would there be on the roof? According to the schedule there are sixty-eight squares, 100 feet to a square, which would make altogether 6,800 square feet.
351. What would it cost to cover that amount of roofing as specified in new materials? £221.
352. *Mr. Parkes.*] How much a square? £3 5s.
353. *Chairman.*] I understand that is for material only? Zinc tiles complete, no timber. (Fixed complete, no timber.)
354. Zinc tiles were specified? Yes.
355. And they have put on old slates? Yes.
356. Can you give any estimate of the value of the same work in old slates—material only? It would be rather difficult to do so. Supposing that the Government acted as contractors, and they allowed nothing for the old slates, it would make that much difference in saving.
357. In your opinion, is it a cheaper job than that specified? Yes; it is a far cheaper job.
358. *Mr. Bavister.*] Would not the old slates have been owned by the persons doing the work? According to the specification, the old slates were to belong to the contractor.
359. That is the same thing; we must assume that the old slates were the contractor's without further cost; but he would have had to purchase zinc? Yes; but it is distinctly laid down that no old material of any description was to be used; therefore you would only count the labour and the nails in putting on these slates.
360. The price you have quoted is the cost of the zinc in position;—what would be the probable cost of the nails and labour? £31 9s.
361. *Mr. McGowen.*] What would have been the value of the slates to you for removal? About £18 7s. 6d. That is what I would have got for them from a second-hand dealer. I have sold by auction lately second-hand slates at about 30s. per thousand.

J. A. Eaton. 21 July, 1897.

362. *Chairman.*] Had you been permitted to use the old slates instead of providing the zinc roofing, what difference in your opinion would that have made in your tender price? £170 13s. 6d.
363. *Mr. Bavister.*] Is that the amount you assert has been saved in the method of doing the work by the Government as compared with what it would have cost as you tendered? Yes; according to my schedule.
364. *Mr. Wilks.*] That should be deducted from your tender in order to institute a comparison? Yes.
365. *Chairman.*] Do you know of any other old material having been used on that job? No; you cannot see from the outside.
366. You understood by the specifications and conditions of contract that all new material had to be used by the contractor, and that all old material became his property? Yes; that is in the specification.
367. Do you produce the bill of quantities that you priced in connection with your tender for these works? Yes; I will supply it before the next meeting of the Committee. The Chairman promised that I should be furnished with a blank bill of quantities, so that I could take a copy before handing in my original. This was not furnished to me until 9·20 this morning. I received it by post.

David Turnbull Brown, recalled, and examined:—

D. T. Brown. 21 July, 1897.

368. *Chairman.*] Do you wish to correct any of the evidence which you gave on a previous occasion? I wish to correct a statement with reference to putting up two or three storeys, if required. I wish to say that I could not go up a storey, or anything like that, without being paid for it. I would go up 5 or 6 feet, so long as it did not interfere with the scaffolding; but I would not go up a storey.
369. These corrections which you have made in your evidence of last week are all answered by the evidence you have just tendered? That is right.
370. Will you produce your bill of quantities before the next meeting of the Committee? Yes.

THURSDAY, 29 *JULY*, 1897.

Present:—

MR. BALL, MR. BAVISTER, MR. PARKES, MR. WILKS, MR. McGOWEN.

F. E. McLEAN, ESQ., IN THE CHAIR.

Arthur Stanton Cook, recalled, and further examined:—

A. S. Cook. 29 July, 1897.

371. *Chairman.*] Do you produce the quantities of the work carried out at the Government Printing Office? They are not ready yet.
372. Who is taking them out? Mr. Evans, a quantity surveyor. He had two men with him before this inquiry started.
373. Are those assistants Government officials? Yes.
374. Is Mr. Evans in the service of the Government? Yes.
375. When do you think he will have the quantities ready? He assures me he will have them by Monday week. I told him that he had better attend here this afternoon and explain the position.

William Thompson, called in, sworn, and examined:—

W. Thompson. 29 July, 1897.

376. *Chairman.*] What is your profession? Quantity surveyor.
377. Are you an architect and quantity surveyor? Yes. I have practised as an architect, but I am now a quantity surveyor to the Builders' Association, and as such must confine myself to quantities exclusively.
378. Are you engaged by the Builders' Association? I am under a bond to them. Three or four years ago they appointed two, and I was one of them.
379. Under that bond, do you furnish quantities to the members of the Builders and Contractors' Association? Yes.
380. At a scale of charges? Yes; at a percentage.
381. Does your bond guarantee the members of the Association against any loss in using your quantities? Yes.
382. Do you still hold that position? Yes.
383. Were you employed by the Government to take out the quantities in connection with the proposed alterations to the Government Printing Office? Yes.
384. Was that entirely outside your private contract with the Builders' Association? Yes; but I was employed through holding the position I did with the Builders' Association.
385. That is to say, it was understood by the Government that your quantities would be accepted by the contractors? Yes.
386. What arrangement did you have with regard to fees? One per cent., and 7s. 6d. per page for lithographed copies. That is the orthodox fee.
387. Was that paid on the amount of the accepted tender, or on the estimated cost? On the amount of the lowest tender.
388. In the case of a tender not being accepted, would you be paid on the amount of the lowest tender received? Yes.
389. Then you were really paid about £100 by the Government for that work? Yes.
390. Are you acquainted with the terms and conditions of the contract upon which these tenders were invited? Yes.
391. Do you know the general conditions issued from the Government Architect's Department? Yes.
392. In the event of any additional work being required—say the addition of another storey, or the addition of another wing to the building—would the successful tenderer be compelled to carry out that work at the schedule of prices furnished according to your bill of quantities? I do not think so, in the case of

any

any sweeping alterations of the plan. The schedule prices are more to cover unavoidable extras; otherwise a new building might be put up altogether.
393. *Mr. Parkes.*] Supposing there was an amount mentioned for ordinary brickwork, and that was exceeded by 20 rods, would not that be paid for at the schedule rates? Yes; if on the same building.
394. Supposing they had a stone cornice, stone course, and stone sills, would the schedule apply to that? Yes.
395. *Mr. Ball.*] Practically, any work done in the same building would be covered by the schedule? Yes.
396. *Chairman.*] Are you acquained with the work done at the Government Printing Office? No; I have simply seen it from the street.
397. Looking at it from the street, could you tell if there had been any considerable departure from the original design? Yes; the design has been materially changed.
398. Do you know that there has been an extra work, called the northern wing, added to it? Yes; that was quite outside the contract.
399. In your opinion, would a contractor have been compelled to carry out that work at his schedule rate? That is what I am doubtful about. It is practically going into another building. It is not like the same building. That building was not to have been touched at all under the first contract.
400. Have you ever been employed in arbitration cases where contractors, proprietors, and architects disagreed? I have been, but not recently.
401. Do you practice as an arbitrator in these disputes? Yes.
402. What is your general experience with regard to extra work;—does it frequently lead to disputes, or are those matters usually adjusted amicably between proprietors and contractors? They do have occasional disputes.
403. With regard to Government work, are there frequent disputes between contractors and the Government Architect's Department? No; I do not think they can very well have disputes now under the system of schedules, because they have the prices there, and it is not easy to get away from that, and the price is the chief source of dispute always.
404. But with regard to such extra work as that referred to at the Government Printing Office, could there not be a dispute there between the contractor and the Government Architect as to his liability under the contract, and his obligation to carry out extra work? If it were in the same building, he could not possibly object.
405. It has been stated that there was about £6,000 of extra work done at the Government Printing Office, including the addition of the northern wing;—do you think that that work could have been forced upon the contractor, or do you think that the Government would have been compelled to call for fresh tenders for the carrying out of that work? That is the point I am doubtful about, because that addition to the north wing is practically in a separate building. I do not know that the contract would cover that; but any alteration of the old building would, of course, have come under the schedule.
406. From the contractor's point of view, do you think he would be justified in declining to go on with an addition like that under the terms of his contract? I think that is rather a legal point, and would hinge upon the fact whether or not that north wing could be considered a separate building.
407. Do you prefer not to give a legal opinion? Yes.
408. Have you estimated any of the quantities of material that would be required to carry out that work, according to your measured quantities? No.
409. Would it be possible for you, as a quantity surveyor, to estimate the quantity of materials that would be required to carry out that work, either under the original contract, or the further extension? Yes.
410. That is to say, you could deduce from a bill of quantities the actual measurement of the material required to complete the work? Yes; decidedly.
411. *Mr. Ball.*] Did you mention just now that you took out the quantities for the Builders and Contractors' Association in connection with this work? No; not for the Builder's Association, but the Government Architect wrote to me and instructed me to prepare a bill of quantities.
412. Did you take out the quantities for the Builders and Contractors' Association? No; I was employed directly by the Government Architect. Each tenderer was given a schedule, and used it for the preparation of his tender. The successful man was required to furnish his priced bill of quantities, in order to have it annexed to and made part of bond.
413. There was no necessity for the Builders and Contractors' Association to get the quantities taken out? No; they got them at the office.
414. Did all the tenderers tender on the same quantities? Yes.
415. *Mr. Wilks.*] Did you state, from viewing the buildings in the street, you noticed that the design had been materially changed? Yes; the mode of carrying out the work had been changed. There were zinc tiles in the front, but slates have been used, and the elevation has been changed. The windows have been altered.
416. Would the change of design cause more expense, or would it lessen the cost? As far as the roof is concerned, the slates would be much cheaper than tiles, but I cannot say with regard to the stonework without going into it. There was, however, a balustrade in the original, which would have been very expensive, as each baluster would be worth about £1.
417. Would the change lessen the cost, or increase it? As far as the external appearance is concerned, the change would lessen the cost; but, perhaps, for all I know, more accommodation was gained, and thus one thing might balance the other.
418. *Mr. Parkes.*] Did you price up any of the schedules for any of the buildings? No; I certainly never do when acting in the capacity I did. I do this simply in case I am employed by one particular individual.
419. Supposing the work was carried out by day-labour by a private individual or a public institution, is it not more costly to supervise day-labour? Yes; you have to watch every stage of it. If you found out that a builder had done something wrong, even a month afterwards, you could compel him to rectify it.
420. Have directions to be given to the workmen? Yes; the architect generally charges 7½ per cent. for supervising, &c., day-labour, on account of the extra trouble.
421. Have you studied contract systems? No, not specially.
422. Do you know whether the direct employment of labour has been tested previously in other countries? Yes; but I can only speak from general reading on the subject.

W. Thompson. 29 July, 1897.

423. *Mr. McGowen.*] Do you say that it is more costly to supervise the work done by day-labour than it is to supervise work done by the contract system? It is; and, as a proof, architects charge 7½ per cent. for that, and 5 per cent. for ordinary supervision; so that they really charge 2½ per cent. additional.
424. Would it necessarily cost the Government more to do this work at the Government Printing Office by day-labour than to do it by contract? Yes, in the supervision.
425. In what way? It would take a great deal of time in lodging the orders for material and giving directions, in ordering stone, timber, and such things, and checking the accounts. Under the ordinary system, nothing of that kind is necessary; the builder does that.
426. But if the work is done by the contract system, the same work would have to be done by the contractor? Yes; he would order his material.
427. In putting in his tender, would he make any allowance for that? They always allow something for profit, and that covers all time employed.
428. In making up their estimates, do they not allow for time for a clerk? No; I never knew anyone to allow anything for that.
429. *Chairman.*] Does not your schedule provide some amount for contingencies? Yes; but in the case of ordered extras simply. That is provided in the specifications.
430. Is there no item in the schedule for general supervision, or some such item as would embrace all those services? For use of plant, a general clause, as a matter of form, is inserted; but certainly nothing for ordering materials, and such services.
431. *Mr. McGowen.*] Do they not make any allowance in the estimates for keeping a man to send out for orders? No; they are rather loose in making up those estimates. A man might add 5 per cent. or 10 per cent. for profit, and some men might add nothing; but all such services as you mention form a charge upon the profits.
432. *Mr. Parkes.*] For management under a system of day-labour, with a supervising engineer or architect, would not the cost be very much greater than if you let the work under the contract system? Yes; decidedly, with the clerical assistance, the timekeeper, and making out orders. That takes considerable time.
433. *Mr. Bavister.*] Would not that expenditure be necessarily included in the tender by the contractor? A tenderer simply adds a percentage of profit to cover what he may estimate as the value of his time.
434. He would not require to add such a percentage if he had not to provide those services? There would be less work to do for the percentage if he had not to lodge any orders. He would simply walk round and see that the work was done. Then he has to pay for his materials, and has to go through his accounts and check them.
435. *Mr. Ball.*] I presume these things are allowed for in the contractor's profits? Yes.
436. *Mr. Bavister.*] The allowance for meeting such a case, where a schedule of prices is worked under, is a percentage spread over the whole thing? Yes.
437. *Mr. Parkes.*] Is there not a difference between Government and private employment, the Government having to keep up a certain staff, whether they have work or not? Yes; a man might not be working up to his full capacity at all times.
438. For that reason it might be possible that the Government could do work cheaper by day-labour than private contractors could do it? They might by making their officers work a little more.
439. *Mr. McGowen.*] In the Government doing the work by day-labour up to the specifications, and on the other hand letting it out by contract, which of the systems to your mind carries the most danger with regard to imperfect work? Of course a builder, if he were not too particular, would, perhaps, scamp work. They are not immaculate. On the other hand, a man doing work might scamp that work to save himself a little trouble.
440. Do I understand you to say that there are more chances of a work being scamped under the contract system? If a builder has not much thought for his reputation he might scamp. They do scamp sometimes.
441. *Mr. Ball.*] Good builders do not do such a thing? A really good builder would not do it.
442. *Chairman.*] How long have you practised as a quantity surveyor? Twelve and a half years.
443. Has that been all in this Colony? Yes.
444. Where did you receive your training as architect and quantity surveyor? In the Colonial Architect's Office in this Colony. I was there for several years.
445. How long altogether have you been in the profession? Seventeen years.
446. Did you gain your first experience in the Colonial Architect's Office? Yes.
447. *Mr. Ball.*] Have you had any experience with regard to day-labour when the work has been connected with a building already put up, such as these additions to the Printing Office? No.
448. Do you think work of that character, connected with the Printing Office, where they have to work in with the business of the office, could be done better by day-labour than by the contract system? That was all stipulated for in the contract. All that had to be done at the builder's risk. It was expressly stipulated that he must not interfere with the business of the Department.
449. Do you think that all contingencies were covered by that? Certainly; I am positive they were. That was very clearly specified. If the builder broke a machine, or killed a man, he would be responsible under the contract.
450. *Chairman.*] Did you provide an amount for contingencies in the bill of quantities? Yes; I provided the amount specified. I think it was £500.
451. Would that amount cover employers' liability? No; that was not the intention at all. That was simply in case of any extra works being wanted. The liability came in under another clause. Under the preamble the builder would have to put down some sum to cover that. If he thought he would have no risk he might put down £10 for that. If he thought there would be a lot of risk he might put down £500.
452. Is there any item in the bill of quantities for employers' liability? Yes; but there was no amount mentioned. That was left to the builder's discretion.
453. The builder would have to value his own risk? Yes.
454. *Mr. Bavister.*] Reference was made just now to the fact that workmen might scamp the work; might not that occur whether the workmen were employed by a contractor or by the proprietor, just the same as under the system of day-labour? Yes, certainly; but in the case of a builder there would be two persons to watch the labourer, namely, the builder (perhaps jealous of his reputation) and the clerk of works.

455. If there were any such danger on the part of workmen, would it not equally exist on contract work as on day-labour? Yes, speaking generally.
456. If the work were done by contract would there not be a double temptation, owing, on the one hand, to laziness or ill-disposition of the workmen, and, on the other hand, on account of the desire for gain on the part of the contractor, who might furnish an inferior quality of material, or neglect the execution of the work? Yes; with a contractor there is always that temptation.
457. That temptation does not exist if there is no contractor? Yes; but not as regards the materials employed.
458. How? Workmen, to save themselves trouble, will scamp work.
459. But I distinguished that clearly? With regard to material it would not exist, because the material is found.
460. Something has been said as to the cost of supervision and the general management of the job;—is it not a fact that in works carried out by day-labour such charges would be concentrated, and would all appear as separate charges? Yes; I suppose they would.
461. Would they not be able to be traced directly through the accounts as having cost so much for the different departments? Yes.
462. In a contract would that be split up—for supervision, clerk of works, preparation of plans—would not those items appear separately? That would be in the architect's 5 per cent., or the general charges of the office.
463. The wages of foremen and supervision generally would not appear as distinct items, but would be grouped under the allowance made for profit by the contractor? Yes.
464. So that it would be a difficult matter to clearly estimate which system is the cheaper one? Yes.
465. Is it not reasonable to suppose that the Government, or any person having large interests at stake, should be able to carry out works as cheaply by day-labour, as far as supervision and management is concerned, as those works could be carried out under contract? Yes; if they had the same control over the workmen, and the right of instant dismissal; but, on the other hand, the Government sometimes profits by the loss of the contractor.
466. Where the Government carry out a work under this system, cannot the person occupying the position of clerk of works be utilised to a much larger extent at the same cost? Yes; it would depend upon the clerk of works.
467. Would not that have a tendency to reduce the general cost of management? Yes; but it would take more than one man to do it.
468. If a work is carried out by day-labour, could he not perform the whole of the duties of clerk of works, and at the same time exercise a considerable amount of supervision over the men engaged in the execution of the work? Yes; he could work one job in that way.
469. Would it not result in a reduction of friction;—for instance, where a contract is being executed, do not the clerk of works and the foreman in charge have differences of opinion? Yes; it is very spirited sometimes.
470. Under the day-labour system there is not so much chance of that;—instead of there being a divided responsibility there is one man there to do the work? Yes.
471. Ought not that to be worth something in carrying out such works? I do not think it matters much as regards the amount of quarrelling.
472. That is a matter of indifference; but where quarrelling exists, is that not detrimental to the work? I cannot say that it is. Quarrelling often keeps men up to the mark.
473. Where the persons entrusted with the supervision and carrying out of the work are not acting in harmony, does not that tend to retard the work, and is it not detrimental to the work? Yes; it may humbug the men to a certain extent in the performance of their duties for the time being.
474. Have you had any experience as an architect, or in supervising such works? Yes; as an architect I have frequently supervised works.
475. What is your experience as to whether it is easier to get alterations from the original plans and specifications under the day-labour system or the contract system? It is a very simple thing under the day-labour system; so it is under the contract system where you have a priced schedule. It is simply then a matter of measurement.
476. In the absence of a priced schedule, and when the work is carried out under contract, is it not the custom for charges to be made by the contractor to which great exception is taken by those concerned? There is no doubt about it.
477. It is seldom that in such cases that the charges as submitted are accepted without question? It depends upon the character of the man you deal with.
478. It is rare to meet a man who will submit such prices? Yes, particularly if a man has a losing job; he likes to make something out of extra work.
479. Having special regard to the work done at the Government Printing Office, keeping in view the fact that owing to the operations carried on at the Printing Office there was likely to be much confusion amongst the contractor's workmen, and might not the person in charge of the Printing Office insist upon greater precaution than the contractor might think necessary, and would not that create contention? They would have to allow the contractor to do as he chose in that respect, because he would be responsible for any damage occurring to the machinery.
480. But might not a further loss occur—that is to say, while no actual damage might take place to the machinery, sufficient provision might not be made to enable the persons engaged in the ordinary business of the office to continue their operations uninterruptedly? That is also specified. The conduct of the office was not to be interfered with. That, of course, would have to be a matter of discretion to some extent.
481. Do you anticipate that the carrying out of that would be attended with considerable difficulty? Of course, to a certain extent, it would be a matter of opinion as to how far the work was impeded by the contractor. If the Government Printer complained of anything I should think the builder would be bound to remedy it.
482. Do you expect that the contractor would be likely to think that the demands for protection were excessive? Yes; but, as far as that was concerned, the builder would suffer if at all careless. As far as the risk was concerned, if he was not sufficiently careful there would be the more danger of his causing damage to property, and much consequent loss to himself.

Arthur

Arthur Foster Evans called in, sworn, and examined:—

A. F. Evans. 29 July, 1897.

483. *Chairman.*] I understand you are employed by the Government Architect's Department as a quantity surveyor? Yes.
484. How long have you been employed by the Government in that capacity? Four months.
485. Are you at present engaged in computing quantities in connection with the work recently carried out at the Government Printing Office? Yes; I have not completed that work yet.
486. When do you expect to complete it? I will do my very utmost to get it done by next Monday week. There is an immense amount of work. The clerical work is exceedingly heavy. I only finished measuring the day before yesterday.
487. What experience have you had in quantity surveying? I learnt my profession under Mr. G. C. Harrison, Grosvenor-road, Westminster, London, I was with him three and half or four years. From there I went to Mr. Arthur Anderson, quantity surveyor, Melbourne. I was with him nearly four years. I have practised in Sydney myself for about six years. Then I was the successful candidate at a competitive examination for a quantity surveyor in the Government Service, and I have been there since.
488. Prior to that were you employed by the Builders and Contractors Association at any time? Hardly employed; but Mr. Thompson, myself, and my late partner were selected as suitable persons from whom quantities were accepted.
489. Were you under guarantee to the Association? Yes.
490. You guaranteed their members against any mistakes in your bills of quantities? Yes.
491. Were you accepted as their authorised quantity surveyors, and your services availed of by that Association? Yes.
492. How long were you under that arrangement? Five years.
493. Did you ever have any disagreement with them during that time? Not the slightest.
494. Were your arrangements in connection with them very satisfactory? Yes.
495. You have only ceased practising privately in order to accept a Government appointment? Yes.
496. Were you appointed by the Public Service Board? Yes.
497. *Mr. Ball.*] Will your quantities be computed on the actual measurement of the building? Yes.
498. Are there any plans of the building as erected? Yes; there are some, but not complete plans.

THURSDAY, 12 *AUGUST*, 1897.

Present:—

MR. PARKES, | MR. BALL,
MR. WILKS, | MR. McGOWEN.

F. E. McLEAN, ESQ., IN THE CHAIR.

Arthur Stanton Cook further examined:—

A. S. Cook. 12 Aug., 1897.

499. *Chairman.*] What documents do you produce? I produce the bill of quantities of the work that has been actually carried out at the Printing Office, with the exception of extra works.
500. What do you mean by "with the exception of extra works"? The extra works that are in that schedule for which special authority had been obtained. We have taken no notice of these in that bill of quantities.
501. Does this bill of quantities correspond in its general divisions with the original bill of quantities upon which the tenders were received? Yes. It has been taken out as much as possible in the same order, so that it can be compared with the other one.
502. And do you think it possible with this bill of quantities to compile the cost of the work from any schedule of prices? I do.
503. You think that a fairly accurate comparison could be arrived at by using this bill of quantities? Yes.
504. Are there any other papers material to this inquiry that you know of which have not been deposited with the Committee that are in the possession of the Department? No; I cannot think of any other papers.
505. All the accounts have been furnished? A copy of all the accounts.
506. With reference to the plans that are in the possession of the Committee, were there any copies of those plans that were used by the contractors in tendering? Yes; the old plans have been submitted. The original plans were tendered to the Committee with these plans upon which the actual building has been carried out.
507. But there are copies of these plans which it is usual to show to the contractors when they are preparing their tenders, are there not? Yes.
508. Are they still in the possession of the Department? Everything; nothing has been destroyed. Everything that was ever prepared can be found.
509. And you have copies then of those plans that have been put in in the Department? In most instances. Not always copies of plans from which the work has been carried out.
510. Not copies of the working plans, but copies of plans which were prepared for tendering? Yes.
511. What is the form of these plans generally upon which the contractors tender? They will be $\frac{1}{8}$th scale drawings.
512. And what is the scale of these plans for the Department? They are all scales. A large number of them are $\frac{1}{2}$-inch and some of them full size.
513. *Mr. Ball.*] Do I understand that the plans of the works that have been carried out have been lodged here? Yes.
514. Was there any specification connected with the plans? There was an original specification, but there was not a specification of the new work.
515. As regards the extras, is that extra work beyond what the original plans show? Yes. In my previous examination I said that we had adopted this way of dealing with the question. We have presumed that the extra works cost the estimated amount.
516. *Chairman.*] Do you mean the amount authorised to be spent on these extra works? Yes.
517. This bill of quantities is headed, "Measurements of alterations and additions executed by day-labour at the Government Printing Office, Phillip and Bent streets, Sydney, but not inclusive of items covered by

by special authority, excepting alterations to design of main corner, roofing-felt, closets, and lavatories, for the Department of Public Works." Do I understand that this bill of quantities only refers to the work which, in the opinion of your Department, was covered by what we have called the original contract? That is so. A. S. Cook. 12 Aug., 1897.

518. And that original contract was tendered for at £10,800? Yes.

519. There was an extra amount of something like £6,000 spent that was not covered by the original contract, and you tell us that you have not measured up that work? That is so. You will see that it says "not inclusive." In the treatment of that main corner the whole of it has been measured. There is an authority for £600 extra. Therefore when that is all priced out that £600 would have to be deducted against that corner.

520. But we are anxious to make a comparison of the cost of the whole work carried out with the prices included in the contractor's schedule;—how can we do that on the whole work carried out unless we have the quantities of the extra works also measured? These quantities now submitted can be priced out at the contractor's prices, and they will give a certain result. From that the amounts authorised from the total of that amount for these items mentioned there should be deducted.

THURSDAY, 7 OCTOBER, 1897.

Present:—

MR. WILKS, | MR. BALL.

F. E. McLEAN, ESQ., IN THE CHAIR.

Arthur Foster Evans further examined:—

521. *Chairman.*] Since you were examined before, have you made some computations in regard to the bill of quantities that you prepared, at the rates contained in Mr. Eaton's schedule? Yes; I have prepared the prices and filled them in, as far as they could be filled in; in this copy of the bills of quantities, which is similar to the one produced by Mr. Cook. I produce that now, and hand it to you. This morning I wrote the following minute to Mr. Vernon, which I have been instructed to hand to you:— A. F. Evans. 7 Oct., 1897.

Department of Public Works, Government Architect's Branch, Sydney, 7 October, 1897.

Minute Paper.

Subject:—Parliamentary Committee of Inquiry, Government Printing Office.

ACTING upon instructions from Mr. McLean, Chairman of above Committee, I have carefully gone into the cost of the work measured by me, corresponding to the original contemplated contract, and I calculate that this portion of the work as executed amounts to about £32 more than the contemplated contract, viz.:—

	£	s.	d.
Total valuation	10,867	4	4
Eaton's tender	10,835	0	0
	32	4	4

The prices used in the valuation are—(1) Eaton's prices as far as possible; (2) the prime cost values; or (3) a fair valuation where the prime cost is not obtainable, but not allowing any profit.

The brick and stone work are executed face work on both the front and back surfaces, and accordingly do not correspond to the work originally contemplated. I could not, therefore, take Eaton's prices for these items, even as prime cost values, they are so low.

I may say that the whole of Eaton's prices are low, especially the main items of each trade, such as brickwork, stonework, leadwork, and so on.

The Government Architect. A. EVANS, 7/10/97.

522. I understand that the comparative total cost is £10,867 4s. 4d.? Yes.

523. This applies only to the work as originally tendered for? Corresponding to that originally contemplated.

524. And really tendered for? Yes, as nearly as possible.

525. Can you tell me what is being done by the Department in the matter of preparing bills of quantities for the extra works? Yes. As I could not be spared myself from the office, the Department have employed another surveyor—Mr. Pate—to measure the remaining works, which are covered by separate authorities, in a similar manner to the bill of quantities produced, and the bill of such further measurements will be ready and before the Committee, fully priced out, in about five weeks' time.

526. When you say fully priced out you mean at Mr. Eaton's prices, or at the cost price, if obtainable, or at a fair valuation where the cost price is not obtainable, and Mr. Eaton's prices will not apply? Yes.

527. That is the system on which you have priced these? Yes.

528. You do not think it is possible to have that bill of quantities for the extra works within five weeks? I do not think so; there is too much work in it.

529. How long has Mr. Pate been measuring? He started yesterday.

530. *Mr. Ball.*] How did you arrive at the contract prices, seeing that the contract was not carried out according to the plan? I have, through the courtesy of the Chairman, a copy of Eaton's bill of quantities, fully priced out. Where those prices apply I have used them,—that is, where an item is identical in the two bills of quantities I have used Eaton's prices; where they do not apply, and it was possible to get the prime cost value of the work from vouchers, I have turned up those vouchers. You have copies of all vouchers, so you can easily see that the prices are right. There is a third case where you cannot get the prime cost. In such cases I have allowed a fair valuation, not including profit. That has been formed by my own judgment, assisted by the foreman who actually superintended the work, and who knows pretty well the number of men employed on a particular work, and how long they took to do it. In that way I can get the prime cost of any part of the work.

531. Your schedule will not show the difference between the amount of work that was tendered for and the amount actually carried out? Yes, it will, exactly. The original bill of quantities prepared by Mr. Thompson shows exactly what was tendered for. The bill of quantities prepared by myself is the measurement of the work executed. You have simply to compare one with the other, and you have got the difference.

532. Is it not possible that there is a difference in the value of the work? Yes.

533. What means have we then of arriving at a difference in the value of the work? I have taken Eaton's prices where they will apply, and where they will not I have formed my own judgment, assisted by the foreman who actually superintended the work.

THURSDAY,

THURSDAY, 21 *OCTOBER*, 1897.

Present:—

MR. BALL, | MR. BAVISTER,
MR. PARKES.

F. E. McLEAN, ESQ., IN THE CHAIR.

John White sworn and examined:—

J. White. 21 Oct., 1897.

534. *Chairman.*] You are the President of the Builders and Contractors' Association, I believe? I am.
535. Have you been a contractor for many years? For twenty years.
536. Have you had any experience in connection with Government contracts? Yes.
537. What Departments have you worked under? The Colonial Architect's Department, the Railway Department, and the Education Department.
538. Did you tender for the work at the Government Printing Office? No. I was in New Zealand at the time the tenders were invited, and I only returned to Sydney on the Saturday previous to the Monday or Wednesday on which the tenders had to go in. My partner, Mr. Davidson, had obtained a bill of quantities, and he put that before me on the Monday—I have it here—but I declined to tender, as I had not seen the building and knew nothing of it.
539. Had you seen the plans and specifications? No. I had seen nothing whatever in connection with it. I had never been on the building, and did not know the nature of the work, and being an alteration job, involving a considerable amount of risk, I absolutely declined to allow a tender to go in.
540. Did you go to the trouble of making up a price from the bill of quantities? Mr. Davidson did.
541. Have you inspected the work which has been carried out at the office? I think I have inspected pretty well the whole of the work within what I consider the original contract. I have not been to what is known as the northern wing.
542. You have seen a printed copy of the papers laid on the table of the Assembly by the Minister for Works, showing a comparative statement of the cost of carrying out this work and the amounts tendered for? Yes; I have a copy of the paper.
543. Do you understand the departures that have been made from the original plans and specifications? A considerable number of them—that is, those of any magnitude—I think I know. I have paid four visits to the building for that purpose. I have a statement here which I desire to submit to the Committee showing the result of my investigations.
544. Will you make the statement to the Committee? Yes; but I wish to state first that I regret very much not having the specifications. It is almost impossible—in fact, it is morally impossible—for anyone to be perfectly accurate as to the deductions and the departures made from the original contract in the absence of the specifications. First of all, as the president of the Association, with your permission, sir, I got the secretary to that body, who is an architect by profession, to take tracings of what are said to be the original plans. These tracings we had with us in going through the building, but we had no one from the Colonial Architect's Department to show us what was new work and what was there previously. As far as I can judge, in the absence of the specification, I make the omissions to be as I am going to describe to the Committee. I find that the first omission is the whole of the excavations in the foundations. The excavations as per bill of quantities are 133 yd. 21 ft. at 2s a yard—£13 8s. The omission of concrete to carry the foundations is 30 yd. at 35s. a yard—£52 18s. 9d. The omission of brickwork on the ground, first, second, and third floors, is 21½ rods at £12 15s. per rod—£274 10s. There are nine columns omitted, which I estimate to be of the weight of 6½ tons, on the ground, first, and second floors, at £11 10s. per ton—£74 15s. There is a provision in the bill of quantities, 2 tons 14 cwt., for cast-iron bed-plates, to carry the columns that start from the brickwork. The whole of the nine columns which I have mentioned as being omitted start from the brickwork; but in the absence of any details showing the thickness of the castings, I am unable to determine what the exact weight of these bed-plates is. As there are nine columns left out—and I think there are only seven remaining of brickwork—if I take one-half the total of that weight—1 ton 7 cwt.—I leave a margin against the contractor, and therefore I say that there is 1 ton 7 cwt. of cast-iron bed-plates at £12 per ton—£16 4s. omitted. There are also a large number of minor items in connection with the fixing of columns—bolts, tie-bolts, and various tying-down rods which are mentioned in the bill of quantities—which I have not taken into consideration; time did not permit me to go so minutely into the matter. I only profess now to deal with large departures from the original plan. Perhaps I had better explain where I take these omissions to be. On the ground floor there are two large columns shown which are not put in. On the first floor there is a large internal wall shown to be taken down, in the centre of Phillip-street elevation, which has not been removed, and had that wall been removed, five columns had to be erected. These columns have not been erected, on account of the wall not being taken down. On the first floor they have erected three columns for some purpose I could not fairly get at. Therefore I deduct two of the five. On the second floor, which shows to have five new columns on the Phillip-street wing, and the old internal wall to be entirely removed, that has not been done. Therefore I deduct five of these columns, which makes the total nine columns. There are nineteen pediments to the windows on the second floor, and the value of them as per bill is £236 16s. 6d., less work done by the Department of the value of £36 16s. 6d., leaving a saving of £200. On the exterior elevation the string course on the third floor is altogether omitted, and the price as per bill is £24 1s. 6d. The windows on the third floor (16)—I am speaking entirely of the stonework to these windows—have been omitted; but in lieu of what is shown on the plan they have put in eight circular windows. The original bill is £118 16s. 2d., and for the work done by the Department I allow £86 16s. 2d., leaving a saving of £32; that is to say, work has been done to that amount less. There are eight piers on the top of the main cornice for the ballustrading omitted, which, at 30s. a pier, is £12.
545. *Mr. Parkes.*] Is there nothing in their place? Nothing whatever; that is a clear omission altogether. The ballustrading has been entirely omitted, £142 17s. 6d. I may state in reference to the other two portions of the stonework, that I have deducted the value of the work which I consider has been put in place of that which the original plan shows. Zincwork, pages 41 and 42 of the bill of quantities, there are sixty-eight squares of zinc slates, which at 45s. per square amounts to £153. There are twenty-eight squares (89-ft.) of interlocking zinc slates, which at 65s. comes to £87 9s. They have used old slates

which

J. White. 21 Oct., 1897.

which have been taken from the building in place of these materials, and which I value at 15s. per square; but I have not made any deduction in the omissions I have stated. I thought the Department would state what departures they had made. 'I am dealing mostly with omissions. There are omitted 192 ft. of ornamental zinc cresting, 18 in. high, which at 2s. per foot comes to £19 4s.; 314 ft. of ornamental zinc frieze, which at 1s. 6d. per foot comes to £23 11s. Then on page 27 of the bill of quantities there is the staircase to the fourth floor, £27 12s.; at page 29 the staircase to the north end, £25 4s.; at page 40, the spiral staircase fixed complete, £150. I may state that I sent the Secretary to the Association here to ascertain whether a copy of this specification was in the possession of the Clerk of Select Committees. When he returned he said that he had seen an officer at the House, but that he could not find a copy of the specification amongst the papers. To resume my statement, there are 2,460 yds. of painting dados around the rooms and upstairs of the old wing-wall at 9d. a yard, £92 5s.; and temporary walls to secure the machinery, &c., £20. On account of the fact of not taking the building down as provided for in the contract, the provision which the contractors made to secure the machinery and the building was not required. The guarantee for the water-tight roof for twelve months, which the contractors have had to provide for, £10; and contingency fund, £500. These are the whole of the items I made a list of. The total omissions I make to be £1,951 19s. 9d.

546. *Chairman.*] Do you wish to add anything to that general statement? Only that there is a matter which I consider was an important one in the carrying out of this work. In the bill of quantities the internal walls on the Phillip-street side of the first and second floors were specified to be removed, therefore requiring that the whole of the superstructure above it should be shored-up and made secure, which certainly involves a considerable risk. Through that work not being done, not going down to the foundations at all, there has been a considerable saving to the Department; but I am not deducting anything for it, because there is no provision in the bill of quantities for that risk, although it is really spread over every item in the bill.

547. Can you put a value on that risk? I would not like to do that. What my idea of the risk would be might differ very materially from others' idea of it. It would be merely jumping at its value.

548. As a matter of fact it would not be an item which would be taken into calculation in preparing a tender, I suppose? Yes, it would be; I should consider that it would be a certain risk, especially if the bill of quantities does not provide for the necessary securing of a large building like this, with the machinery in full operation; but the risk really has not been incurred by the work not being carried on. I must assume that if the bill of quantities did not provide something special to meet it, it would be distributed amongst various items in the different classes of work.

549. In regard to the items provided in the bill of quantities for contingencies, and for which you have deducted £500, would that not apply to the risk you have been speaking of? No; because it states here that the contractor has to take the whole of the risk in connection with the carrying out of the work. He has to be responsible for any damage accruing to adjoining properties. It is a condition in all contracts, that you have to take the entire risk in carrying out your contracts that you do not injure either the property you are engaged on or the adjoining property. Another matter I wish to mention is, that £127 is set down in the original bill of quantities, making up the original tender for the surveyor's fee and the lithographing had the work been done by the contractor. I think the Department should make a corresponding allowance. I did not know exactly about adding it to the deductions. It is a matter which the Committee will have to see is allowed for. As far as I could judge the whole of the sanitary arrangements, as shown on the third floor, have been omitted.

550. You are aware from observation that other sanitary arrangements have been provided? Yes.

551. And taken as extra work? I am aware that there is other provision, but I take it to be extra provision for certain new work. I have no information before me to show what it is.

552. Your evidence at present applies only to the work which was provided in the plans and specifications on which the tenders were called? Yes; in going through these different floors where the work was shown, I marked on these plans as I went along where I noticed that omissions had occurred. What other provisions has been made outside the plans I have I know nothing of.

553. *Mr. Ball.*] Have you noted any provisions which have been made in the building to take the place of anything that has been omitted? Yes. On the second floor at the northern end of the Phillip-street frontage they provided four closets and four lavatory basins. That is the only provision I have noticed in the building themselves that was not provided for in the original contract. I may mention to the Committee that I applied on the 14th instant for a bill of quantities of the work executed, on behalf of the members of the Association, who were to give evidence here, and that in reply I received an acknowledgment from Mr. Hixson stating that he had received my letter, and that a further communication would be sent, but I have not, up to the present, received any further answer. We wanted the specification to make a comparison. It is a most valuable thing to have. We ought not to have undertaken to do anything without it.

554. *Chairman.*] I wish to ask you a few questions about the values or prices you have put opposite the various items you deducted. Are these your own prices? No; they are taken from the bill of quantities in every case.

555. In every case these are in the bill of quantities? Yes.

556. Take for instance the excavations in the foundations at 2s. per yard? That is the first item in the bill of quantities.

557. Does it put a price down? Yes.

558. *Mr. Ball.*] There is no price mentioned in the bill of quantities? I have every item of the contractor's prices here. I am going on the basis of his price for every deduction I have made.

559. You have taken the lowest tenderer's prices as your basis? Yes; in every case.

560. *Chairman.*] As a matter of fact these deductions have been made on the basis of Mr. Eaton's prices? That is so. In working out the different items in the different pieces of work, which have made one complete whole, for instance, in the ballustrading, I have taken the whole of the items as they appear in the bill of quantities, and as priced by Mr. Eaton. That applies to everything as far as my evidence goes.

561. Coming back to the comparative statement which the Minister for Works laid on the Table of the Legislative Assembly, you will notice that there is a distinction drawn between the work originally tendered for and what was called extra work? I have not paid much attention to the paper, but I notice now, on looking at the paper, that additional works have been put in to the amount of £2,672 15s. 8d.

J. White. 21 Oct., 1897.

562. I refer to these two lines on page 4—

The lowest tender received for the original work was...	£10,835 0 0
To which would have to be added office estimate of additional works	6,172 15 8
	£17,007 15 8

Your evidence this afternoon has had no relation whatever to that extra work estimated by the Department at £6,172 15s. 8d.? None whatever.

563. You are simply giving evidence in relation to the carrying out of the work in accordance with the original plans and specifications, and you estimate roughly that there have been savings of about £1,900 made by the Department? Yes; there have been omissions to that extent. Of course the Department had down in some of the cases other work to take its place. For instance, where I refer to the slate on on the roof I have taken out the whole quantity for the zinc tiles and the cresting and so on, where the Department has in lieu of that put in slates whose value I have not deducted.

564. Have you made any allowance for the extra work they have done, or other work they have done in place of the work which was omitted? No; with the exception of the stonework. In the case of the pediments to the windows on the second floor, I do allow the value of the work which has been substituted in the stonework, and on the windows of the third floor I also allow for the additional work. In the case of the stonework, as far as the two elevations are concerned, I have allowed the difference, with the exception of the corner. There was additional work done at the angle between Phillip-street and Bent-street which the elevation I have does not show. It does not convey what departure there has been from the original plans, but there they have introduced, I believe, more stonework than the original plan called for, and of course the dome and the central feature at the corner in the roofing itself are entirely departures from the original plan.

565. And for these you have made no allowance? No. I believe that in the Parliamentary paper the sum of £600 is allowed for that departure; but the actual value of the work I have not had the means of ascertaining.

566. *Mr. Parkes.*] But you can do so when you get the bill of quantities? Yes; I was not in a position to obtain the quantities—in fact it would be almost impossible to do so in the absence of the specifications. We have been without the specifications all through. It has been a most difficult thing to us. You will find the items here somewhere—alterations to design of corner, £616. That does go outside the contract no doubt. Whatever additional work they did they would charge the value of it.

567. *Chairman.*] That really does not come within the range of the evidence you have been giving this afternoon? No; it is outside of that.

568. What I wish to know, before you conclude your evidence is, whether the sum of £1,951 19s. 9d. represents in your opinion a net saving to the Department, or whether it is only the total amount of the deductions you have made without allowing for additional work? Yes; it should be in that form. In the external elevation I have allowed for the difference in the cost of the stonework, but as regards the internal arrangements I have not made any allowance for any extra work they have done.

569. You do not wish the Committee to understand that there has been a net saving of £1,951 19s. 9d. by these omissions? No; I could not convey that impression, because I am not in a position to say that there is anything provided in place of the many things which I have noticed to be omitted. Other things undoubtedly have been provided. For instance the sanitary arrangements have been placed on the second floor in the north corner of the Phillip-street frontage.

570. *Mr. Ball.*] You would be in a better position to say after you have been furnished with the quantities? Undoubtedly.

Frederick Trenchard Smith sworn and examined:—

F. T. Smith 21 Oct, 1897

571. *Chairman.*] You are the Secretary to the Builders and Contractors' Association, I believe? I am.

572. You have been making some tracings of plans in connection with the additions and alterations to the Government Printing Office? That is correct.

573. Did you recently make an application here to see a copy of the specifications in connection with that work? No. I looked through the plans which were in the keeping of Mr. Mowle; I had a hunt for it amongst them. We came up here and made an application to Mr. Mowle to see all the documents connected with the construction of the works therewith; he handed me a roll which I had possession of at subsequent intervals in his room, and through that roll I looked for the specification.

574. You did not ask him specially with reference to the specification? No. I came up one afternoon to see him; he evidently was engaged; I waited fifteen or twenty minutes; and at last finding that there was no one who knew anything about it, at least finding that Mr. Mowle was not accessible, I, seeing the plans here, as I had seen them before, looked through them again to make sure if it was among them. I understood at the start that the roll embraced all the documents and plans in connection with the construction of the work.

TUESDAY, 23 NOVEMBER, 1897.

Present:—

MR. BALL, | MR. BAVISTER,

F. E. McLEAN, ESQ., IN THE CHAIR.

John White recalled and further examined:—

J. White. 23 Nov., 1897.

575. *Chairman.*] Did you receive from the Public Works Department a copy of the bill of quantities compiled by Mr. Evans? I have one which I assume was compiled by Mr. Evans. It is the bill we applied for in the first instance.

576. Have you any knowledge of Mr. Evans, and of his qualifications for doing this kind of work? Not a very great deal. I can only say that he was one of those under bond to the Builders and Contractors' Association for some years. During that time he supplied several bills of quantities to our members, and I never heard of any claim being made on them for errors committed in any of their bills.

577. Have you had any opportunity to test the accuracy of this bill of quantities? No; I assume that it is perfectly accurate.

578.

J. White. 23 Nov., 1897.

578. For the purpose of this inquiry you accept the bill of quantities as accurate? I do.
579. Do you wish to make a statement as to what you found on going into the bill of quantities? I wish to hand in to the Committee the bill of quantities furnished by the Government Quantity Surveyor duly priced by myself; and I take it that it embraces the alteration in the design at the corner at a cost of £616; the increased latrine accommodation, £400; and lining under slate attic roof with felt to minimise the heat in the composing-room, £30.
580. What system have you adopted in pricing the bill of quantities? We priced from the original bill of quantities of Mr. J. A. Eaton, the lowest tenderer for that work, where it applied, and where it did not apply we got as near as we possibly could to his price; in fact, we kept above his price where the new bill is not covered by the bill as issued previously to the job being tendered for.
581. Can you furnish a list of the quantities to which you thought Mr. Eaton's prices would not apply? I have not taken out any special list, but if you compare that bill with the bill which you have already before the Committee, you will see where there are many substitutions. In many cases where cedar has been specified in the original bill, it is redwood in this bill in the execution of the work, so that we have had to vary the prices in that respect.
582. That is to say, as far as you considered Mr. Eaton's prices would apply you have priced this bill at his prices? Yes; in every case that is the basis on which we worked throughout.
583. And in every case where his price would not apply you put your own valuations on the work, I suppose? Yes; in accordance with that bill we kept as near as it was possible for men to keep to it.
584. In putting your own valuations on that work, have you allowed the usual percentage for a contractor's profit? I have not allowed anything. I have gone on the basis of the original bill of quantities, which did contain the contractor's profit.
585. If you are putting valuations on quantities not covered by Mr. Dean's schedule, do you allow the ordinary percentage for contractor's profit? Yes.
586. In other words, the prices you have put on these items would be the prices at which you think the work could be done? Would be the prices at which I consider Mr. Eaton would have priced them if they had been in the original bill.
587. *Mr. Ball.*] Practically you base the profits on what Mr. Eaton allowed in other work? Yes, where there has been a deviation from the original specification.
588. I suppose that would be arrived at by a percentage on the prime cost? Yes; he has got down certain prices for the supply of various things which have been carried out by contract. I think that should give the Committee some evidence as to what his profits were likely to be, because the works, instead of being out by day-labour, have been carried out by the Government by calling for tenders from various merchants, and they have supplied the materials.
589. *Chairman.*] In the case of these sub-contracts, the contractor, were a tender accepted, would require a percentage on to the sub-contractors' prices;—you consider that he should have a profit out of their work? Yes, undoubtedly, if he sublets. You cannot sublet unless you have the sanction of the Department.
590. What I am wanting to get at is whether the full allowance for the usual contractor's profit, both on labour and material and any contracts sublet, has been made by you in pricing these items? Yes; I priced these items as strictly as I could by the prices which Mr. Eaton had in his bill—never deviated from it as far as I am aware. Where there was an alteration, and the thing was not covered—for instance, the relative value between 2-inch down-pipe and 2½-inch down-pipe is well known to the trade—I have made the extra difference in every case. The prices are based on the prices that Mr. Eaton has got in his original bill of quantities.
591. Will you state the result of your pricing of this schedule? I have made a summary which deals shortly with the matter. My price of the items under the various headings is as follows:—"General bill, £301 17s. 6d.; excavator, labourer, and drainer, £66 6s.; mason and slater, £1,068 16s. 9½d.; bricklayer, £903 4s. 10d.; carpenter and joiner, £2,085 9s. 1½d.; ironmonger, £74 11s. 7d.; smith and founder, £1,720 16s. 6d.; plumber, £1,111 13s. 4d.; plasterer, £60 1s. 11d.; painter and glazier, £626 3s. 6d.; surveyor's fee, £127; lift machinery (Atlas Co.), £595; making a total of £8,741 1s. 1d.
592. You have not dealt with this credit for old material shown at the end of the bill of quantities? No. Nor have we dealt with the additions to the northern building, which work we contend is outside the contract, and should be included in the work which has been carried on in the northern building.
593. Is this the item you refer to—"allow for altering and making good waste from third floor of northern building, and refix traps complete"? Yes, that is one of the items.
594. Will you take the bill of quantities and state what you have omitted, and explain why you have done so? The first item, as taken from the original bill, is, "allow for clerk of works office, provided with the usual fittings complete," £10. The next item is, "allow for all risk of damage to property or accident to individuals from whatever cause arising"; there is no provision made for that. The next item is, "allow for maintaining the works, making good all defects, and keeping same in thorough repair for twelve months after completion"—there is no provision made again for that. The next item is, "Allow for entering upon the work whenever required, taking away all old material, which remains the property of the Government." We say it is not the property of the Government, but the property of the contractor, as distinctly stated in the specification. We contend that whatever old materials there are arising from the carrying out of these alterations are the property of the contractor, and it is distinctly stated are not to be used in the building itself. The clause referring to it is as follows:—

> Contractor must enter upon work whenever required, take up foundations, drains, and other impediments, clearing away all old materials and rubbish. The old materials become property of contractor, but must not be reused.

Provision is made for entering upon so and so, the property of the Government. We have put nothing against it, because that is the property of the contractor.

595. You have just stated in evidence that you have not priced that item at all? Not at all. For the clerk of works office we allow £10—that is in the original bill. For "carrying on the works without interference with the business of the office" we allow £74 17s. 6d. The next item is on page 2, "for removing all rubbish from the building and site, cleaning all windows, scrubbing all floors, and leaving the premises ready for occupation," no provision is made—we allow nothing for that. The next item is "allow for temporary scaffolding and tarpaulins in every department where work is being performed for protection

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of employees and machinery in motion." We allow nothing for that—nothing outside the provisions as they appear in the original bill, where the same responsibility attaches and the same work has to be executed. The item "allow for carefully taking down roof, &c., &c., over Jobbing room," is included in the original bill of quantities. The item "allow for carefully taking down roof with all timbers, iron-work and other works connected, disconnecting down-pipes and eaves, gutters, &c., &c., complete over old Numbering room" is included in the original bill. The item "allow for carefully taking down roof, &c., &c., over Ruling room" is included in the original bill of quantities. The item "allow for carefully taking down roof over stairwell next Ruling room" is included in the original bill. The item "allow for carefully taking down principal roof over Bent-street wing" is included in the original bill. The item "allow for carefully taking down iron principal roof over main angle" is included in the original bill. The item "allow for carefully taking down principal roof, disconnecting pipes and removing tank over Phillip-street wing" is included in the original bill. This is going on the basis that the materials will pay for the cost of their removal, that they are the property of the contractor and will more than pay, in very many cases, for the trouble of taking them down. That is the last of the items at the beginning of the bill of quantities. There are a number of others here such as the item, "allow for carefully cutting through roofs, lead flats, lantern lights over span for passage of wall of superstructure, and providing and fixing temporary flashings on each side." They are marked against where anything is allowed, and allowed on that principle that they are the property of the contractor, and carrying out the principle of the original bill, they are not allowed for, because the material will pay the cost of its removal. With the exception of the alterations to goods lift, northern building, I do not think there is any other thing but what is priced. We contend that no work embraced in this bill of quantities should apply to the northern building.

596. In the original bill of quantities a provisional sum of £500 was set down for contingencies;—can you explain to the Committee how that sum would be treated by the contractor? The plan and specification and bill of quantities form the contract, and if anything was not inferred or implied by either one or other of these things in carrying out an alteration job, then the contractor could make a charge against the contingent fund for the work he had to do.

597. Do I understand that this sum of £500 has got to cover the whole of the contingent items which may arise on the contract? That would be my idea of it, certainly.

598. That he could not be paid more than £500? No, that would not apply. The architect would have £500 at his disposal in departing from the original work to that extent.

599. *Mr. Ball.*] He could order work to that value without extra authority? Without extra cost to the Department. Most private architects have a similar provision.

600. *Chairman.*] He has authority for £500 extra work? He has that sum as a fall back, but he may not require a penny of it. I have known contracts where the provisional sum has scarcely been touched. The whole of that is deducted. It is distinctly stated that unless the whole of this sum or any portion of it is spent it can be deducted on completion of the work.

601. Have you dealt with that sum in any way in making up your total according to Mr. Evans' bill of quantities? There is a large number of items which we have allowed for there which undoubtedly do come against the contingency fund—items that Mr. Evans has in the bill are extra works we have had to allow for as being a charge against the contingent fund of £500.

602. Ought you not to add that provisional sum of £500 to the total cost for comparative purposes? No; it would be most unjust to do such a thing, because he gives you the actual work executed which we have priced. Any work which was part and parcel of this contract we have priced. A considerable amount of that is evidently work which is outside the contract, and which would be charged against the provisional sum of £500. You could not put £500 on to the cost of the work and nothing be down for it whatever.

603. *Mr. Ball.*] That £500 is included in Mr. Eaton's total amount? Yes. Mr. Eaton's original price was £10,835, to which you have to add £616 for the extra work done at the corner, £400 for additional lavatory work, and £30 for roofing felt, making a total of £11,881, which the Government say they have spent on this work, and which we say in accordance with Mr. Eaton's original bill of quantities only amounts to £8,741 1s. 1d.

604. *Chairman.*] Has Mr. Evans included the whole of that lavatory work in this bill of quantities? I cannot say what is included, but I understand that it was included. There are forty cisterns. The actual number, additional to the original contract, I could not say—not now.

605. *Mr. Ball.*] You assume, in pricing that, that that work is included? Yes; we understand that £1,046 of additional work to that included in Mr. Eaton's original bill is included in the bill which Mr. Evans has prepared. A member of the Committee, who is in attendance to-day, will show where a discrepancy has occurred, and state what is the reason for it. I may state that it does not deal with the whole of the latrine accommodation. There is another considerable amount here for work of that kind, but we have not taken it into consideration—I mean for which special provision was given by the Department. For instance, the item, "Lavatory and retiring rooms for female employees, £140," I take it will be covered by the extra bill you are getting.

606. *Chairman.*] Do we understand that £8,741 1s. 1d. is, in your opinion, the amount that the Government would have had to pay for the work priced in this bill of quantities had Mr. Eaton's tender been accepted? That is correct.

607. *Mr. Ball.*] And his tender was not a lump sum? It was a lump sum, but based on this bill, which had to be submitted before his tender would be accepted. The total was worked out by the quantities being supplied, but it was all itemised and priced.

608. He would have been paid according to schedule for work actually executed? Yes.

609. *Chairman.*] At the price enumerated in his own bill of quantities? Yes; either paid for extras or deductions made for work not carried out. The schedule is the whole basis of the tender. The lump sum is only an approximation which gives the Department an idea of what they will have to spend. I think it is put there with this object—that in case of any alterations they may know exactly what the price will be for any class of work.

610. £8,741 1s. 1d. would be the amount payable by the Government under Mr. Eaton's tender, and plus this extra work for lavatories and alterations at the corner £11,881;—for what purpose do you present that total? From the statement made by the Department in this Parliamentary paper.

611. The Department have not stated that it cost them £11,881 to do that work? Yes, they have, as I take it.

612. Will you just quote from the Parliamentary paper to show why you submit that sum? "The lowest tender received for the original work was £10,835."

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613. Exactly so, but it does not state anywhere in that paper that it cost the Government £10,835 to do the work? No, but they say that they have only exceeded the amount of the lowest tender by £328.
614. The £11,881 which you put down for comparative purposes as the total cost to the Government of doing this work is not derived from any actual figures as to the cost of that work but from a comparative statement shown in the Parliamentary paper? Yes, and from the statement contained in that bill of quantities that that includes the whole of the work embraced in this tender, and the Department themselves claim that £10,835, adding on their office estimate for the work which is outside that contract, making their total of £17,007, which they say is only £328 in excess of what the lowest tender and their office estimates for outside work actually brought it to.
615. As a matter of fact, that statement submitted by the Minister in the Parliamentary paper does not show the actual cost of the original work and the actual cost of the extra work? No; I would not say that it does.
616. But he starts by saying that the original work cost what the lowest tenderer was willing to do the work for? Yes, and £328 more.
617. He estimates that £10,835, Mr. Eaton's tender, was a fair price for the original work? Yes.
618. There is really no division of the accounts to show the cost of the original work and the cost of the extras? No; I have no means. Only taking that statement there, I am merely assuming that the whole of the original contract money has been spent, plus the three items we have mentioned on that bill of quantities, as submitted there. Of course, I might be wrong in that respect.
619. As a matter of fact, until we get the measured quantities of the extra work which will enable us to divide the old work from the extra work, it will not be possible to set up a comparison between the contract and the day-work systems? I think, certainly, in the interests of fair play, that you cannot arrive at a thorough basis until what you say is furnished. It is possible that they have spent a large amount of money outside their office estimate of £6,172. It may be that they have spent £8,000 on the northern building. It is a most singular thing if they have spent such a large amount.
620. You have visited the Government Printing Office and seen the work as carried out? Yes.
621. Can you pass any general opinion on the workmanship? I could not notice any defects in the Government work. I must say that I did not go to look very minutely into it.
622. Do you think the work was well done? I should think it was.
623. Do you think it was done quite as well as it would have been by a contractor? I think so.

William Stuart sworn and examined:—

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624. *Chairman.*] You are a builder by occupation? Yes.
625. Have you had much experience in performing works under the Government? No.
626. Have you ever tendered or executed work under the Government? Yes; we have tendered a good few times, and done work once, but it is a good many years ago.
627. *Mr. Bavister.*] Did you complete that one job to the satisfaction of the Government without any friction arising? Yes.
628. You have never been refused a Government job? No. We do not care about Government work as a rule. We were second in the case of the Lands Office, next to the lowest in the case of the Water and Sewerage Board Office. We have tendered for good many big Government works, but we found the prices were too low, and we could get better prices with less trouble.
629. *Chairman.*] Are you familiar with the terms and conditions of the tendering for additions and alterations to the Government Printing Office? Yes.
630. You remember the Department calling for tenders for that work? Yes.
631. Have you seen the specification? Yes; I have been through it.
632. And the bill of quantities issued with the specification? Yes; I have been through that too.
633. You have seen Mr. Eaton's bill of quantities duly priced? Yes.
634. Have you seen the works carried out at the Government Printing Office? Yes.
635. Do you consider that the prices in Mr. Eaton's schedule would apply to the whole of the work carried out—that is, to the work comprised in the bill of quantities which was sent to you by the Department? I do not know that the prices in the bill of quantities would apply to all the work which has been done there, but it would apply to all the work which was included in the original bill, and which has been done there, and also to any similar work to that in the original bill.
636. Then Mr. Eaton's prices, contained in his bill of quantities, would be the basis for either deductions or extras in connection with that work? Undoubtedly.
637. Sometimes difficulties arise in connection with the carrying out of extra works, and it is held, is it not, by the architect sometimes that the work is not covered by the schedule? Yes; that might arise, certainly. I do not know that any difficulty has occurred. I do not think any difficulty would occur where a schedule is very plain and straightforward.
638. You have had an opportunity with Mr. White and other members of your Association to go through this bill of quantities prepared by Mr. Evans? Yes.
639. Can you give us the result of your investigation in a general way? Yes. The members of the Association, I amongst others, went though the bill of quantities which was given to us by Mr. Evans, and we priced them out according to the prices in Mr. Eaton's original tender, for all the work that was the same in both bills and for any similar work, and where any work in Mr. Evans' quantities could not be covered by Mr. Eaton's prices we put in what we considered a fair price, and the result was that we estimated the cost of the work as actually executed and shown by Mr. Evans' bill to be £8,741 1s. 1d. I did not know until this moment the amount for the lifts, but assuming this sum of £559 to be correct—I know the other is right—that would make a total of £8,741 1s. 1d.
640. That is really what you estimate the work, carried out according to Mr. Evans' bill of quantities, would have cost the Government had Mr. Eaton's tender been accepted? That is right.
641. Have you any statement showing the items to which, in your opinion, Mr. Eaton's prices would not apply? If I had the bill of quantities here I might perhaps find them out, but it would take up some time, because his prices apply to nearly all the work. The only items his prices do not apply to are small items that are hardly worth your consideration; but the main items—the large items, which form the bulk of the contract, and where the principal difference lies—are identical in both cases.

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642. You spoke of having put a fair price upon the work that was not covered by the schedule;—how do you arrive at what you call a fair price? There is generally a price ruling in the market for certain work, and we give that price. Of course it varies according to circumstances. The small items, as I said, are of very little consequence, and where we had the least doubt we put on a good big price for the work.
643. Did you put on a price which would pay a contractor? Yes.
644. Not cost price? No; a price that would pay a contractor. Where we had any doubt, we always went the other way, and gave the Government the benefit of it.
645. Have you seen the work which was carried out at the Printing Office? Yes; I have been through it twice.
646. Was it carried out well, and do you think it was carried out as it would have been had a tender been accepted? Am I bound to answer that question?
647. I think you might give an opinion on that matter? It is fair average work.
648. Is it such work, do you think, as would be carried out under Government inspection by a contractor? Well, it is not certainly by any means as good as I have seen done by contractors under a Government inspector; and then, again, I have seen bad work done by a contractor under a Government inspector. I take it that it is just a fair class of work.
649. You have seen the bill of quantities duly priced that has been put in by Mr. White to-day? Yes.
650. I assume that you have been associated with Mr. White in preparing that document? Yes, I was.
651. You are quite satisfied that the prices contained in that bill are correctly taken from Mr. Eaton's schedule, and that those not taken from Mr. Eaton's schedule are fair prices? I am perfectly satisfied on that point.
652. And you are equally responsible with Mr. White, I understand, for the figures contained in that document? I am; I spent a good deal of time over these quantities. I revised them all, too. I knew that very likely there would be a difference, but I did not think it would be as much as it has come to. I wish to point out where the difference lies, and what has caused the difference. I worked out the figures. Mr. White, I think, altered a few of the figures, but the alterations were not material. The schedule, as you are all aware, is divided under different headings. The first heading is "general bill." In the original bill it amounted to £796 7s. 6d., and in the work as executed it is only £301 17s. 6d. I call Mr. Eaton's prices the original bill and the other the work as executed.
653. What items have you excluded from that bill to reduce it so much? The item of £500 which was included in the original bill as a contingent sum.
654. *Mr. Bavister.*] That brings the difference down to £5 10s.? The amount would be about £5 10s. more in the work as executed than in the original bill.
655. *Mr. Ball.*] Do you mean to say that only £5 10s. of the contingent amount has been used? Yes; under that heading.
656. I mean in the whole contract? I do not know about the whole contract; that will come later on when I tell you the other differences.
657. You have deducted £500 straight away;—is not that £500 to cover some other items in other parts of the contract? Wherever the work executed comes to more than was allowed for it, then you can draw on the £500.
658. In making up your comparison, have you done it? I have taken it off in the first case, because it was included in the first amount, and as they are both under one general head I had to treat with the sums under that head. In none of the sums afterwards, excepting one, I think, is that £500 referred to. Even if it had been drawn on I am still entitled to deduct it at once; it really makes no difference.
659. *Chairman.*] Have you got the items in that "general bill" by which you arrived at that amount—£301 17s. 6d.? No. They are in the "general bill" of Mr. Evans' quantities.
660. Will you take that bill which Mr. White has handed in and enumerate them? Yes; but I may tell you before we go any further, in regard to the prices contained in this bill, we endeavoured as far as possible to follow the prices in the original bill. We did so because they cover the same work practically; and, furthermore, as the original contract came to more than the work as executed, we thought it was but a fair thing, and would be quite fair to the Government that we should put in the amounts which were put for preliminary work on this work that went against the larger sum. The first item is £10, for Clerk of Work's office; the next is "for carrying on the works without interference with the business of the office," £74 17s. 6d. It is made up in this way: there is an item of 43½ squares of temporary walls, at 15s.; 415 lineal feet of temporary gutter, £20 15s.; and then there is an item of £30 for temporary roof-fencing, performing any underpinning, and such like; and then there is an item of £11 10s. in connection with the same work. Those four items make a total of £94 17s. 6d.
661. Those items are taken from Mr. Eaton's prices at page 2? Yes. Now this work included the shoring and screening off of a considerable part of the building during the pulling down and erection of the back wall. That wall was not pulled down, and was not erected. It was left standing as it is, so that we claim an allowance of £20 for that work, which was required to be done; and if that allowance is deducted you will find it comes to the second item in the bill, £74 17s. 6d.
662. Now, what is your third item? That is for the hoarding, £12.
663. How have you dealt with all the remaining items on that page—

Allow for under-pinning cross-wall of main angle in basement.
Allow for all risk or damage to property or accident to individuals from whatever cause arising.
Allow for maintaining the works, making good all defects, and keeping same in thorough repair for twelve months after completion.
Allow for entering upon the work whenever required, taking away all old material, which remains the property of the contractor.

—? I struck out those items.
664. Taking these items in their order, will you explain the reason why you struck out each item? For the risk of damage to property, for accident to individuals from whatever cause arising, Mr. Eaton did not allow anything, and the reason he said was—and it coincides with my own business—that we are insured both under the Employers' Liability Act and at Common Law, so that it would be very foolish to put in anything against this item, which is really no contingency at all. Even if there was an accident a contractor would not be the sufferer.
665. Was there any provision made in Mr. Eaton's bill of quantities for that? There was an item of that sort in his original bill, and he allowed nothing for it. We pay so much a year—it amounts to a

very

very small sum, but that sum which we pay is spread over a large number of other works, and could not, possibly, in fairness be put down against any one job that covers all our men. W. Stuart. 23 Nov., 1897.
666. You say that Mr. Eaton provided nothing for that in compiling his prices? No.
667. Now, take the third item—underpinning cross-wall of main angle in basement? I do not see it in Mr. Eaton's bill.
668. On the second page of Mr. Eaton's bill it says: "Contractor must provide at his own cost all shores, and temporary roof and fencing, and perform any underpinning"? In that sum of £74 17s. 6d. there is an allowance of £30 for that.
669. There is another £30 allowed for that £94 17s. 6d. in Mr. Eaton's prices? In the first £30 the contractor must provide all shores and such like. There is an item of £30 allowed for that, but it is for 500 feet of Oregon, at 12s. There is an item of £30 in Mr. Eaton's bill which might go against that. I refer to the item, "Contractor is responsible for any damage to the property, or accident to individuals from whatever cause arising." I do not know whether it goes against that or against the other.
670. The is an item, the last, on page 2 of Mr. Evans' quantities: "Allow for carefully taking down roof, lead-flats, iron principals, lantern-lights, with all timbers, glass, and other works connected, £30." Have you allowed £30 for that? There is £30 allowed for that. You will find that that £30 is not in Mr. Eaton's quantities. He has in all cases allowed that the old material will pay for the removal of it. We take it into consideration, and treat it in two ways. We allowed £30 for altering and taking down roof, which in Mr. Eaton's tender he put nothing against; and, furthermore, we also allowed £33 15s. for a temporary wooden enclosure, 33 feet long x 7 feet wide, which he had never allowed for at all.
671. What is the next item? For providing, maintaining, and afterwards removing all necessary hoardings in accordance with the municipal regulations—£12.
672. But on the previous page there is an item for maintaining the works, making good all defects, and keeping same in thorough repair for twelve months after completion;—you did not allow for that? No. I never in my life allowed a penny for that in my business.
673. Mr. Eaton did not allow for it? No.
674. And you allow £12 for the first item on the second page? Yes.
675. What is the next item? There is an item of £10 for giving all notices, paying all fees, &c., complying with municipal and all other regulations.
676. That is what Mr. Eaton allowed? Yes; but I am very doubtful if the Government ever paid it. As far as I am aware they pay no municipal fees.
677. The next item is: "Allow for the use of all scaffolding, plant, &c., for the works"? The sum of £25. Mr. Eaton makes this remark: "For the erection of the crane only." He had got plenty of scaffolding himself.
678. The next item is: "Allow for water for the works for a temporary supply and pay all rates"? For that we have allowed £10, which is the same as Mr. Eaton's price.
679. What have you allowed for closet accommodation for the men? £2 10s.; it is the same in both cases.
680. Now we come to this item: "Allow for the services of a watchman every night and Sunday during the progress of the works"? £42.
681. What was the contract time that Mr Eaton had to do that work? I think it was ten months.
682. Would that sum of £42 have to cover a night-watchman's services for the whole term of the contract? I should say so.
683. Including Sundays? Including Sundays. I have had them offer to work for me, including Sundays, for 15s. a week. They are generally old men—not active young men.
684. Will you take the next item: "Allow for removing all rubbish from the building and site, cleaning all windows, scrubbing all floors, and leaving the premises ready for occupation"? That is an item we never put anything against, because each trade is supposed to pay for removing its own rubbish.
685. But Mr. Eaton has allowed £3 for that and another item; if you refer to page 5 of his bill of quantities is "Allow for old roof remaining till the new roof is finished, &c."; and then another item, "Allow for clearing away all rubbish, and all superfluous materials, and scrub floors at completion, leaving the premises clean and fit for occupation";—Mr. Eaton brackets these two paragraphs together, and prices them at £30? Someone evidently has bracketed them; I do not think he did. At any rate, you will notice that against the item, "Allow for old roof remaining till the new roof is finished, water-tight, and provide temporary gutters to old roof, and escape for water," he says, "Already allowed on page 2."
686. Is that his own note? Yes; but I should say £30 would be a very reasonable sum to put against it.
687. But you have not put anything against it, have you, in your estimate? Well, in the latter part of our estimate we have an item of £33. Mr. Eaton takes a good many of these items in bulk without going into detail. We should run a tender up enormously were we to put a price against small items, besides giving ourselves a great deal of unnecessary labour. Even when we get a quantity schedule out like this, we very often bracket a number together, and put a sum opposite them. It would be an endless task to fill up that thing.
688. What have you to say about the remaining items in Mr. Eaton's bill of quantities, as far as the general bill is concerned? The item, "Allow for temporary scaffolding," and such-like, is struck out as being included previously; and "for tarpaulins in every department where work is being performed, for protection of employees and machinery in motion" and "for temporary wooden enclosure, 50 feet long x 7 feet wide, and 26 ft. 5 in. in total height, around girder in jobbing-room," we have allowed £33 15s., but Mr. Eaton has allowed nothing. "For carefully taking down roof, lead-flats, iron principals, lantern-lights," Mr. Eaton allowed nothing; we have allowed £30.
689. It was not specified in Mr. Eaton's work, was it? Mr. Eaton had to do everything which was necessary, so that the architect could have asked Mr. Eaton to do anything which he, the architect, considered necessary.
690. But that £500 was there to cover that? Oh, dear, no. If I tender to do certain work, and to protect people in the course of doing that work to the satisfaction of a certain individual, I have to do what he asks me to do.
691. But you would not consider that you would have to erect a wooden enclosure 50 ft. long x 7 ft. wide x 26 ft. 5 in. high, where desirable, without being paid for it? I certainly would. Now look at the matter in this way: Suppose I had to pull down that wall which exposed that room, he could say, "It is

necessary

W. Stuart. 23 Nov., 1897.

necessary to close that off." I should have to admit it at once, and as I had to do everything which was necessary to make that room right I should have to put up that at my own expense. Of course, seeing that in a specification, I should at once go to see what I really had to do before putting in my tender and allowing for it in my tender.

692. But if that were not covered by the various items in the bill of quantities on which you had tendered, could you be compelled to do it? Yes; the bill of quantities has to be taken along with the specification, and if the specification distinctly states that I must protect everything and supply all materials and labour to do so in connection with the work, and in order to leave that in a finished state, I have not, and should not have, the least chance of getting anything, and should not ask for it, because I should have taken that into consideration when making up my tender and allowed for it.

693. Then you say that all this allowance here for temporary scaffolding and tarpaulins in every Department where work is being performed would have to be provided by a contractor at his own expense, and without any claim arising against the Department? I would not say yes to that, and I will tell you why. To everything which is included in the contract embraced in the specifications, and shown in the plans that will apply, but if they were to change their mind and say, "I do not think that wall is good enough. It is shown to be left standing in the plans, and is not specified to be pulled down, but we will pull it down," then I should at once ask them not only for the price of pulling it down, and doing any work which they wish to be done to it, but for any hoarding, or covers, or anything necessary to keep the place watertight and complete while it was being done.

694. Then you really are not certain about that item for temporary scaffolding and tarpaulins? Yes, I am.

695. That you would have no claim against the Government on that account? Not the least. I never would have thought of making it. I will put it to you in this way: Supposing I were a tenderer, and the sum of £500 were put down for contingencies, and I were to say, and every other contractor were to say, "Well, there is this to be done and there is that to be done, it will all have to come out of that sum," how on earth could we tender. We should not know anything about what we were going to do. It would be purely guess work.

696. What is the object of giving you a bill of quantities unless it is to show you what you have to do and what you have to allow for? The bill of quantities would in no case attempt to give the exact amount of canvas a man might require to close up a doorway while he was enlarging it. It would simply say, "You break a doorway through there and protect it in doing so." That is a matter which a contractor's judgment should teach him more than a quantity surveyor could possibly do.

697. Have you thrown out the rest of the items under the heading "general bill"? Everyone of these items has no right to be in there at all. Take any of these items you like. For instance, take the item—"For carefully taking down roof over stair-well next ruling-room, 15 ft. 10 in. x 26 ft." Mr. Eaton said he considered that the old material would pay for removal, and I quite agree with him. I was tendering on a job a little while ago where I not only undertook to take down all the old material on the works, but also made a considerable allowance for it.

698. We understand that you reject the whole of the items under the heading of general bill? No; there is one item we allow there in the quantities. Mr. Eaton estimated that there would be 450 feet of temporary guttering required in the alteration of the roof. Mr. Evans gives out that there were 950 feet required. It is the eighth item on page 3. We allow for 535 feet at 1s., the same price as he had put in. Mr. Eaton evidently had measured the work up when he made out 450 feet of temporary guttering. I give him credit for knowing quite well what he would require in doing the work. It seems, however, in the execution of the work there were 950 feet used. We do not admit for a moment that it was necessary to put up 950 feet. We say that Mr. Eaton was quite as competent to judge of that matter as anyone was, but as Mr. Evans has said that there were 950 feet, we waive that point and allow 535 feet. Although Mr. Eaton could probably have done the work with all he had allowed for it.

699. *Mr. Ball.*] But suppose he was required by the inspector to put it up, would he not have to do it? No; he is only required to protect the work, and the inspector could not possibly make him put up more guttering than is necessary to do that.

700. But you stated just now that a contractor would have to do the work to the satisfaction of the inspector? Yes.

701. Under another item you claim that you could not allow anything for it—that you would have to do it if the inspector wanted it to be done? You will recollect that I made the remark, "If it be necessary."

702. Then the point would arise: "In whose opinion is it necessary," and the inspector might say it is necessary? The architect is the one who says it is necessary, but he has control over the matter only to a certain extent. In a matter like this I do not suppose there would be any doubt about it, because it is a plain thing, which can be seen. Wherever there was a doubt in the matter we allowed it. Sometimes a man with considerable training may see his way to do a thing in a different way from what another man would, and thereby save a good deal of money. That, of course, accounts to a large extent for the difference in tendering.

703. *Chairman.*] Do you wish to point out any further items in connection with the bill? No, not under the heading of "general bill." The next heading is, "excavator, labourer, and drainer." In the original bill it was £112 1s. 9d., and in the work as executed the amount is £66 6s. The reason of the difference is that in the original work a long wall was specified to be pulled down, the ground excavated, the material taken away, and a new wall built. There was a good deal of work about that in the original bill, but it was not done, and not being done, of course, the difference had to be deducted.

704. Mr. Evans' bill shows that that has not been done? Yes; we take his quantities as being absolutely correct, and we price out his quantities at the same price as it was in the original bill, the difference of £66 6s. being caused by the work not being done. The next heading is "mason and slater." In the original bill it was £1,252 13s. 3d., and in the work as executed £1,068 16s. 9½d.

705. You might look at one or two of the larger items under that heading to see where the difference arises? The difference is caused by the omission of the stonework, and also by using old materials instead of new. Taking the next heading, bricklayer, in the original bill, the sum is £1,388 11s. 10d., and in the work as executed it is £903 4s. 10d., the difference being caused by the omission of over half the brickwork. The carpentering work in the original bill amounts to £3,360 8s. 5d., and in the work as executed it amounts to £2,680 9s. 1½d., the difference being caused by the omission of inside lift, £700; forme lifts, £300; and the lift from the silver-printing room, £20. The omissions altogether amount to £1,020. The

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next item is the ironmonger, which is practically the same. In the original bill it is £69 8s. 2d., and in the work as executed it is £74 11s. 7d. The "smith and founder" in the original bill is £1,766 15s. 11d., and in the work as executed it is £1,720 16s. 6d. I may make the remark that there is more work in the part executed than was originally specified, but an allowance of £150 for a stair in the building accounts for the difference. The next item is the "plumber." It is £1,240 18s. 9d. in the original bill, and £1,111 13s. 4d. in the work as executed. The difference is caused principally by the omission of a gas service, amounting to £130 12s. 9d., and by the omission of some zincwork which was specified for a roof, but instead of which old slates were used. The next item is the "plasterer." In the original bill it is £189 9s., and in the work as executed it is £60 1s. 11d. The difference is caused principally by the omission of cementing the walls on the inside. The walls, instead of being cemented, were lime-whited. The item "painter and glazier" comes to £649 18s. in the original bill, and in the work as executed it is £626 3s. 6d. There is an addition to the quantity of glass, but there is a deduction in the paintwork. A large amount of the work is specified to be painted, but instead of being painted it was either lime-whited or done with duresco, which is about half the price.

James Milne Pringle sworn and examined:—

J. M. Pringle. 23 Nov., 1897.

706. *Chairman.*] Are you a contractor by occupation? Yes.
707. And a member of the Builders' and Contractors' Association? Yes; I occupy the office of Vice-President.
708. You have been engaged with Mr. White and Mr. Stuart in going into the quantities prepared by Mr. Evans? Yes.
709. And you have seen the documents which Mr. White handed in here to-day, showing the comparative cost of the work according to Mr. Eaton's prices? Yes.
710. Are you jointly responsible with those gentlemen for the preparation of that document? Yes.
711. You believe the prices contained therein are correct and fair? They are based on Mr. Eaton's schedule as far as possible.
712. And where Mr. Eaton's price did not apply, how did you fix the price? We tried to find some item if possible of a similar nature, and if we could not do so we allowed what we considered a fair price.
713. You have accepted the bill of quantities as correct, for the purposes of this inquiry? Practically. There are several items which we do not agree with, such as allowances chiefly, and which do not appear in the original schedule.
714. And against which you placed no sum of money? Yes.
715. Have you any general observations to make about the carrying out of the work? No. We examined the work. It is good work; no better and no worse than a good contractor would turn out.
716. You are quite satisfied that you, and Mr. White, and Mr. Stuart have gone carefully into the matter, and that that document might be put in as correct? As far as we could make a comparison between the original schedule and this schedule, we have tried to arrive at a correct conclusion.
717. *Mr. Ball.*] Do you consider that Mr. Eaton's prices were fair, reasonable prices or were they low prices? It is a difficult question for me to answer, as I tendered for this work.
718. *Chairman.*] What was your lump sum price? £13,200, I think, which is somewhat below what is given as the average in the Parliamentary paper.
719. In other words, your price exceeded Eaton's price by over £2,000? Yes; about 23 per cent. I ought to say, with reference to that matter, that I examined the building very carefully before tendering, and I noticed that certain walls were to be taken down to the bottom, new foundations put in, and the machinery was supposed to go all the time. This would have had the effect of leaving the wall facing Phillip-street standing by itself, and the rest of the floors supported by shoring. I may have placed an excessive value on that work, but I did not think so, and I do not think so now. The work was not carried out. I think if it had been carried out, there was the risk—and a great risk—of the whole thing coming down, so that may account in a certain degree—I do not say it accounts altogether—for the difference between my price and the lowest price. I may say also that Mr. Eaton has tendered for works for which I have tendered and has got lower and carried them out satisfactorily. He has a good reputation as a contractor.
720. *Mr. Ball.*] Do you consider the prices opposite the different items in this tender fair prices? I cannot answer that question, because you can see at once that as I have tendered I have really given my opinion as to what the value of the work is.
721. Do you think that they are low prices? You can draw your own conclusion from my tender.
722. *Mr. Bavister.*] Did you consider that you were putting in other than a fair price? No; I remember I put in a price which would pay me, and which would also pay for the risk, which was a very considerable one, and which has not been undertaken by the Government. That is an important point.
723. *Mr. Ball.*] You were allowing for having to take down a wall, and to put it up again? Yes; evidently they came to the same conclusion as I did—that it was not safe to take the walls away.
724. *Chairman.*] You said that your price was 23 per cent. over Eaton's price;—did you expect to make 23 per cent. out of the work? No.
725. You reckoned that it would have cost you more than Mr. Eaton tendered for when you put your tender in; your belief was that it would cost more than £10,835? Certainly; I think it is only fair to myself to mention that I tendered. You did not ask me the question, but I thought it necessary to give you the information.
726. Do you desire to make a statement in regard to the work, or anything which has come under your notice? No; except that I agree thoroughly with what we have done. We have estimated this work on the basis of the lowest tender, and where that did not apply we allowed a fair and reasonable price.

WEDNESDAY,

WEDNESDAY, 24 *NOVEMBER*, 1897.

Present:—

MR. BALL. | MR. BAVISTER.

F. E. McLEAN, ESQ., IN THE CHAIR.

A. F. Evans. 24 Nov., 1897.

Arthur Foster Evans recalled and further examined:—

727. *Chairman.*] On the last page of your bill of quantities I see the following memorandum:—"For comparative purposes or provisional amounts contained in the original bill of quantities should be added to the above total. This bill contains no such amounts." I want you to explain why you think that these provisional amounts should be added to the total previously arrived at for comparative purposes? You need not add them. You can deduct the provisions from Mr. Eaton's total to make a fair comparison with the total arrived at here, or you can add them in the way I have done. You can add them to the one or subtract them from the other so as to get a fair basis of comparison. There are two lots of work which are to be compared. The works are supposed to be equal or thereabouts; but the one lot of work contains provisions of money and provisions in kind which the other one does not. Therefore, to make them comparable, the one should either have the provisions in money and kind subtracted from it, or else the other one, which does not include them, should have them included with it.

728. I understand that this bill of quantities represents the whole of the work carried out at the Government Printing Office according to the original plans and specifications, with such deviations as were found necessary during the progress of the work? Hardly that, I think. It comprehends the work which was originally contemplated.

729. But as you give us the quantities here they represent the finished work? Yes.

730. Then you have priced these quantities at Mr. Eaton's prices where they would apply? Yes.

731. So that when you arrived at the total of £9,715 12s. 6d. that represents what the work would have cost the Government, in your opinion, had Mr. Eaton's tender been accepted? I do not admit that.

732. Well, what does it represent? The amount represented for the value of the work, as you have stated, is £10,995 12s. 6d. But, I have credited here—(1) the value of old materials, which, by the way, is that part of the value which is really credited to this job in the Treasury; and (2), the authority for the closets; and (3), the authority for the alteration of the main angle; and (4), the roofing felt—items which total up to £1,280—and are separate authorities which you will find given in the Parliamentary paper.

733. In other words, they are extra works which were not provided for in the original bill of quantities? I do not think they are extra works; it is simply a matter of arriving at a total. I have measured the work as it was executed, because there was no way of measuring—say, the closets—leaving out exactly £400 worth of work. There was no way of measuring the main building, leaving out exactly £600 worth of work. I could not tell when I had measured up to within the £600 exactly. Therefore I had to measure the whole work, and leave these amounts out. But I am not prepared to say that £600 would have been claimed by, and granted to, Mr. Eaton for that amount of work involved in the alteration to the design of he main angle.

734. To come back again to the total of the summary, before the credit appears: You arrive at the sum of £10,995 12s. 6d. as the amount that this work would have cost on the measured quantities, at Mr. Eaton's prices, where they would apply, and fair valuation and cost price where his prices did not apply? Yes.

735. Does not that really represent what the work would have cost the Government had Mr. Eaton's tender been accepted? I could not say that, because the items in this bill are not the items in Mr. Eaton's bill.

736. That may be so; but would not Mr. Eaton have been compelled to carry out his contract at the prices enumerated in his schedule? Yes.

737. And where they would apply he would have had to accept those prices? Yes.

738. And the other prices you have put in are what you consider the Department would have allowed? Certainly.

739. So that, practically, that sum of £10,995 12s. 6d. represents what, in your opinion, the work would have cost the Department on Eaton's schedule? You said the prices which the Department would allow. I think the Department would be very happy to take those prices from a contractor. Most likely they would have had to allow much more. Therefore, I think this £10,995 would have been increased somewhat. I think the cost to the Department would have been more than £10,995.

740. *Mr. Bavister.*] Is that in consequence of the general impression that extras in a contract always cost more than the schedule prices? Yes; they generally do cost more.

741. *Mr. Ball.*] Are not extras governed by a schedule if they come within the schedule at all? Yes; where they come within a schedule, and it is clear that the schedule prices should obtain, certainly they must obtain.

742. *Mr. Bavister.*] There is always an attempt made to put extras outside the schedule so as to get an increased price, is there not? Certainly.

743. And in the majority of instances that attempt succeeds, does it not? Yes; there is always some attempt by a contractor, I suppose, reasonably or naturally, to turn an item, or to describe an item in some form whereby it does not fit the schedule, or to get an item inserted which is different from the schedule.

744. *Chairman.*] I am not at all clear about the subtracting of this sum of £1,280, and the adding on of the sum of £1,151 12s. for provisional sums, and I would like you to explain the items one by one. Taking the credits first of all, you allow £200 off the total price for the value of old materials;—will you explain why that credit is made, and how you arrived at £200? All the items contained in the credits were given to me by Mr. Cook. The value of £200 for old materials is the sum which the old materials were sold for by auction, and which was paid into the Treasury.

745. *Mr. Bavister.*] This £200 is the money actually realised—not an estimate? Yes; Mr. Cook is responsible for the accuracy of that amount. It is not the whole value of the old materials, because part of them were exchanged for new materials.

746. You used them in place of others? We exchanged them with merchants in Sydney. The old leadwork which came from the roof, for example, was exchanged for new lead or other new material.

747. *Chairman.*] Were there not some old materials used in the work which the contractor would have had to remove—old bricks and old slates? Yes; but of that I would not be sure.
748. As a matter of fact, you measured up the work as if it was all new work? No; wherever old materials have been used for work you will find that I have said in the item "from stock." That old material may have come from the Printing Office, but, with the exception of the slates, I do not think that more than £15 worth of old materials from the Printing Office were used in the work. In fact, I will say that the value of the old materials used throughout these additions—I am referring now to the additions measured by me—did not exceed £15.
749. Does that apply to bricks too? To everything except slates.
750. *Mr. Ball.*] You stated that £200 was raised by the sale of old materials in connection with this work;—is there not a provision in the specification that all old materials shall be the property of the contractor? I am not acquainted with the old specification.
751. The specification on which Mr. Eaton tendered? I do not know anything of that.
752. *Mr. Bavister.*] If that were so, the contractor would have had the right to sell that material? Certainly.
753. If there was such a clause in the specification the contractor would have sold the material and obtained what he could for it? I have never seen the old specification, and I am not prepared to swear as to what was in it.
754. *Chairman.*] I fail to see why you make a credit of £200 for the value of old materials. This bill of quantities is not prepared to get at the cost, but to get at the amount which would have had to be paid to a contractor under the old arrangement? In that case you would use for comparative purposes the first total, £10,995 12s. 6d.
755. I want to call your attention to the first part of your bill of quantities headed "Preamble to the General Bill";—you arrive at a total there, which is carried forward to the summary, of £883 10s.? Yes.
756. You allow for the services of a watchman for nights and Sundays during the progress of the work, £108? Yes.
757. The amount allowed by Mr. Eaton in his bill of quantities was £42? Yes.
758. Can you explain why you have increased that item to £108? I do not know how long Mr. Eaton allowed for the services of a watchman. I do not know the length of time given for the contract, but I know what it cost us for a watchman.
759. Is not this bill of quantities priced on the basis of Eaton's prices wherever they would apply? Yes.
760. *Mr. Bavister.*] It is a material difference? Yes; we paid a man £2 a week for twelve months, and why have we got to put down £42 down for it.
761. There is nothing to show us on what Mr. Eaton based his estimate? No.
762. *Chairman.*] But Eaton would have had to put up with his price which he had assumed was sufficient? Yes; and you want me to put up with the same price.
763. The same principle would apply to anything else;—for instance you might think his price for stonework or for brickwork was too low? But I should use his prices, nevertheless, unless the conditions have changed.
764. The contractors told us yesterday that Eaton's time for the contract was ten months;—will you refer to the specification I hand you, and tell the Committee what period was prescribed? I see by the specification the time for completion is thirty weeks. He has allowed about 30s. a week for thirty weeks.
765. You have allowed the actual cost? We had to keep a man there for over twelve months, and we paid him £2 a week.
766. That really does not affect the comparison? I think it does.
767. If Mr. Eaton allowed only £42 for that particular service there is no way by which he could increase the amount of his contract, even though it took him twice as long to do the work? That is true. I do not see that that has anything to do with the case, because he would allow for the service under certain conditions, viz., thirty weeks. We allow for a service of fifty-two weeks. You might reasonably say that the proportion would be in that of thirty to fifty-two, but you could not expect us to keep a man going for fifty-two weeks for the same price as a contractor would allow for keeping a man going for thirty weeks.
768. The question really is whether you have carried out this work at more or less cost than Mr. Eaton would have carried it out at, and the fact that you allow a larger amount for that service seems to show that it has cost you more to do the work in that respect? That is, of course, for you to say. I am simply pointing out that the service is under different conditions.
769. Looking at Mr. Eaton's bill of quantities, what is the total amount that he arrives at there on the "general bill"? £796 7s. 6d.
770. And that includes the amount of £500 for contingencies? Yes.
771. Deducting that amount for contingencies, what will be the amount? £296 7s. 6d.
772. According to your "general bill," the amount would be, at Eaton's prices, £883 10s.? Eaton's prices would not apply; we have different items altogether.
773. But if Eaton's tender had been accepted, would he have been allowed these prices, amounting in all to £883 10s., on the "general bill"? Most certainly.
774. You give that as your deliberate opinion? That is my deliberate opinion. You quite understand, of course, that this amount of £883 10s. is really only an item in getting out the total. It is just a matter of practice amongst surveyors whether they will put these items in the preliminaries, or in the bricklayer's bill, or in the carpenter's bill. It is just a matter of surveyors' practice as to whether this item shall be increased, or whether the carpenter's item shall be increased. Some of these things which are in the preliminary bill—for cutting away and taking down things, and doing jobbing work about the place—could not be conveniently described in any of the trades, because they embrace several trades, and are as applicable to one as to another. Therefore, they have been put in the preliminary or general bill.

TUESDAY, 30 *NOVEMBER*, 1897.

Present:—

MR. BAVISTER, | MR. WILKS,

F. E. McLEAN, ESQ., IN THE CHAIR.

Arthur Foster Evans recalled and further examined:—

A. F. Evans. 30 Nov., 1897.

775. *Chairman.*] I understand that you desire to explain some matter which is not clear in your evidence? On the last occasion you asked me some questions about the various amounts, and I wish to point out that £10,995 is the valuation of the amount of work executed—comprehending the work which was originally contemplated. It must not be forgotten that the design executed is different altogether from the design for which Eaton's tender was the lowest, viz., £10,885. The amount £10,995, therefore, is for that amount of work which corresponds to that originally contemplated, although of a different and much larger design, and is inclusive of the additional amounts authorised for the (1) main angle, (2) the latrines, and (3) for roofing-felt. The amount of £9,715 12s. 6d. is £10,995 minus £200 credited for old materials, and also minus the additional amounts authorised for the (1) main angle, (2) the latrines, and (3) the roofing-felt. These additional amounts are deducted, because they have to be accounted for with the other additional amounts authorised to be expended, and which are enumerated on the Parliamentary paper. The amount £10,995 is the amount £9,715 just referred to plus the provisions of money and provisions in kind included in the design for which tenders were called, and which must be included now in the work measured as actually done, or else deducted from the work originally proposed to have been done to make them stand upon similar levels, either both with provisions in them, or both without provisions. By valuation, I mean that amount arrived at under the conditions imposed upon me, viz., at the rates in Mr. Eaton's bills of quantities where they will apply, cost prices where Mr. Eaton's prices do not apply, and analogous valuations not including any profit where cost prices cannot be obtained.

776. *Mr. Wilks.*] You said that the design on which the work was executed was different from the design on which Mr. Eaton sent in the lowest tender;—was it materially different? Yes.

777. Is the inference to be drawn from that statement that it was a more costly or a less costly design? I am not prepared to say that. That comes out by the bills of quantities.

778. Will that affect the comparison at all? You can get your comparison properly and exactly from the two separate bills of quantities. The two designs are different—one is much larger than the other. The work as finished is very much larger than the design for which Mr. Eaton's tender was the lowest.

779. Supposing that your quantities equalise with Eaton's, you are giving more work for that money? Yes.

780. *Chairman.*] Still there have been some counterbalancing items in the way of work not executed or savings made, which I daresay have helped to compensate the Department for the extra work carried out in the larger design? Doubtless there have been certain works which have been omitted from the work as executed, which it was found as the work progressed would be disadvantageous—for example, in extending the floor space—in giving more accommodation.

781. *Mr. Wilks.*] If Eaton were to tender for the work as executed it is reasonable to believe that his tender would be much higher? Undoubtedly, much higher.

782. That is, after allowing for all these counterbalancing items which the Chairman spoke of? Yes.

783. *Chairman.*] Do you produce the bill of quantities for the extra work? I produce the bill of quantities for the additions, being the further additions to the work set forth in the schedule dated August, 1897. The bill of quantities is prepared by Mr. Pate. It has been priced and moneyed out in a similar manner to the first bill of quantities, and the total amount is £7,417 16s. 1d. The general statement may now be made as follows:—The actual expenditure, *ex* Parliamentary return, is £17,856, from which has to be deducted the amount paid into the Treasury by the Department, £200, for old material; so that the net cost of the work is £17,656. The estimate or valuation of the first part, as set forth in the first bill of quantities, is £10,995 12s. 6d., and deducting from that the additional amounts which were authorised to be expended, and which were included in the last bill of quantities, it leaves £9,915 12s. 6d.; and then adding on the amount of the bill of quantities now produced, £7,417 16s. 1d., that totals £17,333 8s. 7d., leaving a difference between the actual expenditure and the actual cost of the work, as set forth by the two bills of quantities, of £322 11s. 5d.

784. Have you adopted the same principle in pricing this bill of quantities as you adopted with the original one—that is to say, that where Eaton's prices would apply you have used them, and where they would not apply you have either used cost price or a fair valuation? I have priced the bill in the manner you have stated, but never in any case allowing a profit or a sum or sums analogous to builders' establishment charges, or anything like that. They are simply cost prices, without the cost of supervision, and without any profit.

785. I understand that Mr. Pate is responsible for the measured quantities, and that you are responsible for the pricing of the document? Yes.

Alfred William Whitaker Pate sworn and examined:—

A. W. W. Pate. 30 Nov., 1897.

786. *Chairman.*] You see the document which has been handed in by Mr. Evans—a bill of quantities for the work carried out at the Printing Office? I do.

787. Was it prepared by you? Yes.

788. Did you measure the quantities enumerated in the bill? I did.

789. What experience have you had in quantity surveying? I have had an experience of fifteen years in all—formerly as assistant in London and Melbourne, and for the last six and a half years I have practised here as a quantity surveyor, and for five years of that period I was one of the surveyors to the Contractors' Association.

790. Are you now in practice as a quantity surveyor? Yes.

791. Have you any connection at the present time with the Builders and Contractors' Association? No.

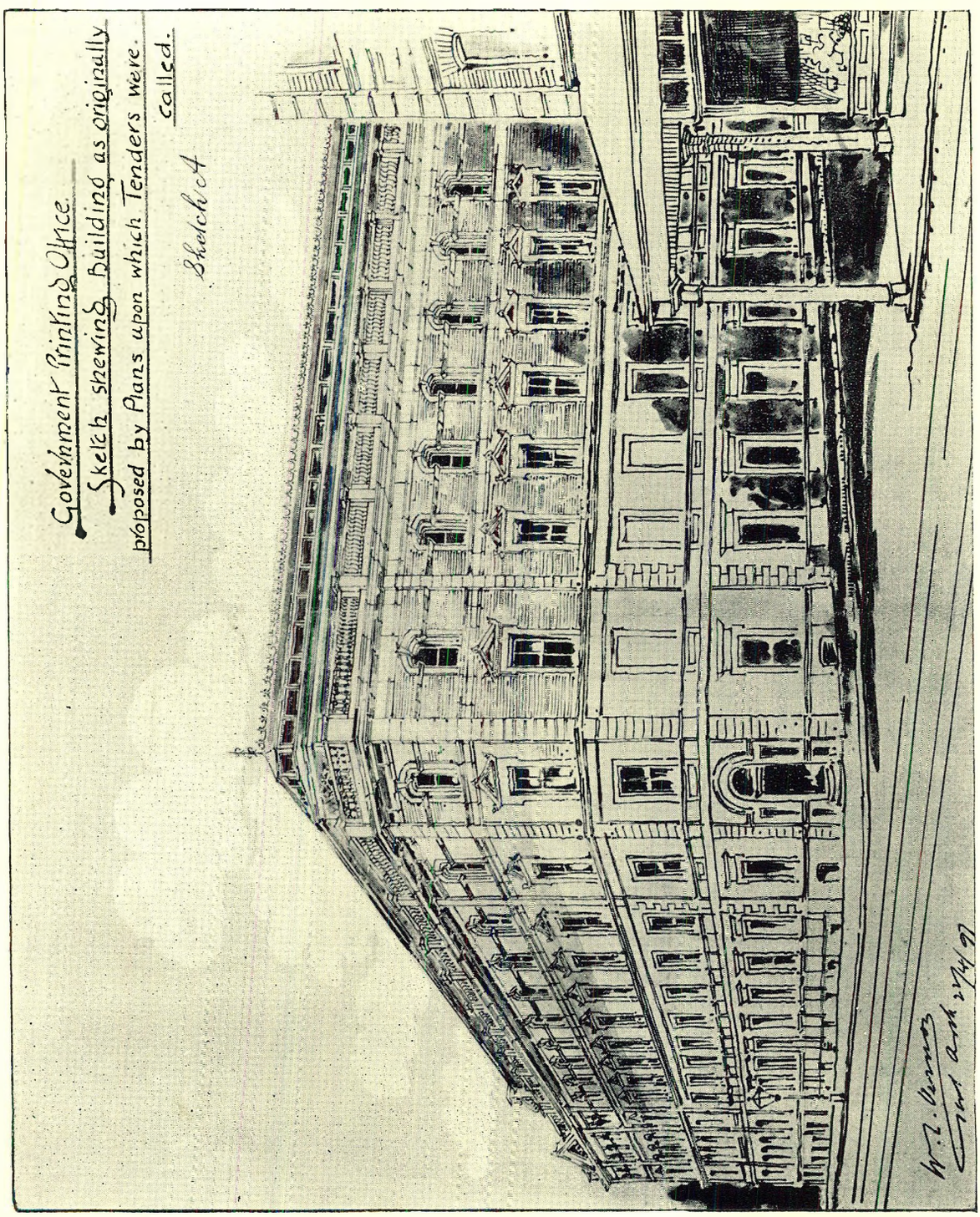
792. Have you ever been employed by the Government before in connection with work of this kind? I have been employed by the Government to prepare quantities for several buildings.

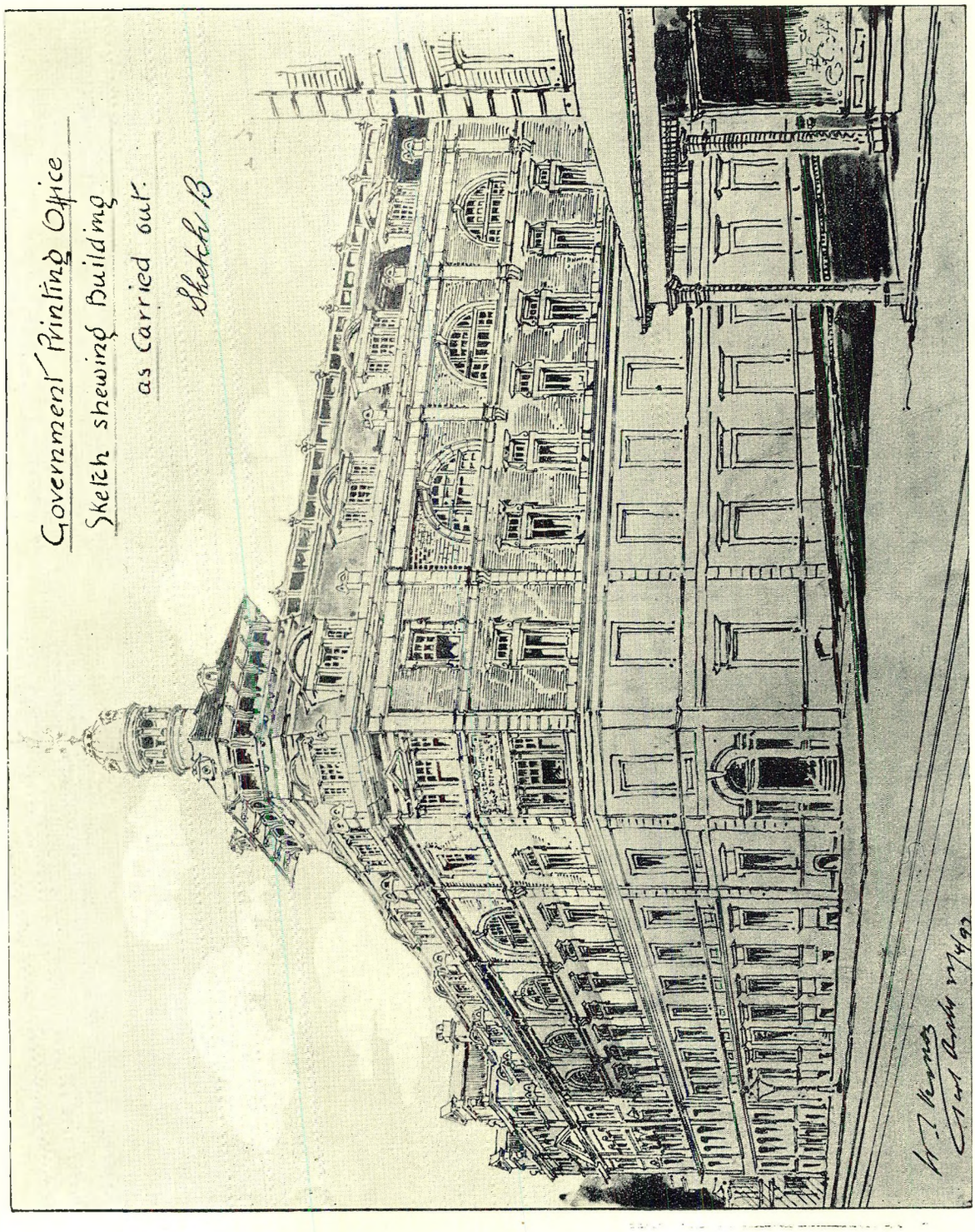
A. W. W. Pate. 30 Nov., 1897.

793. Will you enumerate some of the buildings? The Kenmore Hospital for the Insane, the Court-house at Maitland, the additions to the Treasury, the additions to the Museum, the Court-house at Nowra, the additions to Newington, and other jobs which I cannot call to mind at this moment.
794. During your connection with the Builders and Contractors' Association you were under some guarantee to them in regard to furnishing correct quantities? Yes; my late partner and myself were under a guarantee of £1,000 to them that our quantities were correct.
795. And you furnished quantities to them during a period of five years? Yes; under that agreement.
796. Did you have any claim made on you during that time for losses made by builders tendering on your quantities? No.
797. Your connection with the Builders' and Contractors' Association was always of a satisfactory kind? It was always satisfactory.
798. Will you explain what portion of the work carried out at the Printing Office these quantities really refer to? These quantities refer to the works which would have been extra works had the original work been a contract. That is, additions to the contract in the course of the work.
799. And not contemplated in the original design? No; these are sums afterwards authorised to be spent by the Minister.
800. Are you absolutely certain in your own mind that there is nothing included in the bill which it would have been incumbent on the contractor to carry out without extra payment? Yes; but I may point out that it was not my business to separate these things. They were to be pointed out to me by an officer of the Department, but at the same time I took certain care myself to see that that was the case. I was furnished with Mr. Evans' dimensions, and I was careful not to include anything which had been taken in his, but the actual discrimination between the work included in the contract and the work contemplated in the authorised works was to be decided by the officers of the Department. I simply measured what was pointed out to me.
801. You had an opportunity of seeing the bill prepared by Mr. Evans for the work originally contemplated? Yes, and all its details. I had all his figures.
802. And you are prepared to swear that there is nothing in your bill which is included in his bill? Quite so.

ADDITIONS AND ALTERATIONS TO THE GOVERNMENT PRINTING OFFICE.

APPENDIX.




Government Printing Office
Sketch shewing Building
as Carried out.
Sketch B

C.

[*Appended by the Committee.*]

SPECIFICATION OF WORKS to be done and material to be provided and used in adding two additional stories, and making various alterations and additions to the Government Printing Office, according to plans and specification and further details and instructions which may be from time to time provided.

Public Works Department, Government Architect's Branch, Sydney, , 1895.

Generally.

The whole of the works to be carried on without stopping the work of the Office, and the portion facing Bent-street to be completed first, so that it may be used whilst the portion facing Phillip-street is being constructed. The contractor is to provide at his own cost all shores and temporary roof and fencing, and perform any underpinning, and to be responsible for any damage to the property or accident to individuals from whatever cause arising, and the struts used for shoring up floors while brick walls are being removed and rebuilt to be placed in such positions that the brackets or plumber-blocks carrying shafting may be slewed round and bolted thereto, thereby causing no stoppage to machinery. The contractor will have to enter upon the work when required; he will have to take down the old walls required, take up the foundations, drains, and other impediments, and clear all old material and rubbish from the premises; to erect all necessary hoarding in accordance with municipal requirements, keep it in order during the progress of the works, and remove it on completion with any other hoarding, scaffolding, or impediments which may be on the ground. He will have to give all notices, submit all plans, pay all fees, and make all arrangements with and carry out the work in accordance with all municipal and Water and Sewerage Board and Gas Company's requirements. He will have to procure some piece of ground in the vicinity which is to be considered part of the site for the time being for working and stacking his materials, fence it in and maintain it at his own cost. He will have to provide and erect all scaffolding, shoring-up, centering-sheds, and provide all materials, ladders, tools, and other necessaries, and lay on water for his own use at his own expense. He will have to provide all closet accommodation for the workmen employed other than on the premises, and to keep a watchman on the premises at night and on Sundays.

The contractor is to set out the whole of the work, excavate for foundations to the required depths, but not to commence setting the footings until the bottom has been inspected and approved by the Government Architect.

He is to carry out the work in accordance with the drawings and specification and future details and directions which are to be worked to, and in the case of any details or explanatory drawings or directions being given to the contractor in which he should consider there be more work than that shown in the contract drawings, or described in the specifications, he shall give notice to the Government Architect to that effect, with his objections thereto, or otherwise carry out the work according to the detail drawings given him without further charge.

The old roofs over building are to remain until the walls are carried up and new roof put on, and building made watertight. To provide temporary gutters to the old roofs, with escape for water, and make the roof water-tight, so as not to interfere with the rooms below.

The contractor is to complete the first portion within six months after signing the contract, which is to consist of all the portion facing lane at back, running along Bent-street to easternmost angle of corner, and is to erect a temporary weatherproof partition, so that he may give up full possession when it is certified to as being completed. The partition to be removed upon completion of the work.

The contractor is to construct a partition off a portion of old building, where directed, as a Clerk of Works' office, fitted up with table-drawers, two stools, hat-pegs, and approved door-lock and key, also locks and keys to both drawers. The sum of £10 to be allowed for same, to become the property of the Government on completion.

The contractor is to carry out his contract and make all arches and openings for belting, shafting, &c., required, with brick arches in cement; all jambs to be carried up true and plumb. All old materials become the contractor's property, but cannot be reused.

Insurance.

The contractor will have to insure the building in an approved office, in the name of the Hon. Minister for Works for three-fourths ($\frac{3}{4}$) the contract sum, and pay all premiums required for same until the issue of the final certificate of completion. The policy and all receipts to be delivered to the Government Architect.

The insurance to be effected immediately on signing the contract.

Excavator.

Excavate in rock or soil for foundations of all walls, piers, or columns in positions and to the depths shown, and cart away any surplus earth not required in or around foundations.

Pull down existing walls to be rebuilt and take up foundations; none of the old material to be used again, to become the property of the contractor and to be removed from the premises.

After taking down the old walls, foundations, &c., excavate and level the ground to the required depths, and in all cases to go down to the bed-rock. Any old drains, water or gas pipes to be taken up and diverted as required to other channels, and made good with all necessary junctions; all new materials to be used in this work and to be done at the contractor's own cost. The bottoms of all trenches to be properly levelled and stepped in 12-in. and 6-in. steps as required.

The contractor is to clear away all rubbish from under the building and about the premises, and cart away any surplus earth or rubbish, and leave the premises clean. Floors to be scrubbed out and left fit for occupation.

Remove present roofs and other work over existing building when raised on, and cart away; the old roofs to become the property of the contractor.

Materials.

Stone.—All the freestone used in the foundations and other parts of the buildings to be the best Pyrmont stone or other of equal quality, to be approved before being used, and to match in colour as nearly as possible that of the existing stonework. All stonework to be laid on its natural bed.

Templets.—Templets built into the walls to receive the ends of the girders to be hard freestone.

Slates.—Slates for steps and urinals and damp course or other purposes, to be the best Bangor slates in thickness hereafter specified, to be selected of a uniform colour.

Bricks.—Bricks to be of the best description, hard, sound, well burnt, of proper size and shape, to be built in old English bond; 9-in. walls to built in colonial or Flemish bond with frog upwards, to be well soaked in water and laid wet; no bats or broken bricks will be allowed in the work, sample of bricks to be submitted and approved by the Government Architect; facing bricks to be double pressed, and to bond with backing bricks and to match existing work.

Cement.—Cement to be the best Portland of approved brand, mixed with clean sharp sand—two of sand to one of cement.

Sand.—Sand for all purposes to be clean and sharp, well washed, free from saline and all vegetable matter.

Mortar.—Mortar for all building purposes to be composed of the best fresh-burnt stone lime and clean and sharp sand, mixed in proportion two sand, one lime, ground and mixed in a mortar mill, the lime to be stacked on the ground. That for plastering purposes to be shell lime.

Concrete.—

Concrete.—Concrete for foundations or other purposes to be composed of four parts of Kiama blue stone, broken to 1½-in. gauge, two of sand to one of cement, to be well mixed and incorporated with fresh water, and well rammed down after being thrown in.

Timber to be colonial hardwood, blue gum, blackbutt, or tallow wood as directed, cedar, Oregon, Baltic red deal, and kauri, to be well seasoned, free from sapwood, shakes, knots, white ant, gum veins, and all other defects, and to be cut full and square to the sizes specified when finished. All flooring or lining boards to be stacked on the ground within three months after accepting the contract. Timber for roofs, all ceiling joists, and other framing to be of Oregon; all floor boards and joists, door frames, and timber of lead flats to be of hardwood; all doors, windows, box frames, sashes, skirtings, linings, fascias, and all joiners' work to be of cedar, and lining of ceilings, boxing in of girders, rolls for lead and zinc roofs, also boarding for roofs, boarded partitions, herring-bone strutting grounds, beads, gutter boards, bearers, and valleys to be of Oregon.

Mason.

The whole of the mason's work to be built in cement, flushed up every course, and grouted.

Stone Footings.—The footings for the nine columns on ground floor to be 3 ft. x 3 ft. x 1 ft. 6 in. deep, in single stones, and bedded on the solid rock; the footings of walls to be concrete, to be 12 in. wider than the wall or footing above. All fronts to be of brick and stone, as shown; all stone to be laid on its natural bed.

Carry out stonework in freestone according to future detail, and to line with old building. All cornices, copings, caps, pediments, &c., to be dimension stuff, and to be all through stones, heads, sills, and jambs to windows and doors to be in single stones, no stones to be less than 4 ft. in length; all stonework to have chiselled beds and joints, and the cornices, coping, and parapet walls, and all stonework to be grooved and grouted with liquid cement; all exposed surfaces to be rubbed. Carry all cornices, copings, strings, and quoins, &c., in Bent-street front round corner in lane the same distance as in existing work; carry up all quoins in existing ones on all fronts as at junction of new with existing buildings as shown.

The existing work to be pulled down to the level shown on drawings all round, and rebuilt in new materials; all new work to be made to thoroughly bond with old, and any expense incurred in cutting away of old work to bond with new, or any new material required to make good bond, to be borne by the contractor.

The top of all blocking courses, copings of parapets, weathering of cornices, and other projections, to be weather-jointed, pointed in cement, and painted four coats oil and white lead, and back and top of brick parapets to be rendered in cement and painted four coats. Carry balustrade round building with turned balusters to match existing ones, and to be dowelled into blocking and coping.

The whole of the stonework exposed to view of old and new building throughout the joints to be raked out and pointed with a clean-cut even joint. The putty for the face work to be made with oil stained to the colour of stone, no portion of the work to be carried up more than 4 ft. until the whole is brought up to a level, and to be carried up simultaneously with the brickwork. All stones to be wetted on beds before being laid.

Damp Course.—Build in new wall at rear damp course, consisting of two courses of Bangor slates, bedded and flushed up in cement, to be the full thicknesses of walls and piers, and first course of stone or brickwork above to be set in cement.

Mantelpieces.—Provide and fix marble mantelpieces, of the value of £3 10s., to two fire-places, and register grates of the value of £2, exclusive of fixing and carriage, to be selected, to be filled up solid behind with stone concrete.

Hearths, Sills, and Steps.—Provide and bed in mortar 2-in. rubbed slate, inner and outer hearths in one piece each, jointed to the floors, to be 18 in. wide, and 24 in. longer than the openings, to have three 2½-in. x 1-in. wrought-iron bars built into the brickwork, and bolted through trimmer or joist, with sheet of corrugated galvanized iron and 3 in. of concrete, and hearths bedded on same; also provide and fix 2-in. rubbed slate steps and sills to doors to lavatory, lifts, and doors on first floor, 2 in. longer than openings by full thicknesses of walls, and rounded and returned, projecting nosing to be mortised for door frames.

Window Sills.—Window sills to be of 9-in. clean-chiselled freestone, all through stones in one length, and projecting 2 in. and 18 in. longer than openings, to be properly sunk, weathered, and throated, and rebated for wood sills, and set hollow, other sills to front windows to be as per detail.

Templets.—Provide and build in freestone templets the full thickness of walls or piers, and four courses of brick-work in height by 2 ft. long, with axed beds and joints under ends of all iron girders, also to receive the ends of beams or large timbers of old or new work, also similar freestone templets, 3 ft. long, under the feet of cast-iron columns or walls.

Rebuild portion of party wall disturbed in old building with all carved trusses and mouldings, as per detail. Carver to be approved by the Government Architect.

Generally.—Cut chases in stone walls, 6 in. deep, at intersection with brick walls, to bond in and provide and build in every 6 ft. in height 2½-in. x ½-in. galvanized iron cramps, 1 ft. long, with ends turned down also where the old and new walls meet, every other stone to be bonded in at least 15 in., and bonded with galvanized iron cramps as above. The mason is to cut all chases for rain-water pipes or other purposes and openings as may be required, all sinking or cutting for panels, &c., checking for lintels, plates, frames, form any skewbacks which are to be worked perfectly true, cut all holes, slots, bolt-holes let in; all cramps, iron ties, or plates, and other work, as may be necessary in connection with other trades.

Provide and build in 2 tons of galvanized iron cramps and 2 tons of stout 2-in. galvanized iron bond, also 3 tons of rolled iron girders, in addition to any herein specified, that not required to form reduction on completion.

Bricklayer.

Pull down old walls where required, but before disturbing old work shore up old floors with 12-in. x 12-in. posts and plates, cramped together and carried up from the solid ground. Cut out any wood, bricks, or lintels in walls that are to be raised upon, and make good with 14-in. brick arches in cement on cambered 3-in. x ½-in. iron bars. Take down as much stone coping from party walls as may be required.

All walls and other parts coloured red on plans and sections and pink in elevations to be built of brick in cement, of the forms and dimensions shown, carried up perfectly level and plumb, flushed up every course and grouted in cement, the joints to be ⅜ in. thick, and the external faces of all walls, except fronts, to be left rough for cementing. The whole of the old and new brickwork in fronts, excepting new wing in Phillip-street, to have joints raked out ½ in. deep, and bricks coloured to be properly tuck-pointed with putty.

Footings.—The walls to be built on a solid footing of concrete 12 in. wider than the spread of footings of wall, to spread twice the thickness in the required number of courses with 1½-in. offsets to each course. Form all door, window, and other openings. Jambs to be perfectly plumb, and form reveals or checks for frames; finish the whole of the interior of brick walls with a neatly-struck trowel joint.

Arches.—Turn 14-in. axed and grouted arches over all door and window openings, springing from properly formed skewbacks, and 18-in. segmental arches over wide openings on 2½-in. x ½-in. cambered wrought-iron bars, one to every half brick in thickness, the ends built 12 in. into walls and turned down. All courses to be perfectly horizontal.

Chimney breasts.—Chimney breasts to be carried up square to line of ceiling and built solid, leaving the flues, which are to be 9 in. x 9 in., and turnover openings 9-in. brick, semicircular arches. Carry up stacks above roofs to correspond with existing ones, and provide and carry up one extra flue in each stack for ventilation for sewers or other purposes, to commence from the lowest point. All smoke or ventilating flues to be lined with 6-in. glazed earthenware pipes, let in cement.

Flues.—Carry up all flues in old work with new work in additions. Carry over arch and parget and core and gather in with new, care being taken to prevent mortar dropping down.

Wall plates.—In all cases where joists have a bearing on walls, both in new and old floors, where the wall has been rebuilt, to have 2-in. x ½-in. galvanized-iron wall plates to receive ends of joists well bedded in cement.

Urinals.—Urinals to have 1½-in. rubbed slate backs, sides, and divisions 6 ft. high and 1 ft. 6 in. wide, secured in and resting on wrought-iron brackets secured to framed back; edges and corners rounded, and provide and fix to each division best white-ware trapped urinals of approved pattern. (See Plumber.)

Provide

Provide and fix 1½-in. rubbed slate top to wash basins with dished holes, rounded nosings in not less than 8 ft. lengths with 6-in. x 1-in. slate skirting with rounded ends against walls to be properly screwed up and fixed as directed.

Generally.—Form chases for water or other pipes as directed. Cut away and make good where required for carpenters, plasterers, and other tradesmen, and do all things necessary for bricklayers' work to make the whole complete.

Drainage.—Provide and fix patent earthenware traps of approved size, 12 in. x 12 in. for pipes from sinks and all down pipes, with necessary bends and piping into earthenware, soil, or water drains, and provide and lay from soil-pipes 75 ft. of 6 in. earthenware pipes, glazed inside and outside, with all necessary bends. Junctions, &c., to be laid with sufficient fall and to the required depth below the surface, to properly join in with the existing drainage from other closets, &c. Provide and build an inspection pit 2 ft. x 2 ft. square and of sufficient depth, as will be directed, of 9 in. brickwork built and rendered in cement and properly trapped with piping leading into main drain, to be covered with 2-in. slate slabs and made good above. Provide, as may be required, a ventilation-pipe communicating from drain with spare flues in chimney-stack, and induct pipe and grating, also Buchan trap, and carry out as the Water and Sewerage Board requires, make good all paving and other parts which may be disturbed by these alterations, with new materials or as directed.

Carpenter and Joiner.

All joists, rafters, studs, and all constructional timbers, to be spaced 18 inches centre to centre, and to be trimmed for fireplaces, hearths, chimney breasts, stacks, stairs, manholes, lifts, and other openings; all trimming-joists or rafters to be 1 inch thicker than ordinary joists or rafters; plates for floors to be 2-in. x ½-in. galvanised-iron bars halved and riveted together at all angles and junctions, and bedded in cement.

Repair all floors, joisting, and skirting, and any carpenter's or joiner's work disturbed by these alterations, and make good with new work to old any extra flooring, to make old work as serviceable as it was before being disturbed.

Joists and Flooring.—Joists throughout to be 10 in. x 2½ in. hardwood and 4-in. x 1¼-in. grooved and tongued hard-wood flooring-boards with bevelled heading; joints well cramped up and spiked to joists with two nails to every intersection of floor-board, and joist punched in and boarding cleaned off after being laid; put 3-inch mitred margins round all hearths and floors of landings, and one row of 2 in. x 2 in. herring-bone strutting to be fixed up between all joists having a bearing of more than 8 feet, and a 1-inch iron bolt running through with strong washers and bolts and nuts at each end.

Partitions.—Construct wrought and studded partitions on third and fourth floors; studs, sills, heads, and braces of 6 in. x 3 in. Oregon stop chamfered, trimmed for door and window openings; end studs securely bolted into wall with ⅜-inch bolts, washers, and nuts, one every 3 feet in height.

Construct 2-inch framed, panelled, and beaded partition with door in openings on third floor, as per detail; panels to be wrought T.G. and V. jointed, fixed into 6 in. x 3 in. rebated, channelled, and chamfered cedar frames, and transome and pivot-hung fanlight over; all timber exposed to view to be wrought.

Construct glazed and panelled framing to passage in upper part of Stamp-printing Room, upper part glazed and lower part panelled as for partition above described, and carried up to ceiling with attic rail and pivot-hung fanlight above; all fanlights to open with approved nickel-plated transome rods.

Roofs.—Roof and walling of Composing Room to be constructed with 6-in. x 6-in. x ½-in. forge T iron principals with 6-in. x 3-in. Oregon plates bolted every 3 feet apart, one on each side of web, with intermediate studs to wall and rafters 6 in. x 3 in.; plates, heads, and sills 6 in. x 4 in.; purlins, kerbs, and sills 8 in. x 4 in., properly framed with mortices and tenons and braced and trimmed for openings, as may be directed. Provide and fix at springing of roof at each principal, 1¼-in. wrought-iron tie rod, with union screws; ¾-in. hangers from kerb of lantern.

Construct lantern in roof with 6-in. x 4-in. top and bottom plates, 6-in. x 6-in. corner posts, and 4-in. x 4-in. intermediate muntins, and weathered and throated sill. Provide 6 lb. lead flashing under sill, to be flashed over covering of roof, and turn up inside to form gutter with brackets and openings through sill for escape of water. Ceiling joists, 6 in. x 2 in., made to project, and trimmed for eaves, lined with 1-in. wrought fascia and soffit and 2-in. scotia; pole plates, 4 in. x 3 in., and rafters 4 in. x 3 in., 1½-in. hips and ridges, and 2-in. rolls.

The sides and ends of lantern to be fitted with 2-in. moulded sashes, glazed with rough rolled plate-glass, pivot-hung, with proper beads and stops, and fitted with approved patent brass screw adjustment, with cords, &c., complete to each sash; p.c. value, 7s. 6d. each. Trim for windows in walls Composing Room, and provide and fix a 4 in. x 4 in. wrought frame, with 2-in. moulded sashes, pivot-hung, glazed with 32-oz. glass, and fitted and fastened as sashes in lantern.

The photo. gallery, dark room, &c., to be framed with similar wrought-iron principals, braced in similar manner, sides to have proper frames, and fitted with 2-in. sliding moulded sashes, with fastening, &c., complete, and glazed with best polished British plate ground glass. The roof to be constructed with four queen-post principals, to be framed with 10-in. x 6-in. tie-beams, queen-posts cut out of 8 in. x 6 in., principal rafters, and straining pieces, 8-in. x 6-in., struts 4 in. x 4 in., purlins, 8 in. x 4 in., common rafters 5 in. x 3 in., struts 4 in. x 4 in. Principals to be securely framed together and secured with 2½-in. x ½-in. wrought-iron straps on each side at heads and feet of principals, and struts bolted through with ¾-in. wrought-iron bolts with nuts and washers, and 2½-in. x ½-in. stirrup-iron to pass under the tie-beam and bolted through queen-posts in a similar manner, the ends of tie-beams to be bolted to 8-in. x 4-in. plate and to iron principal, which is to turn up under beam at least 12 in., and be securely bolted. All timbers exposed to view to be wrought. Tie-beams to be cut, and made to project and form eaves with 7 in. x 2½ in. bearers framed on to plate, spaced 2 ft. apart to form eaves; purlins to be notched on to and blocked and spiked to principal rafters; all except photo. gallery, to have common rafters notched on to and spiked to pole plates and purlins, and nailed to 8-in. x 1½-in. hips and ridges, with 2½-in. rolls blocked up and spiked. Wall plates framed with angle ties, all angles and junctions of plates to be halved and double spiked. The portion over photo. gallery and end wall to be glazed with patent glazing, p.c. value 3s. 6d. per super. foot, including glass, the glass to be best polished British plate ground glass.

Cover all roofs, flats, fronts of mansard and gutters throughout with 6-in. x 1-in. Oregon boarding, nailed to the rafters to receive the covering of roofs and flats.

Gables of all roofs to finish with 8-in. x 1½-in. wrought and chamfered barge-boards, properly blocked out with 3-in. moulding under projection of zinc.

Gutters.—Form box gutters to all roofs, and lead flats to have 1-in. deal boards on proper bearers and securely blocked up to the required height, behind parapets to be not less than 10 in. wide, laid to a fall of 1½ in. in 8 ft. and 1½-in. drips 8 ft. apart, and put 1-in. boards to all valleys. Details for all roofs, &c., will be provided as the work goes on.

Lining.—Line the whole of the new partition walls both sides throughout, also walls of mansard roof on inside and lantern light with 6 in. x 1 in. grooved and tongued and V-jointed Kauri and boxing in all girders, and make good all lining or boxing disturbed, and finish round all angles with 3-in. Kauri angle-fillets.

Architraves.—Finish round all door and window and other openings with 1½-in. plain, chamfered, and beaded Kauri architraves, 6 in. wide, and linings as required.

Angle Fillets.—At all floors, landings, with 3-in. Kauri angle-fillets, well and truly mitred; provide and fix to all windows 1½-in. window-boards, with scotia under ends returned into walls.

Grounds.—Provide and fix all necessary grounds or plugs as required for fixing architraves, linings, &c.

Door-frames.—Provide and fix to external floors 4½-in. x 4-in. solid, rebated door-frames in all brick walls secured to brickwork with three 9-in. x ½-in. bolts and nuts on either jamb; heads of bolts built into brickwork, and holes plugged up. To inside doors provide and fix 1½-in. wrought and rebated jamb linings.

Doors.—Hang in all new openings inside where doors are indicated, 7-ft. x 3-ft. 3-in. x 2-in. four-panel moulded doors hung with three 4-in. iron butts fitted with 7-in. approved Carpenter's rim-locks, handles, and keys complete. The external doors to be 2¼-in. four-panel bead butt outside and moulded inside, hung with three 4-in. butt hinges, and fasten with 8-in. Carpenter's rim-lock and two 8-in. rod-bolts, iron.

Windows.—Provide and fix in all window openings, except windows in skylight, 2¼-in. moulded sashes, double hung, in cased frames, 1½-in. pulley stiles, 2-in. heads, 1-in. beads and stops, ⅜-in. parting slips, ¾-in. linings, 2-in. patent best brass-faced axle-pulleys, with best patent Manilla line and iron or lead weights; to have rebated and weathered hardwood sills and best patent brass-spring fasteners, and two approved brass lifts to lower sash; the window-frames to stone jambs to be jammed into their respective openings with three folds of green baize spread inside with a thick layer of white lead; after fixed and quite dry the rough edges to be cut off, those to brick jambs to be properly screeded with hair mortar. Circular windows in mansard to be pivot-hung 2-in. sashes to 4-in. x 4-in. circular rebated frames, built into framing-frames, with all necessary stops according to detail. Take out existing windows on second floor, exclusive of under

lavatories,

lavatories, and provide and fix new, with cedar boxed frames and 2-in. sashes, and glazed with patent plate-glass, to be similar in every respect to those in northern portion facing Phillip-street, and to have approved lifts and catches complete, p.c. value, 3s. each.

Staircases.—Construct of hardwood one dog-legged and two open newel staircases with 2-in. stringers and 1½-in. wrought and rounded treads with scotia under and 1-in. risers; ends housed into strings, and to be properly glued and blocked; fix two hardwood carriages under stairs, and form all landings on 6-in. x 2½-in. joists, covered with 1¾-in. glued and tongued boarding; soffits of stairs to be covered with 6-in. x 1-in. wrought, grooved and tongued V-jointed boarding, flush with underside of string; handrail to be 4½ in. x 3 in. moulded Kauri, grooved for iron core, to have all necessary ramps and bends to be framed into 6-in. x 6-in. wrought, turned, and cut newels; half-landing to have 2-in. square balusters, 4 in. apart, two to each step, and every tenth baluster to be of wrought-iron, same shape as wooden ones, and riveted to 1½-in. x ½-in. iron core; the treads and landings of all new stairs to be covered with 6-lb. milled lead, and neatly dressed down and tacked with copper nails; cover lead flat with gratings of 3-in. x 1-in. hardwood battens on 3-in. x 2-in. cross-pieces, and securely checked together and spiked and laid in convenient sizes.

Closets and Urinals.—Take off present roof of back building next lane, and construct closets, urinals, and lavatories. The brickwork to be raised and finished as described in Bricklayer, and provide and fix four 16-in. x 6-in. rolled iron girders. The floor to be constructed with cambered galvanised iron corrugations, 4 in. deep, 3½ in. x 4 in., one end to be built in wall, and other end resting on girders, to be filled in on top with cement concrete, 6 in. thick above corrugations at crown, and haunches filled in; the flat over to be formed with a fall to gutters, which are to be formed in the thickness of concrete, the underside of iron to be painted four coats of oil and white lead. The flat to be covered with 1½ in. thick of approved asphalt, p.c. value, 10s. 6d. per yard, worked to a smooth surface, and forming gutters as will be directed; to turn up all round walls, parapets, and partitions at least 4 in., with 4-lb. lead, flashing lapping over-checked into walls or parapets, and well wedged with lead wedges.

Shed for closets and urinals, &c., to be formed with 6-in. x 6-in. wrought framing, the corner posts and intermediate 6-in. x 4-in. posts to be framed into 6-in. x 6-in. top and bottom plates, the corner posts to be chased into walls to level of floor, with 6-in. x 4-in. transome, and lower spaced braced with 4-in. x 4-in. diagonal braces; provide and fix divisions for urinals, to have 6-in. x 4-in. top and bottom plates, and studs spaced one to each urinal. Construct urinals with 6-in. x 4-in. hardwood uprights from plate on floor up to tie-beam, and braced and mortised and tenoned together and securely bolted. Provide and fix 1¼-in. rubbed slate backs, sides, and divisions; back to be covered with T.G. & V. jointed 6-in. x 1-in. boarding, and finished on top with weathered cap; divisions to be supported on wrought-iron shoes, securely bolted to the uprights.

Form roof and lantern with four queen-post principals, with 8-in. x 4-in. tie-beams notched to side and intermediate plates, and 6-in. x 4-in. rafters and straining pieces, secured with 2-in. x ½-in. straps and stirrup-irons, same as roof of composing room. Common rafters, 4 in. x 2½ in., made to project to form eaves, and lined with fascia and soffit as other roofs.

Form lantern with 8-in. x 6-in. kerb, 5-in. x 5-in. corner posts, 5-in. x 4-in. top, bottom, and intermediate plates, and 4-in. x 4-in. muntins; the roof of lantern to have rafters cut to shape, finished 4 in. x 2½ in. The lantern to be braced over every alternate muntin with 4-in. x 4-in. cross diagonal braces, the whole to be well and securely framed and put together and secured with wrought-iron straps and knees, securely bolted at all the principal junctions of timbers.

The whole of the work exposed to view inside and outside to be wrought and stop chamfered, and spaces coloured blue on drawing to be filled in with corrugated galvanised iron—small corrugations, 26-gauge—and secured with galvanised-iron screws and lead washers through each corrugation, into spaces, other spaces to be left open for ventilation.

Closets to have 4-in. x 4-in. top, bottom, and intermediate rails and uprights, and cross-braced, and 4-in. x 3-in. rebated frame for door, and hang 2-in. four panel bead butt doors with two 4-in. butt hinges, and fasten with 6-in. Carpenter's rim-lock and 4-in. iron rod bolt inside; leave spaces under doors of 6 in.

The ends, backs, and divisions of closets to be lined with 6-in. x 1¼-in. upright grooved and tongued and V-jointed boarding, finished on top with weathered capping, and 1-in. weathered skirting at bottom 6 in. high. The framing and boarding to be wrought Kauri.

Provide and fix to each w.c. apparatus with waste-preventing cistern complete. (See Plumber.)

Lavatories.—Provide and fix enamelled iron basins, fixed flush into 1½-in. rubbed-slate top, and to be secured with six screws to each basin into slate top, rounded nosing and rounded corners, and ½-in. slate skirtings 6 in. high on top, grooved and fitted with white lead, each basin to be supplied with brass plug washer and chain and 1½-in. lead pipes, to drain with syphon-traps connecting with 3-in. lead down-pipe to drain fixed to 3-in. x 2½-in. framing, plugged to wall with framed panels, sheeted with 6-in. x 1-in. grooved and tongued and V-jointed Kauri boarding, to cut under to floor; front to be made in sections 6 feet long, to take up and down and fasten with brass buttons.

Lead flat.—Lead flat to have 12-in. x 6-in. rolled girders, 7-in. x 3-in. ceiling joists, and 6-in. x 3-in. rafters, and 4-in. x 3-in. plates, furred and blocked up to have sufficient fall to gutters, to be covered with Oregon boarding as directed and 2-in. rolls, 1 ft. 8 in. centre to centre.

Lifts.—Provide and fix additional length of runners same as at present to run the additional storeys to new position, and making good, removing the roof, and box in with galvanised iron, secured to 4-in. x 1-in. battens and 4-in. x 1½-in. hardwood diagonal braces, crossed at an angle of 45 degrees; roof to be erected in new position; runners to be stayed by 6-in. x 6-in. plates, secured by 3 in. x 1 in., wrought-iron straps, bolted to angle posts with ½-in. bolts, nuts, and washers. Provide and fix double-hung 2-in. moulded sashes in cased frames with wood sills, &c., as for other double-hung sashes, with architraves complete, and 2 in. sliding lattice doors, properly braced and suspended by proper steel-wire cords. Balance weights and lifts complete to fourth floor. The contractor to alter the machinery of lift to work the five storeys and to leave the work complete and perfect and in thorough working order.

A sum of £700, independent of enclosure, is to be provided for a hydraulic lift to work the five storeys, situated where decided upon later on. This sum of £700 is to include lift complete, with cage value £20, made to detail, but to be exclusive of enclosure.

A sum of £300 to provide and fix two approved balance lifts for raising formes from basement to top floor (five storeys), in the positions shown on plan, and an approved balance lift from silver-printing room to lead flat above, to cost £20.

The Contractor is to fix all woodwork, and to assist the engineer in fixing lifts. Box in small lifts with 3-in. x 3-in. Oregon corner posts, with 3-in. x 1-in. diagonal hardwood bracing, covered with 6-in. x 1-in. V-jointed, T. and G. boarding through all rooms through which they pass, with neat angle bead, and to have sliding-doors hung on steel-wire cords, with balance weights, pulleys, &c. All quartering for framing to lifts to be securely bolted to walls and floors, with ½-in. bolts every 6 feet apart.

Generally.—The whole of the carpenter's and joiner's work to be perfectly wrought and finished in the most workmanlike manner, and fix all outside work put together with white lead. Fix all ironwork of every description. Provide and fix all necessary templets, screeds, linings, centering blocks, stops with all necessary grooving, rebating, framing, tonguing, housing, beading, mitreing, and other workmanship and materials necessary to complete the carpenter's and joiner's work.

Lift-well (for new lift).—Enclose lift-well with 6-in. x 1¼-in. T. and G. and V-jointed boarding, grooved into 4 in. x 4 in. uprights, with cross-bearers every 5 ft. apart, with 4-in. x 4-in. wrought chamfered door-frames and heads, and bolted together on all sides with ½-in. bolts and nuts, three to each floor, and provide and fix 4-in. x 3-in. mitred hardwood threshold; finish at floor and ceiling with 4-in. splayed fillet to break joint at floor and ceiling; hang in openings, sliding 2-in. four-panelled and moulded doors, with 1-in. brass wire-netting in upper panels, and sliding on 2-in. x ½-in. iron bar, secured to head with screws 6 in. apart, and with pair of Kendrick's pulleys, and on iron T bar at threshold, to be finished in a workmanlike manner.

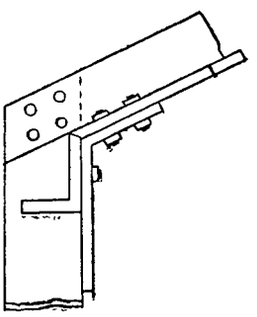
Take out all existing columns, where shown on drawings, supporting floors in position facing Bent-street and replace with specially-designed stanchions to run from basement to top floor. Stanchions to be 18 in. diameter, tapering off to 9 n. at top, with specially-cast flanges; webs, and bearings, to be cast vertically, and to be of the best grey cast-iron, and to weigh on an average, say, 125 lb. per foot, run throughout. All columns to have faced ends, and to be well bolted together with 1-in. bolts and nuts, the ends of girders to be secured threto with 1-in. bolts and nuts, the columns to rest on and be thoroughly secured to bed-plates with nuts and bolts; the bed-plate under each column to be cast to detail, and to weigh 6 cwt. each, and to be bedded in cement on block of brickwork 5 ft. x 5 ft. x 18 in. deep, the whole to be carried out to future detail; all floors requiring it to be shored up.

Smith

Smith and Founder.

Construct all floors, except floor to lavatory, with 19¾-in. x 7⅛-in. rolled iron joists, supported on columns and built 14 in. into wall; those to lavatories to be 16 in. x 6 in. All joists to be in one length across building, excepting those that only go from column to wall, and bedded in cement on stone templets on walls.

Construct roof principals of 6 in. x 6 in. T iron, as per future detail; angles formed by lapping webs and turning up tables and riveting with four rivets in each case (see sketch); punch holes in webs for fixing timbers every 3 feet apart; provide and fix with shackle at each end 1¼-in. iron tie with two distant pieces under kerb with nut and clamp nut, and bolted to table of T iron; bolt 4 in. x 4 in. angle iron, drilled every 3 ft. to take kerbs of roof, and to be bolted thereto with ½-in. bolts and nuts and washers. The ironwork of roof from eaves to lantern light to be braced with 1-in. diagonal braces, two to each bay, secured at either end, and to tighten up with union and right and left screws. The upright portion of iron principal to be strutted down to joist, where practicable, and feet of iron principal to be riveted to iron joists on which they rest.



Spiral stair.—Construct spiral stair where shown with cast-iron steps and risers threaded on to a 2½-in. wrought-iron newel with plain wrought-iron balusters and cedar hand-rail running 4 in. apart and two to each step. The sum of £150 to be provided for above.

Iron and Concrete Construction.—Construct floor to lavatory with 16-in. x 6-in. iron joists spaced as shown with 4-in. corrugations 18-gauge cambered galvanised iron, cut in between and filled in with coke concrete, and finishing with a setting coat of asphalt 1½ in. thick, floated off at one operation, laid with proper falls to hopper heads or drains. The average thickness of concrete over top of corrugations to be 6 in.

Zinc-worker and Plumber.

Cover the whole of the roofs of main building with No. 10-gauge zinc, with rolls every 18 in. apart; cover the walls of mansard with interlocking tiles with stamped, as approved and built up, dormer windows to approved design, and ornamental approved and stamped frieze (none to photo. gallery), and ornamental capping with approved zinc gutters, and supported at eaves of roof, and lantern every 4 ft.; form all valleys and gutters of No. 16-gauge zinc with all necessary straight or stepped flashings and aprons wherever required. The whole to be constructed on the most approved interlocking principle, and to be guaranteed watertight for a period of twelve months, and to be carried out to detail.

Corrugated iron.—Cover the whole of lavatory roofs with 26-gauge galvanised corrugated iron with 12 in. heading, and two corrugations lap at sides securely fixed to battens spaced every 3 ft. apart with galvanised-iron screws and lead washers every 12 in. apart. Provide and fix 4½-in. galvanised-iron eaves guttering, supported every 4 ft. with approved wrought-iron brackets or spikes and tubes, complete with all ends and junctions properly soldered and leading into hopper heads of approved pattern, or as may be directed with 4 in. cast-iron down spouting, leading water from lantern roof on to lower gutters. Provide and fix No. 12 cast-iron hopper heads, and twelve stacks of 5-inch cast-iron down pipes to main building secured to walls with holdfasts every 6 feet apart in height and proper lead swan-necks from eaves or zinc or lead gutters into hoppers.

Gutters.—Lay all box gutters to roofs where shown, and valleys, &c., with 6-lb. lead, where there are iron roofs to turn up 8 in. under iron; gutters to have 1½ in. drips every 8 ft., and 1½ in. fall every 8 ft.; form all necessary hoppers of size required, properly bossed, communicating through parapets or walls to cistern or hopper heads of down pipes with 5-in. socket piping of 7-lb. lead.

Hips and ridges.—Provide and fix to all hips and ridges 6-lb. lead capping 20 in. wide securely dressed round rolls, and secured with round lead headed nails every 2 feet apart.

New ceilings.—All new ceilings and ceiling of lantern to be lined with corrugated galvanised iron No. 26-gauge, small corrugations screwed up to the joists with round-headed galvanised iron screws every 12 in. apart to lap two corrugations, and 9 in. longitudinal laps, and fixed perfectly even.

Lead flats.—Cover lead flats with 6-lb. milled lead rolls 1 ft. 8 in. centre to centre, and to have 1½ in. fall every 8 ft. and 2-in. drips; gutters to turn up on to wall or joists 8 in., with any necessary 4-lb. lead straight or stepped flashing or aprons to lead flat or galvanised iron roofs over lavatory, communicating with properly dressed aprons through parapets and lead water to hopper heads. Flash down sides of lifts where they join walls or roofs with all proper hips or valleys, and make good if required.

Closets.—Provide and fix in each closet an enamelled iron w.c. apparatus p.c. value, £4 10s., with cistern and waste-preventing cistern, to cost 30s., each complete. Provide and fix two cast-iron 6-in. diameter soil-pipes, caulked and run with lead, and secured to brickwork, with approved holdfasts every 3 ft., bolted by two ½-inch bolts to brickwork, with all proper fittings with pull and handle, according to the Water and Sewerage Board's regulations.

Urinals.—Provide and fix urinals of approved pattern properly fixed with 2-in. lead pipe and ventilating shafts trapped to soil-pipe, in accordance with Water and Sewerage Board's regulations. Urinals to be automatic flushing, with galvanised cast-iron cistern to supply each urinal, lavatory, fittings with all necessary lead-piping, &c., complete.

Lavatories.—Provide and fix to each washstand approved enamelled iron basins with brass plug chains, and brass valve cocks, carry away waste and overflow through 2-in. heavy lead pipes properly trapped to drains; support all lead pipes on approved lead brackets. The whole of the plumber's work to be carried out in accordance with the Water and Sewerage Board's regulations.

Water Supply.—Lay on 2-in. galvanised wrought-iron supply pipes from cistern on tower to two 400-gallon tanks, with overflow pipe to drain, fixed on proper stands and fitted with ball-cocks complete on lead flat with 1¼-in., 1-in., and ¾-in. branches from tanks to closets, urinals, and lavatories, sinks, and other requirements, also to tap and stand-pipe on lead flat. The pipes for water to be the best galvanised wrought-iron piping, put together with white lead, and to have five turns of the screw, and provide all elbows, bends, junctions, T pieces, reducing sockets, properly fixed with holdfasts as required. All the pipes to be properly laid and fixed of the sizes before mentioned with best fullway brass stop-cocks required sizes, one from tank on tower and three at closets, lavatories, and urinals, and cocks to be all of the best high-pressure valve cocks; ¾-in. cocks to wash basins and sinks and 1-in. cock to stand-pipes.

The Contractor is to make all connections to existing tank free of charge.

No. 8 sinks to be provided by the Contractor according to requirements and for which a sum of £20 must be allowed.

Plasterer.

Rendering in Cement.—Render in cement ¾-in. thick in two coats the whole of the new walls inside and outside, excepting outside of the two fronts in Phillip and Bent streets, including tops and backs of parapets, &c., and clean down and repair the walls of old building where not already cemented, to render same and make good, and weather all projections.

All external rendering to be trowelled to a fine surface and lined to imitate masonry, in courses to correspond with present work as directed.

Cement to be of the best quality of English Portland cement, of approved brand, mixed with sand, one part cement to two of sand.

Make good plastering where disturbed.

Painter and Glazier.

Clean down, stop, and prepare all the new wood and iron work inside and outside, and all fittings, eaves, gutters, linings, ceilings, &c. Paint all inside wood and iron work four coats good oil and lead paint, and pick out in colours as may be directed, last coat to be flatted; paint dado 6 ft. high to cement work round all rooms and up staircases as directed.

The whole of the new windows and glass doors to be glazed with 32-oz. sheet-glass well puttied and back puttied and sprigged in; the glazing in lantern and glazing in roof to be rough-rolled plate-glass; that to photo. gallery best ground and polished British plate-glass, ¼ in. thick; glaze windows in silver-printing room with approved ruby glass. Cover the whole of the interior walls, except dado and partitions, also all galvanised-iron ceilings with two coats of kalsomine and finish approved tints except under lavatory block.

Gas.

Gas.

Connect from the nearest main with 2½-in. cast-iron pipes to meter of the size required for number of lights to be provided and fixed where directed. From meter lead 2½-in. pipe to inside of building with 2-in., 1¼-in., 1-in., ¾-in., and ½-in. branches to supply on the different floors pendents, brackets, lamps, &c., also to all fire-places. Size of pipes to be decided as work goes on. Where smaller piping than the above is required brass tubing is to be used.

Gas stoves are to be fixed in all fire-places, with copper tubes, atmospheric globes and jets, and curved tubes, with approved fire block of p.c., value 27s. 6d. each, and to be filled up with patent asbestos to required height.

The supply pipe to be carried under the front hearth and brought up through back hearths under grates; a stop cock to be fitted with movable key and brass flap, &c., in floor. Pipes to be of the best black iron, with all necessary bends, junctions, T pieces, sockets, and syphon traps where required, and fixed with all necessary holdfasts and stopcocks where necessary. Pipes to be put together with white lead, as described for water-pipes.

Provide and fix best patent stopcock, of required size for pipes, at meter, also on entering building, and one at each floor. All fittings, &c., to be of approved quality, and fitted with the best patent burners of approved kind, duplex burners, and with shades or globes as required. All the fittings and pipes to be subject to such test as the Government Architect may require; globes to be ground glass, or as approved.

No. 100	—Provide and fix in Composing Room, on two upper floors, fittings with shades, similar to the present Composing Room, each	15s.
No. 14	—Brackets on to staircases, each	15s.
No. 3	—Brackets on landings—ground, 1st, and 2nd floors, each	15s.
No. 1	—Bracket in passage, on 3rd floor, each	15s.
No. 10	—Brackets—press, silver printing, photo., dark, and enlarging rooms, each	15s.
No. 3	—Lamps and stands in closets, urinals, &c., each	100s.

Contingency sum.

The contractor is to provide the sum of £500 in his tender, to be expended as may be directed by the Government Architect during the progress of the works, and to be deducted in full or part from amount of tender in final payment.

GENERAL CONDITIONS.

Interpretation of Terms.

1. WHENEVER the terms hereafter explained in the present clause occur in these or any special conditions, or in the contract or specification, they shall be held to mean, and shall mean, as follows:—

"Government" shall mean the Government of New South Wales promoting this undertaking.

"Minister" shall mean the Secretary for Public Works of the Colony of New South Wales for the time being.

"Architect" shall mean the Government Architect having the principal charge of the works, or the person acting as such for the time being.

"Superintending Officer" shall mean any person or persons who may from time to time be entrusted with the superintendence of the works on behalf of the Government.

"Contractor" shall mean the person or persons who contracted to execute the works.

"Special Conditions" shall mean any "special conditions" hereto attached and forming part of the contract; and such special conditions shall be read with the general conditions as part and parcel of the contract.

"Schedule of Prices" shall mean the rates at which the contractor has offered or agreed to execute the contract, where the same is based on a schedule of prices; and be the basis on which the value of any extra works or of any deductions shall be calculated, and progress payments made, whether the contract be one of a schedules of prices or a bulk sum.

"Plans" shall mean and include all drawings referring to the works and explanatory of, or supplementary to, the specification.

"Works" shall mean the works set out in the specification and plans, or, in the event of there being no plans, in the specification only.

"Net Claim" shall mean the sum claimed by the contractor after deducting therefrom the sum acknowledged by the Department to be due.

"Net Award" shall mean the sum awarded on arbitration, after deducting therefrom the sum acknowledged by the Department to be due.

Supply of Labour, Materials, and Plant.

2. The contractor shall, except in so far as the specification may expressly state to the contrary, provide at his own cost and expense all labour, materials, and plant, and everything which the Architect may consider necessary for the proper and complete performance of this contract. No materials or plant placed on the site of the works shall be removed therefrom, or otherwise disposed of, without the consent of the Architect.

Plans, Specifications, &c.

3. The plans and specifications represent generally the form, dimensions, and description of the several works. Where any discrepancy exists between the dimensions as indicated by the scale and those marked in figures, the figures are to be considered as correct, and are to be taken in all cases in preference to the measurements by scale. Or, if there be any discrepancy between the figures or dimensions, or the form of construction, or the material as indicated in the plans, and the dimensions and materials given in the specification, the directions of the specification shall be adopted; and in all cases of defective description, or any ambiguity, the explanation given by the Architect shall be binding upon the contractor. Also, anything contained in the plans, and not in the specification, or anything contained in the specification and not shown in the plans, shall be equally binding as if it were contained in both. If neither specification nor plans contain any mention of minor parts, which, in the opinion of the Architect, are reasonably and obviously necessary for the satisfactory completion of the works, such parts are to be provided by the contractor without any extra charge, as if they were specially mentioned, and shall be deemed to be, and hereby are, included in this contract.

All works described in, or implied by, the specification or shown in any of the plans, or set forth in any lists or tables thereon, or attached thereto, as well as those expressly provided for, are to be made and executed in every detail conformably to the several plans already prepared or which may be prepared hereafter for the purpose of this contract, in strict accordance with the provisions of the specification and conditions, and to the entire satisfaction of the architect.

Copies of Plans, &c.

4. A copy of all plans and specifications required by the contractor for carrying on the works will be provided by the Government, but must be returned before a final certificate for the work can be given. Any additional copies which may be required and are supplied by the Department shall be paid for by the contractor at a rate to be fixed by the Architect.

Setting out Works.

5. The works will be set out—that is to say, all necessary centre lines and levels will be given to the contractor—except in the case of buildings, when, in the absence of setting out, a block plan will be supplied, from which he must work; but the contractor must satisfy himself of the accuracy of the setting out, as no work incorrectly set out or improperly executed will be paid for.

Protecting and maintaining Signals and Marks.

6. All bench marks, pegs, and signals on the surface, and all alignments, and level marks underground put in by the architect or superintending officer for the purpose of checking the contractor's work, will be confided to the care of the contractor. He shall, at his own expense, take all proper and reasonable precaution and care to preserve and maintain them in their true position; in the event, however, of their being disturbed or obliterated by accident, or from any other cause whatever, they may, if necessary, be replaced by the Architect or Superintending Officer at the contractor's expense, and the cost thereof deducted from any moneys then due or thereafter becoming due to the contractor.

Possession

Possession of Ground.

7. In giving the contractor possession of the site it shall not be deemed that he is to have the exclusive possession, but only a limited possession—that is to say, such possession as will enable him to perform the works comprised in this contract. The Minister may at any time take possession of any portion of the works or ground or intended site of the works for the purpose of carrying on any other works or for any purpose whatsoever. The contractor must procure for himself all other land which he may deem requisite for any temporary purposes or for his own convenience.

Access to Works.

8. The Architect, or any other person authorised by him, shall have free and uninterrupted access at all times to the works, and during working hours to any workshop or premises, not on the site of the works, where materials may be in preparation or stored for the purpose of this contract. The contractor shall give the Architect all particulars as to the mode and place of manufacture of any of the materials proposed to be used in connection with this contract, and shall facilitate in every way the inspection of the same.

Contractor's risk.

9. The contractor shall take upon himself the whole risk of executing the works to the satisfaction of the Architect, and in accordance with the plans, sections, and specifications.

Contractor to be represented.

10. 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 in charge to receive instructions from the Superintending Officer or Architect, and to represent the contractor for all purposes of this contract.

Any notice or any written instructions to be given or delivered to the contractor under this contract shall be deemed to have been so given or delivered when given or delivered to the contractor or his representative at the work, or left at the contractor's usual or last-known place of abode or business.

Order of Procedure.

11. The Architect shall have full power to decide in what order in point of time the various parts of the work or works comprised under this contract shall be carried out.

Power of Entry.

12. The Architect shall have the power, at his discretion, without vacating this contract, to enter upon, by himself or his agents, and make use of any part or parts of the work comprised under this contract, and his doing so shall in no wise be held as a waiver of the responsibility of the contractor in respect of this contract, except in so far as any injury may accrue to such work so entered upon, by reason of any proved carelessness, to the satisfaction of the Architect, of any employee of the Government, in which event the contractor shall be free from liability on account thereof, but not otherwise.

Instructions to be obeyed.

13. Should the contractor refuse or neglect to carry out the instructions of the Architect or the Superintending Officer, the Architect shall have the power of suspending the usual monthly certificate until such instructions have been complied with.

Power to dismiss men.

14. The Architect may require the dismissal within twenty-four hours by the contractor of any agent, overseer, foreman, workman, or other person employed on the works, and, in the event of the contractor refusing or neglecting to comply with such requisitions, all further payments on account of the work may be stopped until such dismissal is effected.

Bad Materials or improper works to be removed.

15. The contractor shall be bound to remove within twenty-four hours, if written notice from the architect or superintending officer to that effect be given, any materials or work, whether fixed or not, which may appear to the Architect to be of an inferior or improper description; and, in case of refusal, the Architect shall have the power to get such materials or work removed at the contractor's expense, and to withhold all payments until such instructions have been complied with.

Extra Works—Omissions of Works.

16. If at any time whilst the works are in hand it shall be deemed expedient by the Architect to order material or work of a different description to that specified, or to increase or diminish the dimensions or extent of any works to be done under this contract, or to alter their situation or vary the form or dimensions of any of the said works, or of any part thereof, or to make any deviation or to substitute one class of work for another, he shall have full power to do so, and to order and direct any such increase, diminution, alteration, deviation, or substitution, and the works involved in any such increase, alteration, deviation, or substitution shall be executed by the contractor if of the class of works provided for in the Schedule of Prices, at such schedule prices; and no such increase, diminution, alteration, deviation, or substitution of works shall in any way annul or set aside this contract, or extend the time for the completion thereof, unless the Minister shall see fit to grant such extension; but such additions or alterations shall be measured and paid for, or deducted from the contractor's account, as the case may require, according to the schedule of prices. Provided that if any portion of the works so ordered to be done shall not be, in the opinion of the Architect, of the same value or class of works provided for in the Schedule of Prices, the same shall be executed by the contractor, at such prices as may be agreed upon with the Architect; but if the contractor and Architect cannot agree as to the price to be paid, the Architect may order and direct the same to be done by such person or persons as he may think fit. Before any extra work, or work of an altered value or class, is undertaken by the contractor, it shall be imperative for him to procure an order in writing from the Architect for carrying out such extra or variation of work, and the contractor shall not be entitled to any payment for such extras or variations unless he produce the written order for the same, as aforesaid, and he shall not be entitled to plead that the Architect omitted to give such written order, as it is to be distinctly understood that the onus of obtaining such order shall be on the contractor. The contractor shall not be entitled to any other rate than the schedule rate on the plea that the work was in a different position or of a different class from, or in a more difficult position than that shown on plan or specification, or carried out under circumstances not contemplated in the specification, unless an agreement entitling him to payment by other than the schedule rates shall have been previously made and signed by the Architect and the contractor.

Valuation of Omissions.

17. The Architect shall have the power to direct the omission of the carrying out of any part or parts of the said works, but not amounting to the omission of the whole; and the value of such work so omitted in such case, calculated at the schedule rates, or in the event of there being no schedule rates, calculated on the basis of the proportionate value which such work bears to the lump sum, as ascertained by the Architect, whose decision on that point shall be final, shall be deducted from the contract sum, subject, however, to Arbitration Clauses Nos. 36 to 41.

Net Measurements.

18. The whole of the work shall be executed and paid for according to the contract dimensions, and no allowance will be made for any excess of dimensions above those found on the working plans now exhibited, or which may be afterwards supplied, notwithstanding any general or local custom to the contrary, unless such excess has been expressly ordered. In the case of dressed masonry all cubic measurements will be taken at the extremes, and in the case of rock-faced masonry all measurements will be taken to the draft. With regard to timber, all framed work will be paid to extremes, but in no case will scarfs in hewn or round logs be paid for.

Contractor liable for injury to adjoining Lands, Properties, &c.

19. The contractor shall not commit any act of trespass, and shall effectually protect all adjoining properties and owners thereof against any loss, damage, or injury that may occur through the carrying on of the works, whether to buildings, goods, property of any kind, or to persons; and in case any such trespass be committed, or any such loss, damage, or injury occur, the contractor shall make full compensation, and shall make good all or any such loss, damage, or injury; and if any such compensation for trespass, or any such loss, damage, or injury be recovered against the Government in the first instance, it may be deducted from any money due or coming due to the contractor under this contract, or may be recoverable from the contractor or his sureties as liquidated damages in that respect incurred.

Damages, &c., to be paid for by the Contractor.

20. All damage, injury, or loss that may happen to the works from any cause whatever during their progress must be made good by the contractor at his own expense; and the whole of the works must be delivered up, complete in every respect, according to this contract, and the care and maintenance of all works under this contract shall remain with the contractor until the Architect 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 damages thereto.

Contractor not to Sublet Works or Assign Moneys.

21. The contractor shall not assign or underlet this contract, or any part thereof, or assign or mortgage, charge or encumber all or any of the moneys payable or to become payable under this contract, or any other benefit whatsoever arising, or which may arise, under this contract, to any person without the consent in writing of the Minister being first obtained. The contractor, for each and every breach of this condition, shall be liable to pay to the Government the sum of £50 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 Government. And any permission to assign or underlet works to be done under this contract shall not discharge the contractor from any liability in respect of this contract, and shall extend only to the permission actually given, but not so as to prevent any proceedings for any subsequent breach of this condition; and all rights under these conditions shall remain in full force, and shall be available as against any such subsequent breach.

Truck system not allowed.

22. The workmen and labourers of every class employed on the works 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 and labourers of every class shall be paid on the works if it be possible, or in some building in the vicinity; and in no case shall they be paid at a public-house or other place where liquors or refreshments are sold. The contractor for each and every breach of this condition shall pay to the Government the sum of £50 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 Government.

Power of the Government to pay Workmen and Tradesmen.

23. Before the payment of any money to the contractor, the Architect may require from him a statutory declaration that the tradesmen supplying materials for or incidental to the works, and the workmen and labourers of every class employed on the works, have been paid their claims of every kind in full, in current coin of the Colony, and to the latest date at which such wages or claims are due; and the Architect may withhold the payment of any money that may be due or become due to the contractor until such declaration has been made and delivered to him.

If the contractor shall fail or omit to pay the claims of any such tradesmen, workmen, or labourers, in the current coin of the Colony, it shall be lawful for the Minister, or the Architect, as often as the same shall happen, upon complaint of such failure or omission made by any such tradesman, workman, or labourer, and upon proof to the satisfaction of the Minister or Architect of such failure or omission, to pay the amount of such claim to such tradesman, workman, or labourer, and to deduct the same amount from any money then due or owing, or thereafter to become due or owing, to the contractor under this contract.

Delay by Minister.

24. If the contractor shall not be able to obtain possession of any portion of the ground required for the execution of the works to be done in connection with this contract, or if from the non-delivery, or any delay in the delivery to the contractor, of any materials which under this contract the Minister is to supply, or from any cause whatever arising out of the Acts or defaults of the Minister, or any officers or servants in his 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 to the Architect for an extension of time on account of such act, default, or accident, setting forth the cause of such application, and the Architect shall, if the Minister think the cause sufficient, but not otherwise, allow by writing under his hand such an extension of time as the Minister shall think adequate; and the penalties, sets-off, and deductions to which under this 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 the manner aforesaid, and unless and until the Minister 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 liquidated damages, deductions, and sets-off as in these conditions provided; nor shall the Minister be deprived in any way or to any extent of his right to deduct or recover any sum or sums as liquidated damages, and not as or in the nature of a penalty or to make deductions or sets-off which under this contract he is entitled to make, deduct, set-off, or receive from the contractor for or by reason or 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 him be in any way affected.

Patent Rights to be included.

25. The contractor is to include in his tender the amount of all patent rights and royalties which may be claimed by any patentee or patentees for the manufacture and use of any portion of this work, and must undertake to liquidate the same when required to do so.

Free Passes, &c.

26. No free passes on any of the Government railways will be granted either to the contractor or his agents, nor will any materials or articles of any description be conveyed free of charge.

Conditions not to be waived.

27. None of the conditions of this contract shall be varied, waived, and discharged, or released either at law or in equity, unless by the express consent of the Minister, testified in writing under his hand.

Progress Payments without Prejudice.

28. No progress payment given to the contractor shall prevent the Architect from at any future time before the final settlement rejecting all unsound materials and improper workmanship discovered subsequently to the giving of any previous payment; and notwithstanding any approval given or made by the Superintending Officer that portions or the whole of the works have been satisfactorily performed, the Architect may require the contractor to remove or amend at any future time previously to the final payment on account of the work, any work that may be found not in accordance with

with this contract; and the contractor must remove and amend at his own cost all such work when so required; and if he refuse or neglect to do so, the Architect shall have the power to carry out such work, and to deduct the whole cost thereof from any moneys that may be due, or that may become due, to the contractor.

If, in the opinion of the Architect, further inquiry is necessary or desirable before any progress payment is made, he shall have the power to withhold the certificate on which such payment would have been made, for any period which he may consider necessary for the purpose of such inquiry.

Security.

29. Within fourteen days after the 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, he shall deposit with the Minister, or, at the option of the Minister, in some bank or banks in Sydney, upon fixed deposit in the name of the Minister, a sum calculated at the rate of £5 for every £100 or part thereof on the amount of his tender up to the sum of £100,000, and at the rate of £1 for every £100 or part thereof in addition, for any amount over that sum, to be held by the Minister as security for the due and proper performance and completion of this contract until the Architect has certified that the whole of the work in the said contract has been completed to his satisfaction, or until this contract has been cancelled by the Minister under the power given to him in that respect under clause 32 of these Conditions, in which last-mentioned event happening the money so deposited shall become forfeited to the Crown, and shall be held by the Colonial Treasurer, for and on behalf of Her Majesty the Queen, as liquidated damages. If, however, this contract shall not have been cancelled under the said clause, and if the works comprised in this contract are not completed within the time mentioned in clause 34 of these Conditions, the liquidated damages which, under the last-mentioned clause are made payable to the Minister, may be deducted and taken from the money so deposited.

If the contractor fail to deposit the sum as hereinbefore provided within fourteen days from the acceptance of the tender, or if he fail to execute the contract for the due performance of the works mentioned in the said tender, the Minister shall have the option of and full power and authority to declare such acceptance to be annulled, in which case the amount of the preliminary deposit will be absolutely forfeited to the Crown, as provided by the Regulations of the Tender Board.

No tenderer will be authorised 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 moneys being deposited as aforesaid, he shall not have any right of action, claim, or demand against the Minister.

The contractor will be entitled to receive any interest that may be payable upon the fixed deposit of the money, if the money be placed in a bank at fixed deposit, as such interest becomes payable; but it is expressly declared that the Minister is not to be held liable or answerable in any way for any loss on the money so deposited, or for any loss of interest from the fixed deposit not being renewed.

Payments.

30. Progress payments may be made once in every month, unless the same shall become not payable by reason of anything contained in these Conditions, on the certificate of the Architect, as the work proceeds, in the proportion of 80 per cent. of the value of the work returned, until the sum retained reaches the amount of the deposit provided for in the preceding clause, when no further deductions will be made. The amount of the retention money will be held by the Minister, in addition to the cash security, unless otherwise provided for in the Specification, until the Architect has certified that the whole of the works have been satisfactorily completed, and the period specified for the maintenance of the said works has expired, and all accounts finally adjusted, when the retention money, in addition to the cash security, will be paid to the contractor; and it is expressly declared that until a certificate has been given by the Architect to the Minister that the work done by the contractor has been executed and completed to his satisfaction, the contractor shall have no right or claim in respect of any work done or materials provided, nor to the payments from time to time to be made under this contract, or to the final payment upon the whole of the works being finished.

Delay or Bad Work, Bankruptcy, &c.

31. In case the Architect shall be at any time dissatisfied with the mode of proceeding, or at the rate of progress of the works or any part thereof, or in case the contractor shall at any time neglect or omit to carry out the instructions of the Architect, or to dismiss any person employed when required, or shall neglect or omit to remove any materials or work which he is required to remove under Condition 15, or in case the contractor shall assign or underlet this contract, or any part thereof, or assign or mortgage, charge or encumber, or attempt to assign, mortgage, charge, or encumber, all or any of the moneys payable or to become payable under this contract, or any other benefit whatsoever arising or which may arise under this contract, without the consent in writing of the Minister being first obtained, or in case the contractor shall make default in insuring and keeping insured, in cases where insurance is specified, and depositing the policies and receipts for premiums in accordance with these Conditions, or in case the contractor shall become bankrupt, or shall make an assignment of his estate for the benefit of creditors, or shall make an arrangement or composition with his creditors, then and in every such case the Minister shall be at liberty, without vitiating this contract, and without prejudice to any right that may have accrued to liquidated damages under any of these Conditions, to take the works wholly or partially out of the hands of the contractor and to employ or contract with any other person or persons to execute the same, and for that purpose to take possession of and use all horses, materials, plant, tools, implements and things on or about the said works, without making any allowances for the same, and all damages and expenses thereby incurred shall be ascertained and certified by the Architect, and together with any sum payable as liquidated damages under these Conditions shall be deducted from any money that may be then due or may thereafter become due to the contractor, or may have been deposited by him; and if the money then due, or thereafter becoming due, to the contractor, or deposited by him, be not sufficient for that purpose, the balance remaining unpaid shall be a debt due by the contractor to the Minister, and may be recovered accordingly.

Cancellation of Contract.

32. In any or either of the events mentioned in the last preceding clause of these Conditions, the Minister shall have the option and full power and authority, in lieu of proceeding under such a clause, and without prejudice to any right that may have accrued to liquidated damages under any of these Conditions, to cancel this contract whether there are any works remaining to be done or not; 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 this contract; and upon notice in writing under the hand of the Minister that he, under the authority of this condition, cancels this contract, being given to the contractor, this contract shall be cancelled, and thereupon all sums of money that may be due to the contractor, or unpaid, 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, shall be forfeited, and all sums of money held as security or named as liquidated damages for the non-fulfilment of this contract within the time specified, shall also be forfeited and become payable to the Government, and the said implements and materials shall become and be the absolute property of the Government, and with the moneys so forfeited and payable as aforesaid, shall be considered as ascertained damages for breach of contract.

Insurance.

33. The contractor shall from time to time, when required to do so by the terms of the Specification, insure the works against loss or damage by fire, in an office to be approved, in the name of the Minister for the amount of the full value of the work completed, as determined by the Architect, and shall lodge with the Architect the policies and receipts for the premiums for such insurance, and shall continue such policies until possession is given up to the Government; in default of which the Minister shall be at liberty to insure and deduct the amount of the premiums paid from any moneys payable to the contractor, and may refuse payment of any certificate until such policies and receipts are handed in as aforesaid; but this insurance is to be no limit or bar to the liability and obligation of the contractor to deliver up the works to the Minister completed in all respects according to the contract. In case of loss or damage by fire the moneys payable under any such insurance shall be received and retained by the Minister until the works are finally completed, and shall then be credited to the contractor in the final settlement of accounts in the event of the contract not having been previously cancelled under these Conditions.

Time

Time of Completion, &c.

34. The contractor shall complete the whole of the works comprised in this contract within thirty weeks from the date of the acceptance of his tender; and in the event of their non-completion at the specified times, should the Architect not have proceeded under clauses Nos. 31 and 32 of these Conditions, or either of them, the contractor shall pay, by way of liquidated damages, and not as or in the nature of a penalty, the sum of twenty pounds sterling for every week, or for 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. The contractor shall have no right to a certificate for payment after the date specified in these Conditions for the completion of this contract until the whole of the works shall have been properly completed to the satisfaction of the Architect, unless the time for the completion of this contract shall have been extended by the Minister, in which case such extended time shall become the time for the completion of this contract; and it is to be expressly understood that the fact of the time having been so extended shall not in any way be taken as a waiver of this contract, or as annulling or setting aside this contract in any respect, nor be taken as releasing the contractor from any of the responsibilities or obligations of this contract, which, in all other respects, shall remain the same as if the time had not been extended.

The like liability also shall hold good as to the obligation of the contractor in the event of any advance being made to him from the retention money, or on material on the ground and not *in situ*.

Maintenance.

35. The contractor will be bound to maintain the works for a period of six months after their final completion and use by the Government; and if any part should within that period show signs of weakness, or of giving way, or if any defective workmanship or materials be detected, the contractor, when called upon to do so, shall make good the same at his own expense, to the satisfaction of the Architect, before any moneys held by the Government on account of this contract will be paid. It is also to be distinctly understood that the Government shall have the full, free, and unrestricted use of the said works, without any interference whatever on the part of the contractor during the currency of this period of maintenance; and such use of the said works on the part of the Government shall not be held as relieving the contractor of any liabilities or obligations whatever in respect of his contract.

Arbitration.

36. The following matters shall be decided by the Architect, whose decision shall be absolute and final:—(1) All questions or disputes which shall arise respecting the true construction or meaning of the plans or specification, or the quality of the workmanship, or quantity or quality of materials necessary for the whole or any part of the contract. (2) All questions and disputes when the net claim shall not amount to the sum of five hundred pounds.

37. All questions and disputes not hereinbefore provided for shall, if the net claim be five hundred pounds or upwards, upon the completion of the works under the said contract, and before payment of the retention money and the money deposited as security for the due carrying out of the contract, be fixed and determined by arbitration as hereinafter provided.

38. If either party consider that he has claims in respect of any matter in which arbitration may be claimed, he shall, within one month of the date of the final certificate, furnish to the other party full particulars in writing of such claims, breaches, doubts, disputes, and differences in respect of which he desires arbitration, giving distinct and separate items, and the amount, if any, claimed under each item; and the other party may thereupon furnish particulars of all claims he has in respect of such matters, irrespective of the aggregate amount of such claims; and the party furnishing the same shall be bound by such particulars; and no claim not included in such statement shall be taken into consideration at such arbitration, or become subject of arbitration or action; and the claim or respective claims so made as aforesaid shall be determined by arbitration, in the manner as hereinafter provided.

39. If both parties concur in the appointment of a single arbitrator, then the reference shall be to such single arbitrator; but if the parties for twenty-one days after the particulars first mentioned in the last preceding clause shall have been furnished, cannot concur in the appointment of a single arbitrator, the reference shall be to two arbitrators, one to be appointed by each party, or their umpire to be appointed in writing by such arbitrators before they commence the business of the reference; and the arbitration shall, subject to the express provisions herein contained, be made and held pursuant and subject to the Arbitration Act of 1892 or any statutory modification or re-enactment thereof for the time being in force.

40. The costs of and incidental to the arbitration shall be paid or borne by or between the parties in manner hereinafter mentioned, that is to say:—

1. If the sum awarded does not exceed the amount acknowledged by the Department to be due, the contractor shall pay all the costs of and incidental to the arbitration.
2. If the sum awarded shall amount to the sum claimed by the contractor, the Government shall pay all the costs of and incidental to the arbitration.
3. If the sum awarded exceeds the amount acknowledged by the Department to be due, but is less than the sum claimed by the contractor, the costs of both parties shall be added together and the total cost so ascertained shall be paid by the parties in the proportions following, namely:—The Government shall pay such sum as bears the same proportion to the total cost as the net award bears to the net claim, and the balance shall be paid by the contractor.

The award shall direct to and by whom and in what proportions the costs shall be paid, in accordance with the provisions hereinbefore contained; but the award need not specify the amount of such costs. Such amount shall, in the event of disagreement, be taxed or settled by the arbitrators or umpire, as between party and party, after the award is made. No costs shall be allowed as between solicitor and client. If either party shall be dissatisfied with the costs allowed by the arbitrators or umpire, the same may be taxed by the Prothonotary or other proper officer of the Supreme Court.

41. It is to be distinctly understood that all claims by either party to have any of the matters which 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 cases 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.

Stated quantities and money provisions.

42. It is to be distinctly understood that the whole or any parts of any provision in the specification, whether of money or kind, may or may not be expended in any one or other kind of work, or all or any parts of it may not be expended at all, and every such provision shall be accounted for at the termination of the contract in a bill certified by the architect, and any less sum or less value in kind expended than provided shall be deducted from the amount of the contract.

43. The sums specified in all money provisions are to be taken to be the prime cost to the contractor, exclusive of any profit to him, which he is to provide in the bulk sum of his contract. The architect shall nominate the person or persons to be employed by the contractor to carry out any works under these provisions.

Department of Public Works,
Government Architect's Branch,
Sydney, 2nd April, 1895.

W. L. VERNON,
Government Architect.

[This form applies only to Contracts where Bills of Quantities are provided by the Department.]

TENDER FORM.

Department of Public Works, Government Architect's Branch.

IN pursuance of advertisement in the *Government Gazette* (I *or* we), the undersigned, do hereby tender to provide the material and perform the various works required in and about the full and proper construction, erection, and completion of agreeably to the plan, specification, general conditions, and bill of quantities, which have been inspected by (me *or* us), for the sum of £ , and to complete the same within from the date of the acceptance

acceptance of this tender; and (I *or* we) do hereby agree that any additions to or deductions from the said works shall be paid or allowed for, as the case may be, at prices as per bill of quantities or at a price to be agreed upon at the time, and added to or deducted from the above bulk sum as the case may be; and (I *or* we) hereby undertake that (I *or* we) will, within fourteen days from the date of notification of the acceptance of the said tender, execute and deliver to the Minister for Public Works a valid legal contract with Her Majesty the Queen, embodying the terms and general conditions above-mentioned, and to provide the security required by clause twenty-nine of the said general conditions; and (I *or* we) enclose herewith (my *or* our) cheque for the sum of £ as a preliminary deposit; and (I *or* we) agree that such sum shall be absolutely forfeited if (I *or* we) at any time within thirty days after the said tender is opened withdraw same, or if in the event of this tender being accepted (I *or* we) fail to complete the above-mentioned contract within fourteen days thereafter; and further, that this tender is made subject to the conditions contained in the Tender Board Regulations printed on the back hereof, and by which (I *or* we) agree to be bound.

Dated this day of 189 .

Witness—

TENDER BOARD REGULATIONS.

No tender shall be received after eleven a.m. on the day named for the receipt of such tender, unless there are circumstances which, in the opinion of the Members of the Board then sitting, render it desirable to do so.

It shall be the duty of the President, Vice-President, or the senior Member present, as the case may be, as soon as the tenders shall have been opened and the necessary particulars ascertained, to publicly announce the number of tenders received for each work and the name of the lowest tenderer; but no tender shall be accepted until the Head of the Branch, under whose directions the work is to be carried out, has reported upon the whole of the tenders received.

The Secretary shall, as soon as practicable after the Board has adjourned, exhibit in a conspicuous position in the Public Works Office a full statement of the tenders received, showing the work, the name of the tenderer, and the amount of each tender.

All envelopes containing tenders must be addressed to the President of the Board, and have legibly endorsed upon them the name of the work for which the tender is submitted.

Every tender must, as a guarantee of good faith, be accompanied by a preliminary deposit, calculated according to the following scale, viz.:—

For amounts up to £500 inclusive	£5 0 0
For amounts exceeding £500 and not exceeding £1,000	£10 0 0

For all sums over £1,000, 1 per cent. on the amount of tender up to a maximum deposit of £500. Such deposit to be in the form of a cheque in favour of the President of the Board, endorsed by the manager of the bank upon which it is drawn, or a bank draft.

All deposits, with the exception of that of the successful tenderer, shall be returned by the Secretary to the person entitled thereto as soon as possible after the Board shall have adjourned, and the deposit made by the successful tenderer shall be returned to him on his executing the bond for the fulfilment of the contract. When the contract is for a less sum than £200 the deposit with tender shall not be returnable until the service is satisfactorily completed.

Any tender which may be received without such preliminary deposit shall, unless otherwise directed by the Board, be deemed to be informal, and rejected accordingly.

In the event of any tenderer failing to take up his tender, complete the bond, and proceed with the contract within the time specified, or withdrawing his tender after it shall have been opened, whether such tender shall have been accepted or not, all moneys deposited by him on account thereof or in connection therewith shall be forfeited to the Crown, and in such case be paid to the credit of the Consolidated Revenue of the Colony.

Whenever a tenderer shall fail to proceed with a contract as aforesaid, fresh tenders shall be invited at short notice for the work, unless, in the opinion of the President, there are circumstances which make it desirable for another tender in the same series to be accepted; but the tenderer by whose default such a course has been rendered necessary shall be excluded from the competition, and from any competition for other works at the pleasure of the President.

In the event of any contract being tendered for at a Schedule of Rates, the approximate quantities as given of each item must be worked out and a total sum shown.

In submitting a tender the full Christian name of the tenderer must be given, or, when the offer is in the name of a firm, the names in full of each member. When bondsmen are required, the names in full, occupations, and addresses must be stated in the tender. The omission of this information will render the tender liable to be declared informal.

The Board shall not be bound to accept the lowest or any tender.

The Board-room shall be open for the admission of the public while the tenders are being opened and declared.

RATES OF WAGES TO BE PAID.

NOT less than the several rates of wages as set out in the schedule herein shall be paid by the contractor (or—in the event of the Minister approving of the subletting of any portion or portions of the works—by the sub-contractor) for the various services to be performed under this contract; and, in case of dispute as to the classification of workmen, the decision of the Engineer shall be final. The rates, however, do not include those to be paid to apprentices or boys.

With respect to overtime, the recognised rules of the particular trade then prevailing in the district where the work is situated shall be observed.

If it shall at any time be proved to the satisfaction of the Minister that the contractor, or any approved sub-contractor, is paying or has paid a lesser rate of wage for services rendered during the progress of the works to any workman employed thereon than is set out in the following schedule, the Minister shall have the option and full power and authority to cancel the contract, as if such breach was and is one of the events mentioned in clause 32 of the general conditions. Any permission to sublet shall not discharge the contractor from any liability in respect of the rate of wages to be paid under this contract.

In all classes of labour, forty-eight hours shall be considered as a week's work. This rule, however, shall not apply to those workmen, the necessities of whose employment demand that longer hours shall be worked, as in the case of firemen, who usually have to get up steam in readiness for the day's work. The necessity for longer hours of labour in special cases shall be determined by the Engineer, whose decision shall be final.

The following is the schedule referred to:—

Trade.	Rate.
Carpenters	8/- per day.
Masons	10/- ,,
Bricklayers	9/- ,,
Plasterers	9/- ,,
Blacksmiths	8/6 ,,
Boilermakers and riveters	9/- ,,
Fitters	9/- ,,
Painters	7/6 ,,
Plumbers	8/6 ,,
Shipwrights	9/6 ,,
Copper and brass workers	9/- ,,
Moulders	7/- ,,
Engine drivers	7/6 ,,
Workmen not included in the foregoing list	6/- ,,

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[Appended by the Committee.]

ESTIMATE FOR ADDITIONAL STOREYS AND ADDITIONS, GOVERNMENT PRINTING OFFICE.

	Preamble to General Bill.		£ s. d.
	The contractor is to understand that the contract is based upon the Departmental plans, specifications, general conditions, bill of quantities, and his tender taken together.		
	Before his tender is accepted, the contractor must deliver to the Government Architect the bill of quantities by which he has made up his tender, in order to be attached to and made part of the contract.		
	He must also in making up his tender fill in the charges at end of bill of quantities for the preparation and lithographic copies of same, and these sums will be deducted from the contractor's building account.		
	The contractor must complete the first portion facing Bent-street within six months, and the whole work within months. See clause 34 of general conditions.		
	Contractor must give up full possession of this first-named portion of building when completed, and enclose the end thereof temporarily with a weatherboard partition.		
	Contractor must allow £10 for clerk of works office, which becomes property of Government	.....	10 0 0
43½ 415 230	Allow for carrying on the works without interference with the business of the office.	15/- 1/- 1/-	32 12 0 20 15 0 11 10 0
5,000	Contractor must provide at his own cost all shores and temporary roof and fencing, and perform any underpinning.....	12/-	30 0 0
	Contractor is responsible for any damage to the property, or accident to individuals from whatever cause arising.		
	TIMBER FOR SHORES. 7 14′, 8 13′, × 12″ × 12″; 8 11′ × 10″ × 10″ = 3,157 ft. sup. Plates for same, 278 ft. run. of 12″ × 4″ = 1,112 ,, ,, 181 ,, 12″ × 3″ = 543 ,, ,, 97 ,, 10″ × 3″ = 242 ,, 5,054 ,,		
	The shores are to be so placed that the machinery shafting may be secured thereto.		
	Monthly progress payments will be made at the rate of 80 per cent. upon the value of the work done until such time as the retention money equals the amount of the cash bond, when all advances will be made in full. The retention money and cash bond may be held by the Minister until the expiration of the period stated for maintenance.		
	Each tender must be accompanied by a bank draft or marked cheque for 1 per cent. upon its amount.		
	A cash bond for 5 per cent. upon the amount of contract must be executed within fourteen days of acceptance of tender.		
	After final completion the contractor must maintain the works for a period of twenty-six weeks, and must make good any defects discovered during that time.		
	Immediately uponroof timbers being fixed, contractor must insure building for three-fourths of contract sum, delivering policy to Government Architect, and pay all premiums up to issue of final certificate.....	.....	5 0 0
	Contractor must enter upon work whenever required, take up foundations, drains, and other impediments, clearing away all old materials and rubbish. The old materials become property of contractor, but must not be reused.		
	Allow for providing, maintaining, and afterwards removing all necessary hoardings, in accordance with Municipal Regulations	.....	12 0 0
	Allow for giving all notices, paying all fees, &c., required by the Municipal Council, Water and Sewerage Board, and Gas Company, and conform strictly to their respective regulations.....	.....	10 0 0
	Contractor must secure an enclosed piece of ground in the vicinity, which is to be considered part of the site for the time being for working and stacking materials	.....	15 0 0
	The erection of crane, &c.; got plenty of scaffold.		
	Allow for use of all scaffolding plant, &c., required for the work ...	.....	25 0 0
	Allow for any necessary shoring up and underpinning to adjacent premises.....	.....	10 0 0
	Allow for supplying all water for use of building, including fees ...	.....	10 0 0
	Allow for providing all necessary closet accommodation for the men	.....	2 10 0
	Allow for employing a watchman for every night and Sunday	.....	42 0 0
	Allow for old roof remaining till the new roof is finished watertight, and provide temporary gutters to old roof and escape for water, as contractor is responsible for all damage to rooms below; and afterwards carefully remove old roof	.....	30 0 0
	Allow for clearing away all rubbish and all superfluous materials, and scrub floors at completion, leaving the premises clean and fit for occupation.....		
	Allow the sum of £500 sterling for contingencies	.....	500 0 0
	To Summary...	.....	796 7 6

yds.	ft.	in.				£	s.	d.
				Excavator, Labourer, and Drainer.				
				Al excavation taken irrespective of nature of formation, and allowance to be made for strutting and planking if necessary.				
133	21	0	Cube	Excavation for trenches, &c., to depth of (say) 7 ft., including part filling and ramming, and carting away surplus (134 yards)	2/-	13	8	0
				Detailed estimate of 1 yard of concrete. £ s. d. 4 yards of blue-metal (Kiama), 1½ gauge, at 9s. 6d. ..... 1 18 0 2 ,, sand, 3s. ..... 0 6 0 6 barrels cement = 1 yard cube, 12s. ..... 3 12 0 Cost of materials—4 cubic yards .....4)5 16 0 1 9 0 Labour per yard ..... 0 3 6 1 12 6 7½ per cent. per cr. profit ..... 0 2 6 Estimated cost, 35s. per yard £1 15 0				
30	6	0	Cube	Concrete footings, mixed—1 cement, 2 of clean sharp sand, and 4 of 1½ in. Kiama blue-metal (30¾ yards)	35/-	52	18	9
			No., 1 ...	Make good floors where excavating for column bases (16 columns)...	15/-	12	0	0
			No., 1 ...	Pull down existing walls to be rebuilt, and take up foundations; materials become contractor's property, but cannot be reused.				
				Drainer.				
	75	0	Lineal ...	6 in. earthenware drain-pipes, jointed in cement and laid complete, inclusive of necessary excavation and ramming	1/6	5	12	6
			No., 1 ..	Connect above with main drain in lane	20/-	1	0	0
			No., 20...	Patent earthenware gulley-traps, of approved size, (say) 12 in. x 12 in.	10/-	10	0	0
			No., 20...	Connect above to existing drains	5/-	5	0	0
			No., 1 ...	Buchan trap	18/-	0	18	0
				Estimate for inspection pit. £ s. d. 1¾ cube yards of excavating, per yard, 2s. ..... 0 3 4 44 ft. superficial 9 in. brickwork, in cement, 8d. ..... 1 13 0 9 ft. ,, 2 in. slate in cover, 3s. 1 7 0 £3 3 4				
			No., 1 ...	2 ft. x 2 ft. x 3 ft. deep inspection pit of 9 in. brick in cement, ½ in. cement, rendered inclusive of 2 in. slate top	65/-	3	5	0
			No., 1 ...	Extra for trap to outlet of last	10/-	0	10	0
			No., 1 ...	6 in. drain, galvanized iron vent-pipe (say) 65 ft. high, with 6 ft. of induct piping, with grating, the whole properly stayed.....	.....	7	9	6
				NOTE.—Drainage will be subject to future measurement, and any addition or deduction will be valued at schedule prices.				
				To Summary	.....	£112	1	9
				N.B.—About 1,800 cube feet of old dressed stone to be removed. No allowance made, as the stone ought to pay for removal.				
				Mason.				
				Stone is to be from an approved quarry, and to match as nearly as possible the existing stonework. Slate to be best Welsh. Cement mortar is 1 cement to 2 of sand, which must be clean, sharp, and, if necessary, well washed. Include with stone cost of hoisting and setting same. All joints to be cement grouted, and pointed up neatly with putty on face. No stone used in face-work to be less than 4 ft. long. All carving to be executed by an approved carver to future details.				
				Footings for Columns.				
	121	6	Cube	Freestone.....	2/6	15	2	6
	432	0	Supl.....	Rough axing—labour.				
	13	6	,, ...	Labour to chiselling seats for columns.				
			No., 18...	Labour to sinking holes for holding-down bolts.				
				Templates.				
	267	9	Cube	Freestone, including dressings, &c.	2/-	26	15	6
	1,030	0	Supl.....	Labour to rough axing.				
	76	0	,, ...	,, chiselling seats for girders.				
				Window Sills.				
	202	9	Cube	Freestone, fixing and stone	1/6	15	4	6
	617	0	Supl.....	Labour to chiselling beds, &c.	-/3	7	14	4
	159	0	,, ...	,, clean chiselling	-/9	5	19	3
	87	0	,, ...	,, ,, sunk	-/10	3	12	6
	162	0	Lineal ...	,, throat	-/1	0	13	6
			No., 58...	Splayed ends to sinkings	-/6	1	9	0
				For the above window sills—say about 3/6 per cub. foot.				
				Quoins.				
	420	0	Cube	Freestone, stone and sittings	1/6	31	10	0
	22	9	Supl.....	Labour to quarry face	-/3	0	5	9
	1,334	0	,, ...	,, chiselling beds and joints	-/3	16	13	6
	225	6	,, ...	,, rubbed face	1/-	11	5	6
	16	3	,, ...	,, rubbed work, sunk.....	1/2	0	19	0
	117	0	Lineal ...	,, clean, chiselled, and splayed margin, 3 in. wide	-/3	1	9	3
				Averages 2/11½ per cube foot fixed, or 4·20d. per cube; about 3/- per foot. cub.				

ft.	in.				£	s.	d.
			Window dressings, 2nd Floor.				
1,553	0	Cube	Freestone, stone and sittings	1/6	116	9	6
1,634	0	Supl.	Labour to chiselling beds and joints	-/3	20	8	6
190	0	,, ...	,, ,, sunk	-/4	3	3	4
269	0	,, ...	,, rubbing	1/-	13	9	0
19	0	,, ...	,, ,, sunk	1/2	1	2	2
190	0	Lineal ...	,, check for box-frames	-/6	4	5	0
123	6	,, ...	,, moulding, (say) 12 in. girth	1/-	6	3	6
114	0	,, ...	,, ,, ,, 15 in. ,, ...	1/3	7	2	6
285	0	,, ...	,, ,, ,, 18 in. ,, ...	1/6	21	7	6
		No., 95 ...	Mitres	2/-	9	10	0
		No., 38 ...	Labour to carved acroteria 9 in. x 6 in.	10/-	19	0	0
		No., 19 ...	,, ,, 18 in. x 6 in.	15/-	14	5	0
			1,553 cube feet stone at (say) 3/-.				
			Sill and Cornice to 3rd Floor.				
1,036	0	Cube	Freestone and sittings	1/6	77	14	0
2,335	0	Supl.	Labour to chiselling beds, &c.	-/3	29	3	9
430	0	,, ...	,, rubbed work sunk	1/2	25	1	8
220	0	Lineal ...	,, 2 in. bead to architrave	-/2	1	16	8
220	0	,, ...	,, moulding sill, (say) 15 in. girth	1/3	13	15	0
		No., 8 ...	Mitres to 2 in. bead	-/6	4	0	0
		No., 1 ...	Returned end to 2 in. bead	-/6	0	0	6
		No., 8 ...	Mitres to 15 in. sill	2/6	1	0	0
		No., 1 ...	Returned end to 15 in. sill	1/3	0	1	3
		No., 38 ...	Splayed ends to sinkings on sill	1/6	2	17	0
			Averages about 2/10 per cube foot on 1,036 cube feet of stone.				
			Dressings to Windows on 3rd Floor.				
824	0	Cube	Freestone, sitting	1/6	61	16	0
880	0	Supl.	Labour to chiselling beds, &c.	-/3	11	0	0
152	0	,, ...	,, ,, sunk to splayed reveals	-/4	2	10	8
44	4	,, ...	,, ,, circular sunk	-/8	1	9	6
370	6	,, ...	,, rubbing	1/-	18	10	0
190	0	,, ...	,, ,, sunk	1/2	11	2	8
41	2	,, ...	,, ,, ,, circular	1/2	2	8	0
304	0	Lineal ...	,, check for frames	-/6	7	12	0
38	0	,, ...	,, 3 in. moulding to keys	-/3	0	9	6
		No., 38 ...	Mitres to last	1/-	1	18	0
			824 feet of stone at about 3/- per foot cub.				
			String on 3rd Floor.				
124	6	Cube	Freestone, and fixing same	1/6	9	6	9
525	6	Supl.	Labour to chiselling beds, &c.	-/3	6	11	3
142	0	Lineal ...	,, moulding, (say) 9 in. girth	-/9	5	6	6
		No., 38 ...	Returned ends to last	1/6	2	17	0
			124½ feet stone, say about 3/9 per foot cub.				
			Main Cornice and Parapet.				
3,067	0	Cube	Freestone	1/6	230	0	6
4,670	0	Supl.	Labour to chiselling beds, &c.	-/3	58	7	6
469	0	,, ...	,, rubbing	1/-	23	9	0
550	0	,, ...	,, ,, sunk	1/2	32	1	8
440	0	Lineal ...	,, 1½ in. fillet	-/4	7	6	8
220	0	,, ...	,, bead 3 in. girth	-/3	2	15	0
230	0	,, ..	Labour to moulding rail, (say) 9 in. girth	-/9	8	12	6
223	0	,, ...	,, (say) 36 in. girth	3/-	33	9	0
		No., 160 ..	Mitres to 1½ in. fillet	-/8	5	12	0
		No., 3 ...	,, 3 in. bead	-/6	0	1	6
		No., 80 ...	,, 9 in. moulding	1/6	6	0	0
		No., 3 ...	,, 36 in. ,, ...	6/-	0	18	0
		No., 1 ...	Returned end to 36 in. moulding	3/-	0	3	0
		No., 40 ...	Labour upon half moulded turned balusters, 2 ft. 3 in. high, out of 9 in. x 4½ in.	6/-	12	0	0
		No., 120 ..	Labour upon moulded turned balusters, 2 ft. 3 in. high, out of 9 in. x 9 in., each at	8/6	51	0	0
		No., 240 ..	Dowel above into blocking and coping	-/6	6	0	0
		No., 1 ...	Carve truss, 4 ft. high by 1 ft. 6 in., on face	70/-	3	10	0
			Average, 3/0$\frac{6}{7}$ per cube foot on 3,067 ft.; 3,067 ft. stone, 3/- per foot cube.				
			Chimney Caps.				
287	0	Cube	Freestone and sittings	1/6	21	10	6
229	0	Supl.	Labour to chiselling beds, &c.	-/3	2	17	3
44	6	,, ...	,, rubbing, sunk	1/6	3	6	9
44	6	Lineal ...	,, 3 in. bead	-/4	0	15	0
74	6	,, ...	,, moulding, (say) 24 in. girth	2/-	7	9	0
		No., 20 ...	Mitres to 3 in. bead	-/6	0	10	0
		No., 20 ...	,, 24 in. moulding	4/-	4	0	0
		No., 23 ...	Punch-holes for 9 in. x 9 in. flues	2/6	2	17	6
			Average, about 3/- per cube foot on 287 cube feet stone; 287 ft. stone, 3/- per foot.				
			Mantels, Hearths, and Steps.				
15	0	Supl.	26 g. galvanized iron under outer hearths	.....	0	5	0
15	0	,, ...	Coke concrete laid 3 in. thick on same	3/-	2	5	0
22	0	,, ...	2 in. rubbed slate inner and outer hearths, per foot superficial	3/-	3	6	0
83	6	,, ...	2 in. rubbed slate steps and sills to doors of lavatory, lift, 1st and 2nd floor	3/-	12	10	6
		No., 6 ...	2½ in. x 1 in. wrought iron bars, (say) 24 in. long, under hearths = 100 lb.	-/2	0	16	8
		No., 2 ..	Grates, p.c. £2 each, set with a backing of cement concrete	50/-	5	0	0
		No., 2 ...	Mantels, p.c. £3 10s. each, to be fixed complete	75/-	7	10	0

				Generally.		
			No., 1 ...	Bond all old work with new.		£ s. d.
			No., 1 ...	All stones to be wet on beds before being laid.		
			No., 1 ...	All stonework of old building to have joints raked out and pointed with putty	.....	10 0 0
			No., 1 ...	Rebuild portion of party wall disturbed at north end	.....	10 0 0
			No., 1 ...	Cut chases 6 in. deep x 18 in. wide at intersections of brick walls with stone cornice (say) 30 ft. lineal	1/-	1 10 0
			No., 1 ...	Cut any necessary chases for downpipes, &c.		
			No., 15 ...	Cuttings for end of girders, 20 in. x 8 in. x 14 in. deep, each at	2/-	1 10 0
			No., 1 ...	Build in galvanised iron cramps and hoop iron. (See Smith.)		
				To Summary	.....	1,252 13 3
				Bricklayer.		
				Bricks to be best quality, hard, sound, and laid wet. Double pressed facing bricks must match those in existing work. Mortar is 1 of Portland cement to 2 of sand. Sand must be clean and sharp, and, if necessary, well washed.		
				Brickwork. Estimate cost of one rod of brickwork. £ s. d. 4,000 bricks, at 26s. per thousand ... 5 4 0 6 casks of cement, at 12s. ... 3 12 0 4 loads of sand, 3s. ... 0 12 0 9 8 0 Labour per rod ... 3 5 0 £12 13 0		
rods	ft.	in.				
4	122	0	Supl.	Reduced brickwork in cement to foundations.		
70	220	0	,, ...	Reduced brickwork in cement to walling. This may be estimated as rough both sides, facings being measured separately	12/15/-	949 7 6
	171	0	,, ...	Damp course—2 courses of Bangor slates bedded in cement. NOTE.—None taken to brick piers under columns	-/8	5 14 0
yds.	ft.	in.				
581	1	0	,, ...	Tuckpointing brickwork, new and old, of front of old building and chimney stacks	1/9	50 16 9
				Prime cost of 1 rod of double pressed facing bricks laid in cement :— £ s. d. 4,000 bricks at 75s. per thousand ... 15 0 0 6 casks of cement at 11s. 6d. ... 3 9 0 4 loads of sand, 3s. ... 0 12 0 £19 1 0 Labour per rod ... 8 0 0 £27 1 0 Common brickwork ... 12 10 0 Extra cost of double pressed brickworks .. £14 11 0 26s. per yard cube = 5⅓ yards face work, with headers and stretchers alternately, per rod. N.B. 26s. per cube yard = £14 14s. 8d. per rod. One cube yard = 48 ft. superficial 13½ in. work. At 1s. 1d. per foot = £14 14s. 8d. per rod. 4s. 9d. per yard superficial, 6¾ in. thick = 26s. per cube yard.		
239	8	0	,, ...	Allow for extra cost of facing new fronts and chimney flues with double pressed bricks	4/9	56 15 3
	930	0	Lineal ...	6-in. earthenware drain-pipe set in cement to inside of chimney flues.	-/8	31 0 0
				Labors only.		
	213	3	Supl.	Rough cutting to skewbacks	-/3	2 13 3
	450	6	,, ...	,, segmental arches	-/2	3 15 0
	65	6	,, ...	,, circular	-/4	1 2 0
	342	6	,, ...	Fair cutting	-/2	2 17 0
	224	0	,, ...	,, reveals to splay	-/3	2 16 0
	142	6	,, ...	,, circular	-/4	2 7 4
	179	0	Lineal ...	Allow for bonding new work into old	-/6	4 9 6
			No., 1 ...	Build in arch-bars. (See Smith.)		
			No., 1 ..	Bed wall-plates. (See Smith.)		
				Generally.		
			No., 1 ...	When pulling down old walls the floors must be carefully shored up, so as not to interefere with the working of the office.		
			No., 1 ...	Make any arched openings necessary for belting and shafting	.....	2 0 0
			No., 1 ...	Remove any stone coping from party walls if required. (The stone ought to pay for removal.)		
			No., 1 ...	Cut out any wood, bricks, or lintels in walls that are to be raised upon, and make good, with 14 in. brick in cement arches on 3 in. x ½ in. cambered iron bars, one to each half brick. In order to estimate this item it will be necessary for contractor to inspect the building. (All the cuttings on page 15 make up for this.)		
				Urinals.		
	531	0	Supl.	1½ in. rubbed slate back, divisions, and ends	2/6	66 7 6
	156	0	Lineal ...	Labour, cutting 1½ in. grooves in back	-/6	3 18 0
	244	6	,, ...	,, to rounded nosing included.		
			No., 1 ...	Fix cups and brackets. (See Smith.)		
				Lavatory Shelf.		
	93	6	Supl.	1½ in. rubbed slate top	2/6	11 13 9
	53	0	Lineal ...	1 in. groove in above	-/6	1 6 6
	53	0	,, ...	Rounded nosing to edge of same	-/2	0 8 10
	53	0	,, ...	6 in. x 1 in. nosed slate skirting	1/8	4 7 8
			No., 1 ...	Mitre (included above).		
			No., 2 ...	Returned ends	-/6	0 1 0
			No., 20 ...	Dished holes cut for basins 14 in. diameter	5/-	5 0 0

yds.	ft.	in.				£	s.	d.
				Lavatory Floor.				
160	0	0	Supl.	4 in. corrugation galvanised iron, 18 g., cambered	7/-	56	0	0
146	6	0	,,	Coke concrete over above, averaging 9 in. in thickness over top of corrugations. (Average about 12 in. thick)	9/-	66	0	0
152	5	0	,,	1½ in. asphalte laid over same and turned up walls, p.c. value, 10s. 6d. per yard	10/6	57	15	0
	110	0	Lineal	Labour, forming gutters 4 in. wide in above				
				To Summary		202	12	9
				Carpenter and Joiner.				
				Timber specified as hardwood must be blue-gum, black-butt, or tallow-wood, as directed, and of best quality.				
				Flooring and lining boards to be stacked within three months of date of acceptance.				
				All timbers to be the best of their respective kinds, and to hold full size.				
				Add to each item of timber cost of labour and nails, fixing same.				
				Flooring.				
21,989	0		Supl.	10 in. x 2½ in. hardwood floor-joists	13/-	143	0	0
1,554	0		,,	10 in. x 3½ in. hardwood trimmers	15/-	11	12	3
sq.	ft.	in.						
136	78	0	,,	4 in. x ¾ in t. and g. hardwood floor-boards with bevelled heading, joints double-nailed to each joist	20/3	139	2	0
	ft.	in.						
	210	0	Lineal	3 in. mitred Oregon margins to landings and hearths.				
1,281	0		,,	2 in. x 2 in. Oregon herring-bone strutting-joists, per 100 lineal feet	6/1	4	0	9
			No., 1.	Fix 1 in. bolts and nuts through above strutting. (See Smith.)				
			No., 1	Repair all floors, joisting, skirting, and other carpenters' and joiners' work disturbed by alterations, and make good with new work; also shore up existing floors when putting in new columns and girders, about 3½ squares	....	10	10	0
				Partitions.				
2,697	0		Supl.	6 in. x 3 in. wrought Oregon sills, heads, studs, and braces framed up	15/1	20	3	0
			No., 20	⅝ in. wrought-iron bolts, say, 12 in. long, securing studs to brick-work; 8 lb.	-/3	0	2	0
				Filling Openings on Third Floor				
38	6		Supl.	2 in. framed, panelled, and beaded cedar, panels to be t. g. and v joint boarding	2/1	4	0	3
71	0		Lineal	6 in. x 3 in. rebated, channelled, chamfered cedar frame, per foot	1/-	3	11	0
12	0		,,	6 in. x 3 in. moulded cedar transom	1/3	0	15	0
			No., 2	2 in. moulded cedar fan-lights in one pane, pivot hung, each 6 ft. x 1 ft. 9 in.	12/-	1	4	0
				Screen to Gallery.				
36	0		Supl.	2 in. beaded and panelled cedar framing to above	2/-	3	15	0
108	0		Lineal	6 in. x 3 in. rebated, channelled, and chamfered cedar frame	1/-	5	9	0
			No., 4	2 in. moulded cedar fan lights in one pane, each 7 ft. 7 in. superficial, each	12/-	2	8	0
			No., 4	2 in. moulded cedar sashes in one pane, each 15 ft. 10 in. superficial	16/-	3	4	0
				Roof and Walling of Composing Room.				
5,514	0		Supl.	6 in. x 3 in. Oregon studs, tenoned into sills and plates	15/-	41	7	0
881	0		,,	6 in. x 3 in. Oregon bracing and trimming for openings	15/-	6	18	0
630	0		,,	6 in. x 4 in. Oregon heads, mortised for studs	15/-	4	17	0
1,260	0		,,	6 in. x 4 in. Oregon intermediate and gutter-plates	16/-	10	0	0
840	0		,,	8 in. x 4 in. Oregon sill, mortised for studs	15/-	6	6	6
1,680	0		,,	8 in. x 4 in. ,, purlins	15/-	12	13	9
843	0		,,	8 in. x 4 in. ,, kerb, under lantern, wrought	18/-	7	12	0
			No., 60	9 in. x 6 in. x 4 in. Oregon chocks, for purlins, spiked to principals	15/-	0	9	0
			No., 28	4 in. x 4 in. wrought frames, to take sashes 3 ft. diameter	20/-	28	0	0
			No., 28	2 in. moulded cedar sashes, 3 feet diameter, pivot hung, with necessary beads and stops	18/-	25	4	0
				Lantern.				
1,696	0		Supl.	4 in. x 3 in. Oregon rafters and hangers	15/-	12	15	0
316	0		,,	4 in. x 3 in. ,, pole plate	15/-	2	8	0
1,070	0		,,	6 in. x 2 in. ,, ceiling joists	15/-	8	2	0
186	0		,,	8 in. x 1½ in. ,, ridge, &c.	15/-	1	10	0
413	0		,,	4 in. x 4 in. wrought Oregon muntins	18/-	3	12	0
1,264	0		,,	6 in. x 4 in. Oregon top and bottom plates	15/-	9	8	0
120	0		,,	6 in. x 6 in. wrought Oregon corner posts	18/-	1	2	4
421	0		,,	1 in. wrought and beaded cedar fascia and soffit	-/8	14	0	8
316	0		Lineal	2 in. cedar scotia on last, per ft.	-/2	2	12	8
172	0		,,	2 in. deal roll, on ridge and hips	-/2	1	8	8
316	0		,,	7 in. x 3 in. weathered and throated hardwood sill	-/8	10	10	8
			No., 62	2 in. moulded cedar sashes, pivot hung, with proper beads and stops, in one pane, each 15 ft. superficial	1/3	58	2	6
				Photo. Gallery and Dark Room.				
385	0		Supl.	5 in. x 3 in. Oregon rafters	16/-	3	2	0
35	0		,,	8 in. x 1½ in. ,, ridge	16/-	0	5	6
64	0		,,	4 in. x 4 in. wrought Oregon struts	20/-	0	12	10
16	0		,,	4 in. x 4 in. Oregon struts under ridge	16/-	0	3	4
227	0		,,	6 in. x 3 in. ,, bracing and trimming for openings	16/-	1	16	6
923	0		,,	6 in. x 3 in. ,, studs, tenoned into plates	16/-	7	7	9
174	0		,,	7 in. x 2½ in. ,, eaves, joists, and trimmers	16/-	1	8	0
200	0		,,	6 in. x 4 in. ,, heads, mortised for studs	16/-	1	2	0
274	0		,,	6 in. x 4 in. ,, gutter plate	16/-	1	14	5
176	0		,,	8 in. x 4 in. ,, plate, under tie-beam	16/-	1	8	0
544	0		,,	8 in. x 4 in. wrought Oregon purlins	16/-	4	8	6

ft	in				£	s	d.
266	0	Supl	8 in x 4 in Oregon sill	16/	2	2	8
560	0	,,	8 in x 6 in wrought Oregon principals and straining pieces to trusses	20/	5	11	8
256	0	,,	8 in x 6 in wrought Oregon queen posts to trusses	20/-	2	11	0
680	0	,,	10 in x 6 in ,, tie beams to trusses	20/-	6	16	6
1,072	0	,,	Patent glazing bars, fixed to roof and gable, p c 3s 6d per foot superficial, inclusive of the glass	4/-	214	8	0
102	0	Lineal	Approved wrought iron runners for sliding sashes, grooved into framing	/6	2	11	0
		No , 4	Fix to 4 trusses wrought iron straps, &c (see Smith)				
		No , 24	6 in x 6 in x 4 in Oregon blocks for purlins, spiked to principals, 24 ft superficial, at	20/	0	5	0
		No , 20	2 in moulded cedar sashes, in one pane, size 2 ft x 6 ft 6 in	1/3	15	12	6
		No , 6	2 in ,, ,, ,, ,, 2 ft 6 in x 6 ft 6 in	1/3	6	2	0
		No , 3	2 in ,, ,, ,, ,, 3 ft x 6 ft 3 in	1/3	3	0	4
			Roof Sheathing, &c				
95	36	0 Supl	6 in x 1 in shot edge Oregon boarding	16/-	76	5	0
523	0	,,	1 in deal gutter boarding, on 3 in x 2 in bearers, properly blocked up, per foot superficial	/4	8	14	4
78	0	Lineal	8 in. x 1½ in wrought and chamfered cedar barges, with 3 in moulding planted on	1/-	3	18	0
		No , 58	Extra for drips in gutter, each	1/6	4	7	0
		No , 10	Extra for cesspool outlets in gutter	2/6	1	5	0
			Lining, &c				
78	76	0 Supl	6 in x 1 in t g and v joint kauri pine lining	22/	86	13	4
50	40	0 ,,	,, ,, (inclusive of necessary cradling)	24/-	60	9	8
188	30	0 ,,	26 g galvanised iron, small corrugation lining ceilings, lapping two corrugations, and 9 in end lap screwed to joists	24/	225	19	3
9,290	0	Lineal	3 in kauri angle fillets to ceilings and floors	16/	74	8	0
		No , 924	Mitres to same				
		No , 1	Make good all lining and boxing disturbed		5	0	0
			Door Frames and Linings				
70	4	Supl	8 in x 1½ in wrought and rebated cedar jamb linings	/8	2	6	8
53	0	Lineal	4½ in x 4 in solid rebated hardwood door frames	/9	1	19	9
		No , 12	9 in x ½ in wrought iron bolts securing same to brickwork	/3	0	1	6
			Doors				
		No , 5	7 ft x 3 ft x 2 in panelled moulded cedar doors to new lift, with upper panels of brass wire netting—21 ft superficial each = 105 ft superficial, at	2/	10	10	0
		No , 7	7 ft x 3 ft 3 in x 2 in , four panel double moulded cedar doors, 22 ft 9 in superficial, each	32/-	11	4	0
		No , 1	7 ft x 3 ft 3 in x 2¼ in four panel beaded butt cedar door—22 ft 9 in superficial	35/-	1	15	0
		No , 1	7 ft by 5 ft x 2 in sliding cedar lattice door, properly braced to lift —35 ft superficial, inclusive of proper cased frame	80/	4	0	0
		No , 1	10 ft x 6 ft x 2¼ in eight panel beaded butt cedar door, folding—60 ft superficial	3/	9	0	0
			Windows				
			Proper allowances made for box, frame, and sill				
		No , 3	2¼ in moulded cedar sashes, double hung with 2 in best brass-faced axle pulleys, patent lines, and iron or lead weights in cedar box frames and rebated and weathered hardwood sills , box frames to have 1½ in pulley stiles, 2 in heads, 1 in beads and stops, ⅜ in parting slips, and ¾ in linings, each 20 ft 6 in superficial, at	55/	8	5	0
		No , 19	Similar windows, but each 26 ft 2 in supl , and with segmental heads	67/-	63	13	0
		No , 11	,, ,, 27 ft 6 in ,, ,,	69/-	37	19	0
		No , 16	,, ,, 31 ft 8 in ,, ,,	85/-	68	0	0
		No , 4	,, ,, 34 ft 1 in ,, ,,	100/-	20	0	0
		No , 1	,, ,, 35 ft 2 in ,, ,,	100/-	5	0	0
		No , 3	,, ,, 35 ft 5 in ,, ,,	100/-	15	0	0
		No , 19	,, ,, 39 ft 11 in ,, ,,	115/-	109	5	0
		No , 3	,, ,, 40 ft 8 in ,, ,,	115/	17	5	0
		No , 2	,, ,, 43 ft 11 in ,, ,,	120/	12	0	0
		No , 38	Allow for setting box frames in green baize and white lead, each	2/6	4	15	0
			Architraves, &c				
379	0	Lineal	2 in cedar scotia under window board No 162 , returned ends to same	15/	2	17	0
385	4	,,	9 in x 1½ in nosed cedar window board No 162 , notched and returned ends	8/-	12	16	8
1,377	10	,,	9 in x 1 in splayed cedar linings, ploughed to box frames, including grounds, &c	6/	34	8	6
			No 19—splayed linings as above, to fit segmental heads 3 ft wide	2/6	2	12	6
1,807	9	,,	6 in x 1½ in chamfered and beaded kauri Architraves, inclusive of grounds and plugs	4/	30	2	4
		No , 190	Mitres				
		No , 19	Architraves as above, 4 ft long, to fit segmental heads	5/-	4	15	0
		No , 28	Architraves as above, to fit windows 3 ft 6 in diameter	15/-	21	0	0
			Staircase to Fourth Floor				
			Staircase to 4th floor to rise 13 ft 1 = 24 straight treads 4 ft long, including one half landing 6 ft x 2½ ft h w carriages, 1 in rises 1¼ in treads of hard wood, 1¾ in t and g on landing , 6 in x 1 in t and g cedar soffits 38 ft lineal of 12 in x 1 in cedar fascia, round well hole, 1½ in cedar scotia under treads, 4½ in x 3 in kauri handrail 84 ft long , 14 in x 2 in h w strings No 5 newels 6 in x 6 in , 5 ft long 3 similar newels 10 ft long all the newels wrought, cut, and turned 24 steps in all , complete, at 23/ per step				
110	0	Supl.	6 in x 2½ in hardwood carriages and joists to landing				
48	0	,,	1 in wrought hardwood risers, glued, blocked, and bracketed				

sq.	ft.	in.				£	s.	d.
	80	8	Supl.	$1\frac{1}{2}$ in. wrought and nosed hardwood treads, glued, blocked and bracketed.	.....	.....		
	51	0	,, ...	$1\frac{3}{4}$ in. T. and G. hardwood boarding on landing	.....	.....		
	131	0	,, ...	6 in. x 1 in. T. G. and V. joint cedar lining soffites	.....	.....		
	38	0	,, ...	12 in. x 1 in. cedar fascia round well-hole	.....	.....		
	48	0	Lineal ...	14 in. x 2 in. wrought hardwood strings	.....	.....		
	96	0	,, ...	$1\frac{1}{2}$ in. cedar scotia under treads	.....	.....		
	84	0	,, ...	$4\frac{1}{2}$ in. x 3 in. moulded Kauri handrail, with $1\frac{1}{2}$ in. x $\frac{1}{2}$ in. wrought-iron core.	.....	.....		
			No., 48 ...	House treads and risers to strings	.....	.....		
			No., 8 ...	,, ,, newels	.....	.....		
			No., 8 ...	House strings to newels	.....	.....		
			No., 13 ...	House handrails to newels	.....	.....		
			No.,202 ...	Tenoning balusters to strings, &c.	.....	.....		
			No., 4 ...	Ends of handrail cut and pinned	.....	.....		
			No.,192 ...	2 in. x 2 in. wrought hardwood balusters 2 ft. 9 in. long	.....	.....		
			No., 10 ...	2 in. x 2 in. iron balusters, 2 ft. 9 in. long, riveted to core	.....	.....		
			No., 5 ...	6 in. x 6 in. wrought, turned, and cut hardwood newels 5 ft. long	.....	.....		
			No., 3 ...	6 in. x 6 in. ,, ,, ,, ,, 10 ft. long	23/-	27	12	0
				Staircase near Lavatory.				
	38	0	Supl.	6 in. and $2\frac{1}{2}$ in. hardwood carriages	.....	.....		
	30	4	,, ...	1 in. wrought hardwood risers, glued, blocked, and bracketed	.....	.....		
	29	4	,, ...	$1\frac{1}{2}$ in. wrought and nosed treads, glued, blocked, and bracketed	.....	.....		
	18	0	,, ...	$1\frac{1}{2}$ in. ,, ,, winders, ,, ,, ,, ...	.....	.....		
	58	0	,, ...	6 in. x 1 in. T., G. and V. joint cedar lining soffit	.....	.....		
	16	0	,, ...	12 in. x 1 in. wrought and beaded cedar fascia to well-hole	.....	.....		
	52	0	Lineal ...	$1\frac{1}{2}$ in. cedar scotia under treads	.....	.....		
	30	0	,, ...	14 in. x 2 in. wrought hardwood strings	.....	.....		
	20	0	,, ...	$4\frac{1}{2}$ in. x 3 in. moulded Kauri handrail, with $1\frac{1}{2}$ in. x $\frac{1}{2}$ in. wrought-iron core.	.....	.....		
			No., 1 ...	Connect new flight with existing one	.....	.....		
			No., 16 ...	House treads and risers to strings	.....	.....		
			No., 4 ...	,, winders and risers to strings	.....	.....		
			No., 9 ...	,, treads and risers to newels	.....	.....		
			No., 8 ...	,, handrails to newels	.....	.....		
			No., 6 ...	,, strings ,,	.....	.....		
			No., 52 ...	Tenon balusters to strings, &c.	.....	.....		
			No., 1 ...	Pin end of handrail	.....	.....		
			No., 48 ...	2 in. x 2 in. wrought hardwood balusters 2 ft. 9 in. long	.....	.....		
			No., 4 ...	2 in. x 2 in. iron balusters 2 ft. 9 in. long	.....	.....		
			No., 5 ..	6 in. 6 in. wrought, turned, and cut hardwood newels 6 ft. long ...	23/-	27	12	0
				Staircases at North End.				
	188	0	Supl.	6 in. x $2\frac{1}{2}$ hardwood carriages and joists to landing	.....	.....		
	98	0	,, ...	1 in. wrought hardwood risers, glued, blocked, and bracketed	.....	.....		
	141	2	,, ...	$1\frac{1}{2}$ in. wrought and nosed treads, glued, blocked, and bracketed	.....	.....		
	32	0	,, ...	12 in. x 1 in. wrought and beaded cedar fascia to well-hole	.....	.....		
	224	0	,, ...	6 in. x 1 in. T., G. and V. joint cedar lining soffit	.....	.....		
	56	0	,, ...	$1\frac{3}{4}$ in. T. and G. hardwood boarding to landing	.....	.....		
	168	0	Lineal ...	$1\frac{1}{2}$ in. cedar scotia under treads	.....	.....		
	96	0	,, ...	14 in. x 2 in. wrought hardwood strings	.....	.....		
	76	0	,, ..	$4\frac{1}{2}$ in. x 3 in. moulded Kauri handrail, with $1\frac{1}{2}$ in. x $\frac{1}{2}$ in. wrought-iron core	.....	.....		
			No., 88 ...	House treads and risers to strings	.....	.....		
			No., 10 ...	,, ,, newels	.....	.....		
			No., 10 ...	,, strings ,,	.....	.....		
			No., 18 ...	,, handrails ,,	.....	.....		
			No.,175 ..	Tenon balusters to strings, &c.	.....	.....		
			No., 2 ...	Pin ends of handrail	.....	.....		
			No.,169 ...	2 in. x 2 in. wrought hardwood balusters, 2 ft. 9 in. long	.....	.....		
			No., 6 ...	2 in. x 2 in. iron balusters, 2 ft. 9 in. long, riveted to core	.....	.....		
			No., 11 ...	6 in. x 6 in. wrought, turned, and cut hardwood newels, 6 ft. long	21/-	25	4	0
				Lead Flat.				
	42	0	Supl.	4 in. x 3 in. hardwood plates	14/-	0	6	8
	363	0	,, ...	6 in. x 3 in. ,, rafters, firred up for ceiling-joists	15/-	2	14	6
	487	0	,, ...	7 in. x 3 in. ,, ceiling-joists	15/-	3	13	6
3	36	0	,, ...	6 in. x 1 in. T. & G. Oregon boarding on rafters	16/-	2	13	8
3	36	0	,, ...	3 in. x 1 in. hardwood battens, checked to 3 in. x 2 in. bearers over flat	20/-	3	6	6
	162	0	Lineal ...	2 in. deal rolls for lead	-/2	1	7	0
				Closets and Urinals.				
	635	0	Supl.	4 in. x $2\frac{1}{2}$ in. Oregon rafters	16/-	5	1	8
	117	0	,, ...	4 in. x 3 in. hardwood braces to urinal divisions	14/-	0	16	9
	264	0	,, ...	4 in. x 4 in. wrought hardwood diagonal braces	16/-	2	2	6
	120	0	,, ...	4 in. x 4 in. ,, muntins to lantern—hardwood	16/-	0	19	2
	192	0	,, ...	4 in. x 4 in. ,, hardwood diagonal braces to lantern	16/-	1	10	6
	580	0	,, ...	4 in. x 4 in. hardwood rails to closets	14/-	4	1	4
	360	0	,, ...	4 in. x 4 in. ,, uprights	14/-	4	10	6
	600	0	,, ...	5 in. x 4 in. wrought hardwood plates to lantern	16/-	4	16	0
	25	0	,, ...	5 in. x 5 in. ,, corner posts to lantern	16/-	0	4	0
	464	0	,, ...	6 in. x 4 in. ,, studs, tenoned	16/-	3	15	4
	274	0	,, ...	6 in. x 4 in. ,, and weathered hardwood transom	16/-	2	4	6
	210	0	,, ...	6 in. x 4 in. ,, hardwood sill to take urinal posts	15/-	1	11	6
	468	0	,, ...	6 in. x 4 in. ,, urinal posts	15/-	3	10	6
	260	0	,, ...	6 in. x 4 in. ,, Oregon principal rafters, &c., to trusses	22/-	2	17	0
	64	0	,, ...	6 in. x 4 in. ,, queen posts to trusses	22/-	0	14	0
	288	0	,, ...	8 in. x 4 in. ,, tie beams ,,	22/-	3	4	6

sq	ft	in				£	s	d
	822	0	Supl	6 in x 6 in wrought hardwood plates to wall	16/	6	10	0
	108	0	,,	6 in x 6 in ,, corner posts	16/	0	17	6
	448	0	,,	8 in x 6 in ,, kerb to lantern	15/	3	7	0
	1,567	0	,,	Oregon rafters to lantern, cut out of 18 in x 2½ in stuff	20/	15	14	0
4	50	0	,,	6 in x 1 in T, G & V joint deal lining urinal backs	22/	4	19	0
	262	0	,,	1 in wrought and beaded cedar fascia and soffit	8/	8	14	8
11	82	0	,,	6 in x 1¼ in T, G & V joint Kauri lining closet divisions	27/-	15	18	8
6	8	0	,,	26 g galvanised iron small corrugation, secured to walls	24/	7	6	2
	224	0	Lineal	1½ in cedar scotia on fascia, per 100 ft	8/	0	18	0
	256	0	,,	4 in x 3 in wrought rebated hardwood door frames	3/	3	4	0
	55	0	,,	5 in x 2 in weathered deal capping to urinal back	6/	1	7	6
	135	0	,,	6 in x 2 in ,, Kauri capping to closet divisions	5/	2	16	3
	98	0	,,	6 in x 1 in beaded Kauri skirting	3/	1	4	6
	20	0	,,	12 in x 1½ in wrought and beaded cedar barges	/10	0	16	8
	11	0	,,	24 in x 1½ in ,, ,, to lantern	2/	1	2	0
			No, 1	Take off present roof of back building near lane, taking every care to avoid damage by rain, &c., to rooms under				
			No, 1	Provide any bolts for wall framing if required by Government Architect				
			No, 16	6 ft 0 in x 2 ft 6 in x 2 in four panel bead butt cedar doors	25/-	20	0	0
				Lavatory				
	98	0	Supl	3 in x 2½ in wrought hardwood framing to top	/3	1	4	6
	144	6	,,	6 in x 1 in T, G and V joint Kauri pine boarding front on 6 in x 1 in ledges, in ten movable lengths	-/4	2	8	2
				Altering Outer Lift				
	90	0	,,	4 in x 1 in hardwood battens for iron wrought	16/-	0	14	5
	130	0	,,	4 in x 1½ in wrought hardwood diagonal braces	16/	1	0	9
	298	0	,,	6 in x 6 in wrought hardwood intermediate plates	15/-	2	5	0
	360	0	,,	6 in x 6 in wrought hardwood runners	15/	2	14	0
5	4	0	,,	26 g galvanised iron enclosing	21/	5	6	6
			No, 1	Fix wrought iron angle straps and bolts (see Smith)				
			No, 1	Remove present roof and re erect same in new position		5	0	0
			No, 1	Splice the four new runners to present ones	4/-	0	16	0
			No, 1	Alter the existing lift so as to work the fourth floor, and leave same in good working order		6	0	0
				Inside Lift, New				
				Enclosure taken 6 ft 0 in x 6 ft 0 in, and from ground floor up				
	374	0	Supl	4 in x 4 in wrought hardwood uprights, grooved for boarding	16/	3	0	0
	480	0	,,	4 in x 4 in wrought hardwood cross bearers to same	16/	3	16	9
15	75	0	,,	6 in x 1¼ in T, G and V joint cedar lining to enclosure	45/	35	8	9
	223	6	Lineal	4 in splayed cedar fillet	-/3	2	15	10
	17	6	,,	4 in x 3 in mitred hardwood thresholds	/4	0	5	10
	95	0	,,	4 in x 4 in wrought and chamfered cedar door frames	-/8	3	3	4
			No, 40	Mitres to splayed fillet	/2	0	6	8
			No, 390	½ in wrought iron bolts, 6 in long, securing framing	/3	1	12	0
			No, 4	Trim floors for well holes	10/	2	0	0
			No, 1	Allow the sum of £700 for lift and cage fixed complete, but exclusive of enclosure		700	0	0
				Small Lifts				
	298	0	Supl	3 in x 1 in wrought hardwood bracing	16/	2	8	0
	532	0	,,	3 in x 3 in wrought Oregon angle posts	18/	4	15	1
12	78	0	,,	6 in x 1 in T, G and V joint cedar lining	36/	23	1	0
	330	0	Lineal	1 in neat angle bead to last	/1½	2	1	3
	180	0	,,	4 in Kauri angle fillets	/3	2	5	0
			No, 32	Mitres to last				
			No, 108	6 in x ½ in wrought iron bolts to framing	/3	0	8	9
			No, 11	Trim floors for well holes	10/-	5	10	0
			No, 14	2 ft 6 in x 5 ft 6 in x 1½ in panelled cedar sliding doors	40/	28	0	0
			No, 1	Allow £20 for lift from silver printing room, fixed complete		20	0	0
			No, 1	Allow the sum of £300 for providing and fixing two approved balance lifts for raising formes from basement		300	0	0
				Centres				
			No, 2	3 ft semi centres, 14 in soffit	5/-	0	10	0
			No, 2	5 ft semi centres, 14 in soffit	10/	1	0	0
				Ironmonger				
				Include screws and fixing Brass hinges, &c., have brass screws				
			No, 40	2 in brass buttons to lavatory front	-/3	0	10	0
			No, 62	4 in wrought iron butts	-/6	1	12	0
			No, 16	4 in wrought iron rod bolts	-/6	0	8	0
			No, 4	8 in ,, ,,	1/-	0	4	0
			No, 124	Approved brass sash lifts	-/5	2	11	8
			No, 62	,, ,, fasteners	1/6	4	13	0
			No, 19	Approved sash lifts and fasteners, p c, 3s per set	3/-	2	17	0
			No, 16	6 in Carpenter's rim locks	3/6	2	16	0
			No, 7	7 in ,, ,,	4/6	1	11	6
			No, 2	8 in ,, ,,	6/-	0	12	0
			No, 26	Approved fasteners to sliding sashes	2/6	3	5	0
			No, 90	Approved screw openers to lantern, &c, p c, 7s 6d each	2/6	33	15	0
			No, 6	Approved nickle plated transom rods	9/-	2	14	0
			No, 14	Sets of approved balance weights, steel cords, and lifts to small lift doors	8/-	5	12	0
			No, 1	Set similar to above, but for large lift door	27/-	1	7	0
			No, 5	Pairs of Kendrick's pulleys, with T bar and sliding bar to lift doors (The above price includes bars)	20/-	5	0	0
				To Summary	£	69	8	2

tons c qr lb				£ s d
			Smith and Founder	
			All iron to be best quality, and columns cast vertically	
			Roof Construction	
8 0 1 7			6 in x 6 in x ½ in T iron principals	£15	120 4 0
1 0 2 0			6 in x 6 in x ½ in T iron stanchions at photo room walls	£15	15 7 6
2 0 8			¾ in rivets to principals	£28	2 18 0
2 3 10			½ in wrought iron bolts, securing studs, &c , to principals	£30	4 6 3
	No ,330		Punch web of T iron for above bolts	/6	8 5 0
	No , 30		Feet of iron principals, to be secured by six rivets to flange of girders	2/6	3 15 0
1 20			¾ in wrought iron bolts, securing stanchions to tie beams	30/- }	1 2 6
1 2			⅝ in wrought iron bolts, securing stanchions to studs	30/- }	
	No , 40		Punch web of stanchions for above bolts	-/6	1 0 0
	No , 8		Feet of iron stanchions, to be secured by six rivets to flange of girders	2/6	1 0 0
19 3 24			1¼ in wrought iron tie rods and shackles	17/6	17 10 0
	No , 15		Extra for union screws to last	-/6	4 10 0
2 2 14			¾ in wrought iron hangers, including clamp nuts and forged eyes	20/-	2 15 0
1 20			1 in bolts, securing above to tuble of T iron	30/-	0 15 0
3 15 3 0			4 in x 4 in x ½ in L iron under kerbs, &c	£14	53 0 6
1 3 20			½ in wrought iron bolts securing same	30/-	3 0 0
	No ,210		Drill above for ½ in bolts	-/6	5 5 0
1 5 1 16			1 in wrought iron diagonal braces	17/10/-	22 5 0
3 16			Iron rivets, securing above to principals	20/-	3 12 0
	No , 64		Unions to above, with right and left screws	1/-	3 4 0
6 2 0			Wrought iron straps, knees, and bolts to lavatory roof	18/	
14 1 10			,, ,, bolts, &c to trusses	18/-	18 15 6
			Rolled Joists	
12 0 0			12 in x 6 in rolled iron joists to flat roof	11/-	
1 9 2 0			12 in x 6 in ,, ,, over Stamp room	£11	22 15 6
3 6 3 16			16 in x 6 in ,, ,, to lavatory	£12	40 2 6
52 6 1 7			19¾ in x 7⅛ in rolled iron joists	£11	575 9 0
			Columns	
33 6 3 0			Cast iron columns to future detail of average weight of 125 lb per foot	£11/10/	383 7 8
2 14 0 0			Cast iron bed plates under lower columns, on brick piers	£12	32 8 0
16 1 0			1 in wrought iron bolts and nuts, securing girders to columns	£16	13 0 0
4 3 0			1¼ in wrought iron holding down bolts	£16	3 16 0
	No , 90		Faced ends to columns	5/	22 10 0
	No , 1		Remove all existing columns (14) which become contractor's property		
	No , 4		Patterns for cast iron columns		
	No , 1		Pattern for bed plate		
			Sundries	
3 10 1 7			2½ in x 1 in wrought iron arch bars	£11	38 13 0
18 3 12			2 in x ½ in galvanised wrought iron wall plates	28/	26 12 0
3 0 0 0			Rolled iron joists of any required section	£12	36 0 0
2 0 0 0			Galvanised wrought iron clamps for mason	28/	56 0 0
2 0 0 0			2 in galvanised hoop iron bond for bricklayer	16/	32 0 0
1 12 1 20			1 in wrought iron bolts through herringbone strutting of floors	£17/10/	28 9 0
6 3 0			3 in x 1 in wrought iron angle straps and bolts to lift	15/	4 14 0
	No , 26		Approved wrought iron brackets under mimal slabs, say 12 in x 12 in	5/	6 10 0
	No , 26		,, ,, clips to secure slabs at top	1/6	1 19 0
	No , 1		Allow the sum of £150 for spiral stair, fixed complete		150 0 0
			To Summary		380 12 0
			Plumber	
			This trade must be executed in strict conformity to the regulations of the Water and Sewerage Board and Gas Company *Note* — Lengths of *wastes* and *Gas* and water pipe are necessarily approximate only, and will be subject to future measurements	
			Lead	
15 2 0			4 lb lead flashings	18/	
22 1 14			6 lb ,, on flats, dressed to rolls	18/	
23 2 0			6 lb ,, capping to ridge, &c	18/	
75 0 10			6 lo ,, to box gutters, and flashing same	18/	
35 3 0			6 lb ,, flashing to sill of lantern	18/	155 0 6
24 2 14			6 lb ,, lead, copper tacked to stairs	30/	36 14 0
sq ft in			*Zinc Work*	
67 97 0	Supl		No 10 g zinc, inclusive of 1½ in rolls, every 18 in properly secured to roofs measured on flat	45/	153 0 0
26 89 0	,,		Approved, stamped, and interlocking zinc tiles, fixed complete to walls of mansard	65/	87 9 0
44 0	Lineal		No 16 g approved zinc valleys	/7	1 5 8
44 0	,,		,, ,, hips	/9	1 13 0
694 0	,,		Approved moulded zinc gutters to eaves	}	
	No , 8		Mitres	} 1/	34 14 0
	No , 12		Stopped ends	}	
	No ,174		Approved brackets, securing same to fascia	}	
192 0	Lineal		Approved ornamental zinc cresting, 18 in high	2/	19 4 0
314 0	,,		,, ,, ,, frieze, about 15 in deep	}	
	No , 4		Mitres to frieze	} 1/6	23 11 0
	No , 2		Mitres to cresting	}	
	No , 28		Dressings of zinc to dormer windows, inclusive of sill, architrave, and pediment, size over all, say 4 ft x 4 ft	8/-	11 4 0
	No , 1		Guarantee the whole watertight for 12 months		
			Galvanised iron roofing	
11 20 0	Supl		26 g galvanised iron, inclusive of 3 in x 1 in deal battens, galvanised iron screws and lead washers To lap 2 corrugations at sides and 12 in at ends	25/-	14 0 0
6 72 0	,,		Similar iron, &c , but curved	27/	9 2 3

ft.	in.				£	s.	d.
			Eaves, Gutters, and Downpipes.				
314	0	Lineal ...	4 in. galvanised-iron spouting, 22 g. inside lantern, properly secured to sill	-/8	10	9	4
		No., 4.	Mitres to same				
		No., 4..	Stopped ends				
224	0	Lineal ...	4½ in. galvanised-iron eaves gutter, 22 g.	-/9	8	8	0
		No., 8 .	Stopped ends				
		No., 60 .	Approved wrought-iron brackets securing same				
52	0	Lineal ..	4 in. cast-iron downpipes from lantern	1/2	3	0	8
		No , 4. .	Approved cast-iron capper heads to same	12/-	2	8	0
720	0	Lineal ...	5 in. cast-iron downpipes	1/6	54	0	0
		No.,132	Approved holdfasts	7/6	0	15	0
		No., 2	Swan necks				
		No., 10 ..	Lengths of 7-lb. lead, 5 in. diameter, from cess pools to hoppers ...	8/-	4	0	0
		No., 12..	Approved cast-iron hopper heads	12/-	7	4	0
			Water-closets.				
100	0	Lineal .	6 in. diameter cast-iron soil-pipes	2/-	10	0	0
		No., 34 .	Approved wrought-iron holdfasts to same				
		No., 68 .	½ in. wrought-iron bolts, 9 in. long, securing holdfasts to brick-work	-/3	0	17	0
		No., 2	Connect with drains	.	1	2	6
60	0	Lineal	6 in. soil-pipe of 7 lb. lead, hung on approved lead brackets	2/9	8	5	0
		No., 16 .	Connect w.-c traps with above	10/-	8	0	0
		No., 2 .	Connect above with cast-iron soil-pipe	5/-	0	10	0
		No., 2	Lead traps, with brass cleaning-screws	7/6	0	15	0
		No., 2	Approved 5 in. galvanised-iron ventilating pipes, 22 g. (say), 75 ft. long, with cowls, straps, stays, and inlets, with mica flaps	. ...	9	10	0
		No., 16	Closet seats and apparatus, p.c. value, £4 10s. each; also cistern to each, costing £1 10s.	£7	112	0	0
			Urinals.				
20	0	Lineal .	4 in. diameter cast-iron soil-pipe	1/2	1	3	4
		No., 7	Approved wrought-iron holdfasts.				
		No., 14 .	½ in. wrought-iron bolts, 9 in. long, securing holdfasts to brick-work	-/3	0	1	9
		No., 1	Connect above soil-pipe with that from closets	5/-	0	5	0
54	0	Lineal .	2 in. pipe of 7-lb. lead on approved lead brackets	1/-	2	14	0
		No , 25 .	Trap urinal basins, and connect same by 1¼-in. lead pipe to above	6/-	7	10	0
		No., 1 .	Connect above with cast-iron soil-pipe	3/-	0	3	0
		No., 1	Lead trap, with brass cleaning screw	7/-	0	7	0
		No., 1 .	Approved 3 in. galvanised-iron ventilating-pipe, 22 g. (say), 15 ft. long, with cowl and stays	20/-	1	0	0
		No., 25	Urinal basins of approved pattern, each with an automatic flushing apparatus and cistern	50/-	62	10	0
			Lavatory.				
18	0	Lineal	3 in. diameter cast iron pipe	1/-	0	18	0
		No., 6	Approved wrought iron holdfasts.				
		No., 12 .	½ in. wrought-iron bolts, 9 in. long, 6 lb., securing above to brick-work	-/3	0	18	0
		No., 1	Connect with pipe from urinals	2/6	0	2	6
60	0	Lineal ..	1¼ in. wastes, &c , of 7-lb. lead	/9	2	5	0
		No , 20	Properly connect above to 2 in. pipe	1/-	1	0	0
54	0	Lineal	2 in. pipe of 7-lb. lead on approved lead brackets	1/-	2	14	0
		No., 1	Connect above with 3-in. cast-iron pipe	2/6	0	2	6
		No., 1	Lead trap, with brass cleaning-screw	7/6	0	7	6
		No., 1 .	Approved 3 in. galvanised iron ventilating-pipe, 22 g. (say), 15 ft. long, with cowl and stays	2/-	1	10	0
		No., 20	Approved enamelled iron basins, with brass plug and chain	7/6	7	10	0
			Sinks.				
25	0	Lineal ..	3 in. cast-iron pipe to lavatory traps	1/-	1	5	0
		No., 2 .	Connect above with other soil-pipes	2/6	0	5	0
		No., 2	Lead traps, with brass cleaning-screws	7/6	0	15	0
		No , 2 .	6 in. x 6 in. brass bell-traps, with gratings in lavatory floor	7/6	0	15	0
		No., 8	Sinks, p.c. value, £2 10s. each, and place same wherever directed, providing such wastes and traps as will be found necessary	60/-	24	0	0
			Water Service.				
360	0	Lineal .	1 in. galvanised wrought-iron piping with all necessary tees, holdfasts, &c	-/9	13	10	0
320	0	,, .	Similar piping, but 1¼ in.	1/-	16	0	0
260	0	,, ..	Similar piping, but 2 in.	1/6	19	10	0
		No., 1 .	Connect 2 in. pipe with large tank	5/-	0	5	0
		No., 1 .	Connect 2 in. pipe with small tank, providing ball cock	10/-	0	10	0
		No., 25 .	Connect urinal flushing apparatus with service pipe	2/6	3	2	6
		No., 16	Connect closet cisterns with service pipe	1/-	0	16	0
		No., 28	¾ in. brass bib cocks with tees	5/-	7	0	0
		No., 2 .	1 in. ,, ,,	7/6	0	15	0
		No., 3 .	1¼ in. brass stop cocks	10/-	1	10	0
		No., 1..	2 in. ,, ,,	20/-	1	0	0
		No., 2	400-gallon ship's tanks, on approved stands, with connections and overflows complete	£5	10	0	0
			Gas Service.				
2,300	0	Lineal .	½ in. black iron pipe, inclusive of all necessary tees, bends, junctions, holdfasts, &c	-/3	28	15	0
2,100	0	,,	Similar piping, but ¾ in.	-/5	43	15	0
180	0	,,	,, but 1 in.	-/7	5	5	0
1,020	0	,, .	,, but 1¼ in.	-/8	38	0	0
250	0	,, .	,, but 2 in.	1/2	14	11	9
80	0	,, .	,, but 2½ in.	1/6	6	0	0
60	0	,,	½ in. brass tubing to fires	1/-	3	0	0
		No., 1	Connect last to main (2½ in.)	15/-	15	0	0

yards.	ft.	in.				£	s.	d.
			No., 1.	Meter of approved size fixed where directed	10/-	0	10	0
			No., 6	Provide stop-cocks where required	5/-	1	10	0
			No , 2	Stop-cocks for fires, with movable key and brass flap in floor	5/-	0	10	0
			No., 2 .	Gas-stoves with copper tubes, atmospheric globes and jets, and fireblocks p.c. value 27s. 6d. each, and to be filled up with	27/6	2	15	0
				patent Asbestos lumps	25/-	2	10	0
			No.,100 .	Brackets, p.c. 15s. each, with shades similar to those in Composing room	15/-	75	0	0
			No., 28 .	Brackets, p c. 15s. each, with ground glass globe	15/-	21	0	0
			No., 3	Closet lamps, p c. £5 each	£5	15	0	0
				Provide best patent duplex burners to above fittings.				
				Plasterer.				
				Cement Mortar, mixed, 1 cement to 2 of clean sharp sand.				
2,929	0	0	Superficial	¾ in. cement, rendering all new walls, inside and out, in two coats lined imitation masonry	1/-	146	9	0
			No., 1 ..	Make good plastering where disturbed		3	0	0
			No., 1	Clean down and repair walls of old building, and where not already cemented, render same and make good.		40	0	0
				To Summary		189	9	0
				Painter and Glazier.				
				Kalsomine.				
2,900	0	0	Superficial	Two coats kalsomine on all walls of old building—old wing	-/3	36	2	6
2,094	0	0	,, ...	Two coats kalsomine to iron ceilings, measured flat	-/3	26	3	6
				Three Coats Paint.				
2,460	0	0	,, ..	Dado round rooms and up stair cases of old wing	-/9	92	5	0
420	0	0	,, ..	Three coats paint to cemented parapets, &c.	-/9	15	15	0
				Four Coats Paint, Last Coat Flatted.				
3,720	0	0	,, ..	Clean down, stop, prepare, and paint four coats in colours, as directed	1/-	186	0	0
					yards.			
9,300	0		Lineal ...	3 in. angle fillets	775	1/-		
1,378	0		,,	9 in. x 1 in. linings	115	1/-		
2,256	0		,,	6 in. x 1½ in. architraves	125	.. .		
180	0		,, .	4½ in. x 3 in. hand rail	25	1/-	59	12 0
694	0		,, .	Zinc eaves gutter	58	1/-		
192	0		,, ..	Zinc cresting } average 18-in. =	68	.		
314	0		,, ..	Zinc Frieze }				
314	0		,, ..	4 in. eaves gutter	26	1/-		
					1,192			
224	0		,, ..	4½ in. eaves gutter }				
52	0		,, ...	4 in. down pipe . } average 12 in.	110	1/-	5	10 0
720	0		,, .	5 in. ,, . }				
			No., 6	Fanlights, both sides		2/-	0	12 0
			No., 4	Sashes, both sides				
			No., 28	3 ft. diameter sashes, both sides				
			No., 62	Sashes in lantern, both sides				
			No., 29	,, photo. room, both sides		4/-	43	16 0
			No., 15	Doors, both sides				
			No., 81 .	Sashes and frames, both sides				
			No.,320	2 in. x 2 in. balusters				
			No., 24	6 in. x 6 in. newels				
			No., 16	Closet doors, both sides				
			No., 14 ..	Small lift doors, both sides				
			No., 45	Cast iron columns		4/-	15	0 0
			No., 1	Spiral stair				
			No , 52	Brackets and clips to urinal slabs				
			No., 28	Zinc dressings of dormer windows				
			No., 16 ..	Hopper heads				
							£480	16 0
				Glazing.				
976	0		Superficial	32 oz. glass		-/6	24	8 0
789	0		,, .	Patent plate to front windows		2/-	78	18 0
997	0		,, .	Rough-rolled plate to sashes of lantern and dormer		-/6	24	18 6
291	0		,, .	¼ in. polished British plate to sashes of photo. gallery		2/6	36	7 6
45	0		,,	Ruby glass to sashes of dark room		2/-	4	10 0
							£169	2 0

* Note.—In order to estimate this item it will be necessary for Contractors to examine building.

Summary.

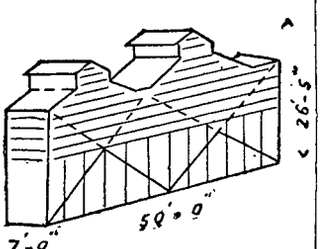
	£	s.	d.
General Bill	796	7	6
Excavator, Labourer, and Drainer	112	1	9
Mason	1,252	13	3
Bricklayer	1,388	11	10
Carpenter and Joiner	3,331	5	4½
Ironmonger	69	8	2
Smith and Founder	1,766	11	6
Plumber	1,240	18	9
Plasterer	189	9	0
Painter and Glazier	649	18	0
Total	£10,797	5	0
Add Surveyor's fee, 1 per cent. on amount of contract	108	0	0
Add 7s. 6d. per page for lithographing fifty-two pages	19	10	0
Total	£10,924	15	0

E.

[Appended by the Committee.]

MEASUREMENT of Alterations and Additions executed by Day-labour at the Government Printing Office, Phillip and Bent Streets, Sydney, but not inclusive of items covered by special authority (excepting alterations to design of main corner, roofing felt, and closets and lavatories) for the Department of Public Works, Government Architect's Branch.—August, 1897.

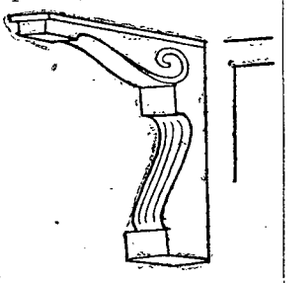
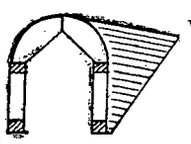
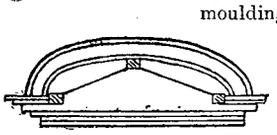
NOTE.—References to original Bills of Quantities made $\frac{\text{ITEM}}{\text{PAGE}}$: thus $\frac{2}{9}$=the second item on page 9.

				£ s. d.
		Preamble to General Bill.		
....		Allow for Clerk of Works office, provided with the usual fittings complete ..... $\frac{3}{35}$	.....	10 0 0
.....		Allow for carrying on the works without interference with the business of the office .... $\frac{3}{35}$	.....	94 17 6
.....		Allow for underpinning cross wall of main angle in basement..... $\frac{4}{35}$	.....	30 0 0
.....		Allow for all risk of damage to property or accident to individuals from whatever cause arising..... $\frac{5}{35}$	.....	
.....		Allow for maintaining the works, making good all defects and keeping same in thorough repair for 12 months after completion	.....	20 0 0
.....		Allow for entering upon the work whenever required, taking away all old material which remains the property of the Government .... $\frac{1}{4}$	.....	
.....		Allow for providing, maintaining, and afterwards removing, all necessary hoardings in accordance with municipal regulations.. $\frac{2}{4}$	.....	12 0 0
.....		Allow for giving all notices, paying all fees, &c., complying with municipal and all other regulations..... .. .. $\frac{3}{4}$	.....	10 0 0
.....		Allow for the use of all scaffolding, plant, &c., for the works..... $\frac{4}{4}$	.....	25 0 0
....		Allow for water for the works with temporary supply, and pay all rates, &c. .... $\frac{2}{6}$	.....	10 0 0
.....		Allow for providing all necessary closet accommodation for the men .... $\frac{2}{6}$	. ...	15 10 0
.....		Allow for the services of a watchman every night and Sunday during the progress of the works.. .... $\frac{4}{6}$	.....	108 0 0
.....		Allow for removing all rubbish from the building and site, cleaning all windows, scrubbing all floors, and leaving the premises ready for occupation .... $\frac{6}{6}$	.....	30 0 0
.....		Allow for temporary scaffolding and tarpaulins in every apartment where work is being performed, for protection of employees and machinery in motion	.....	89 0 0
		 Allow for temporary wooden enclosure, 50 ft. long x 7 ft. wide and 26 ft. 5 in. total height, around girder in jobbing-room, close boarding same with 1 in. tongued and grooved boarding to contour of roofs, with similar flooring.....	.....	38 10 0
.....		Allow for carefully taking down roof, lead flats, iron principals, lantern lights with all timbers, glass, and other works connected, disconnect down pipes, cut and remove eaves gutters, strip slating, flashings, &c., over jobbing-room, 30 ft. x 33 ft. 8 in.....10 squares	40/-	20 0 0
.....		Allow for carefully taking down roof, &c., &c., all as last described, over jobbing-room, 30 ft. x 20 ft. .....6 squares	40/-	12 0 0
.. ..		Allow for carefully taking down roof with all timbers, ironwork, and other works connected, disconnecting down-pipes and eaves, gutters, &c., &c., complete over old numbering-room, 31 ft. 10 in. x 18 ft. 8 in. .... 6 squares	30/-	9 0 0
.....		Allow for carefully taking down roof, &c., &c., all as last, over ruling-room, 58 ft. 5 in. x 26 ft. 2 in. .....154 squares—$\frac{15}{32}$	30/-	22 17 6
.....		Allow for carefully taking down roof, &c., &c., all as last, over stair-well, next ruling-room, 15 ft. 10 in. x 26 ft. 2 in...4$\frac{1}{7}$ squares—$\frac{15}{32}$	30/-	6 5 0
.....		Allow for carefully taking down principal roof, &c., &c., all as last, over Bent-street wing, 86 ft. 9 in. x 36 ft. 8 in. ..... $\frac{5}{35}$		
.....		Allow for carefully taking down iron principal roof, &c., &c., all as last, over main angle, 40 ft. 8 in. x 40 ft. 1 in. extreme ..... $\frac{5}{35}$	40/-	126 10 0
.....		Allow for carefully taking down principal roof, &c., &c., all as last, disconnecting pipes and removing tank over Phillip-street wing, 85 ft. 10 in. x 39 ft. 1 in..... $\frac{5}{35}$		
Feet. 950 run.		Cut away eaves of old roof complete for erection of new walls..... $\frac{5}{35}$	2/-	95 0 0
950 run.		Temporary galvanised sheet-iron guttering and capping over walls to protect rooms below, and include for all connections to down pipes..... $\frac{5}{35}$	-/6	23 15 0
.....		Allow for carefully cutting through roofs, lead flats, lantern-lights, &c., over 33 ft. span for passage of wall of superstructure, and providing and fixing temporary flashings on each side ..... $\frac{5}{35}$	.....	7 0 0
.....		Allow for carefully cutting through roofs, lead flats, lantern-lights, &c., over 20 ft. span, all as last described ..... $\frac{5}{35}$	.....	4 0 0
.....		Allow for cutting No. 8 openings in old roof of ruling-room for insertion of new cross girders, including temporary flashings ...	5/-	2 0 0
.....		Allow for carefully taking down old boarded ceiling and timber, &c., complete over ruling-room, 57 ft. 3 in. x 23 ft. 10 in., including all necessary staying ....1,362 feet	.....	20 0 0
.....		Allow for carefully taking down photo. gallery, lead flats, dark-room, covered verandah, stairway and landing, over 33 ft. x 22 ft., including disconnecting and taking down all gas and water pipes, water-sprays, taking up lead floors, removing all office fittings, &c., &c., complete ....7$\frac{1}{4}$ squares at 40/-	.....	14 10 0

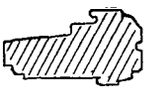
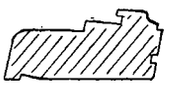
						£ s. d.
			.....	Allow for carefully taking down old store shed with half-glass front, iron roof, &c., &c., by goods lift in area	..	1 10 0
			.... .	Allow for carefully taking tank-stand between lavatory block and No. 2 fount-room, including cast-iron columns, girders, tanks, decking, and timbers of platform, about 10 ft. x 10 ft., disconnecting and removing all pipes, &c., &c., including all staging and tackle complete	..	5 0 0
			. . ..	Allow for carefully taking down photographers' fittings, troughs, &c., in present sewing-room, disconnecting all pipes and removing to photographers' new quarters	.. .	5 0 0
			..... .	Allow for cutting away and carefully taking down No. 2 old w.c.'s, with all old fittings, enclosures, flagging, &c., complete; relaying and making good slate floor, disconnecting soil-pipes, and inserting new cleaning screws, and disconnecting and stopping all soil, waste, and supply pipes complete	. .	15 0 0
			.....	Allow for cutting away and carefully taking down lavatory range and enclosure in stamp-room, containing No. 1 urinal, No. 2 closets, and No. 2 lavatory basins and shelves, disconnecting and stopping all service and waste pipes, and making good and cementing damaged walls; range, 8 ft. long and 5 ft 6 in wide	.	1 5 0
				Carried to Summary	.....	£883 10 0
yds.	ft.	in.		*Excavator, Labourer, and Drainer.*		
8	0	0	Cube .	Excavation in rock in stanchion foundations and basketing out	2/-	0 16 0
7	0	0	,, .	Excavation in rock, about machinery in motion, and basketing out	2/-	0 14 0
8	0	0	,, .	Cement concrete in foundation to stanchions, well rammed	35/-	14 0 0
3	0	0	Sup. . ..	,, concrete in 6 in. layer under floor; goods lift in area .	6/-	0 18 0
8	0	0	,, . ..	,, concrete in 6 in. layer under floor about machinery in motion	6/-	2 8 0
3	0	0	,, ...	Cement flooring, 1 in. thick, floated to a smooth surface	1/6	0 4 6
8	0	0	,, .	,, ,, 1 in. thick, floated to a smooth surface, about machinery in motion .	1/6	0 12 0
			No., 1	Cut and pin standard in old basement, concrete floor, and make good in cement .. .	2/6	0 2 6
			No., 8	Cut away old basement concrete floor for foundations of stanchions, and afterwards make good cement paving around stanchions, floated smooth . . .	15/-	6 0 0
			No., 1	Cut out old concrete floor, and make good with new, forming new channel gutter in same 10 feet long	.	0 15 0
			No., 1 .	Cut away asphalt gutter for seat of iron column, and afterwards make good asphalt around column base		0 7 6
				Drainer.		
256	0		Run	6 in. diameter glazed earthenware drain-pipe, jointed in cement and laid complete, inclusive of excavation, average 3 ft. 6 in deep . $\frac{6}{0}$	1/6	19 4 0
			No., 1 .	Connect above with sewer in Bent street		1 0 0
			No., 7	4 in. glazed earthenware gully traps, junctions, covers, and setting complete .. . . $\frac{2}{7}$	7/6	2 12 6
			No., 7	9 in. glazed earthenware gully-traps and junctions, covers, &c., complete .. . . . . $\frac{2}{7}$	10/6	3 13 6
			No., 7 .	Cut out old D traps and sink stones . .	15/-	5 5 0
			No., 7 ..	Perforations through stone flagging in lane for down pipes, including wrought-iron covers, 18 in x 12 in, cut, and fitted to down pipe	8/6	2 19 6
38	0		Run .	Carefully take up stone flag-paving for drains, and afterwards re-lay and make same good with cement joints	1/-	1 18 0
153	0		,, ...	Carefully take up and afterwards re-lay stone guttering and adjoining stone cubes in roadway for drains	1/-	7 13 0
				Carried to Summary . .	... .	71 3 0
			... .	*Mason.* Stone to be from an approved quarry, and to match, as nearly as possible, the existing stonework .. ... $\frac{1}{3}$		
				Slate to be the best Welsh . . .... $\frac{3}{3}$		
				Stone to be pointed with neat putty joints .... $\frac{3}{3}$		
5	0		Cube .	Freestone and all labour in chiselled column bases . . $\frac{6}{5}$		
34	0		,,	,, ,, templates and corbels . .. . $\frac{1}{9}$		
89	0		,, .	,, in chiselled window sills .. . ... $\frac{4}{6}$		
89	0		,, .	,, in rubbed window sills $\frac{4}{9}$		
427	0		,, ...	,, ,, pilasters on 2nd and 3rd floor, part with rusticated joints ...	4/-	316 4 0
16	0		,, .	,, in rubbed pilasters all as last, with checked face ...		
107	0		,,	,, in making good rubbed pilasters ground and 1st floors, in small pieces		
82	0		,, .	,, in rubbed window dressings, 2nd floor $\frac{16}{9}$		
85	0		,, . .	,, ,, mullions, heads and caps, 2nd floor $\frac{16}{9}$		
393	0		,, .	,, ,, window dressings to 3rd floor, semi openings $\frac{1}{11}$		
58	0		,,	,, ,, ,, ,, square-headed openings . . $\frac{1}{11}$		
196	0		,, ...	,, ,, in rubbed window and pediment, 3rd floor windows, at main angle . ... $\frac{1}{11}$		
921	0		,, ...	,, ,, string on 3rd floor . . . . $\frac{11}{11}$		
45	0		,, . .	,, ,, moulded trusses to string on 3rd floor . $\frac{11}{11}$		
2,246	0		,, ...	,, ,, moulded main cornice .. . .. $\frac{15}{11}$		
438	0		,, .. .	,, ,, dentilled cornice . . $\frac{15}{11}$		
247	0		,, ...	,, ,, terminals and bases . .....$\frac{15}{11}$		
339	0		,, ..	,, ,, blocking ... . $\frac{17}{11}$		
36	0		,, ...	,, in name tablet	4/-	914 4 0
154	0		,, ...	,, in rubbed moulded chimney caps . . ...$\frac{12}{12}$		
32	0		,, ...	,, ,, moulded scrolls between last . . $\frac{12}{12}$		
20	0		,,	,, ,, moulded capping under last . .....$\frac{12}{12}$		
74	0		,, ...	,, in 14 in. walling, with chiselled faces . ...$\frac{10}{13}$		
19	0		,, . . .	,, in chiselled moulded scrolls and spandril filling .....$\frac{10}{13}$		

ft.	in.				£	s.	d.
133	0	Run	6½ in. x 11 in. freestone, chiselled, weathered, and throated cop'ng	2/6	16	12	6
39	0	,, ...	Groove in stone sill for flashing and pointing with oil and cement..	-/3	0	9	9
		No., 1..	Carving name tablet 11 ft. 8 in. x 3 ft. 1 in. over all		15	0	0
		No., 15 .	,, parapet terminals, each three faces	60/-	45	0	0
35	0	Cube	Freestone taken down, redressed, re-erected and set complete . .	1/6	2	12	6
8	0	,, ...	,, ,, from pitched to rubbed face, re-erected and set complete	2/3	0	18	0
11	0	,, ...	Freestone in foundations to machine pit, in piecing and making good about machinery in motion, part old material	3/-	1	13	0
25	0	Supl. . ..	6 in. freestone flagging in patching and making good, about machinery in motion	2/6	3	2	6
217	0	,, ...	Labour only, dressing from pitched to rubbed face, in situ	1/6	16	5	6
201	0	Run	Carefully take down stone cornice and blocking 3 ft 3 in. high front walls	2/-	20	2	0
16	0	,, ...	Carefully take down stone cornice and blocking at main angle say 7 ft. high	4/-	3	4	0
		No., 2..	Carefully take down old stone chimney stack and cap at main angle	20/-	2	0	0
		No., 1..	Carefully break out opening in old 18 in. wall from 5 ft. 5 in. x 6 ft. 2 in. to 10 ft. 10 in. x 9 ft.	.	1	0	0
		No., 1..	Carefully take down blocking, parapet and scroll to ramp of southern wall of northern building	..	1	0	0
		No., 1...	Carefully take and remove old stone coping between chimney stack and water tower and afterwards reset same at higher level $\frac{5}{16}$	.	0	15	0
		No., 18...	Carefully take down, protect, and afterwards clean, hoist, and reset moulded window heads to second floor openings	6/-	5	8	0
		No., 1...	Cutting back projection of main cornice of northern building at fourth floor, level and making junction to new cornice . .	.... .	3	10	0
		No., 27..	Carefully cut old stonework 1 ft. 5 in. x 1 ft., 5 in. deep for insertion of new, in situ	1/6	2	0	6
		No., 2...	Carefully cut old stonework 1 ft. 9 in. x 1 ft., 14 in. deep for insertion of new, in situ	4/-	0	8	0
		No., 8...	Carefully cut old stonework 3 ft. x 1 ft., 14 in. deep for insertion of new, in situ	7/-	2	16	0
		No., 4..	Carefully cut old stonework 2 ft. x 1 ft., 16 in. deep, for insertion of new, in situ	5/6	1	2	0
		No., 4..	Carefully cut old stonework 3 ft. x 1 ft., 16 in. deep, for insertion of new, in situ	8/-	1	12	0
		No., 1..	Carefully cut old stonework 1 ft. 9 in. x 1 ft., 16 in. deep, for insertion of new, in situ	5/-	0	5	0
		No., 2...	Working splayed check 18 in. girth and 7 ft. high in old stonework, in situ	7/6	0	15	0
		No., 1...	Carefully take down, rework, hoist, and reset in different place stone window dressings to openings 5 ft. 5 in. x 6 ft. 2 in. .. .	.. ...	1	10	0
		No., 2..	6 in. x 18 in. freestone chiselled kerbs 12 in. long in patching and making good about machinery in motion	3/-	0	6	0
		No., 1..	7 in. freestone chiselled window 3 ft. 6in. x 3 ft. 8 in. extreme, set in cement, old	.. ...	0	10	0
		No., 1..	7 in. x 18 in. freestone chiselled step, in patching and making good, including cutting away old stone and brickwork for same—from store...	.....	0	10	0
		No., 1...	Cut out joints, wash down, and repoint all old stonework throughout—$\frac{9}{11}$	.. .	10	0	0
		No., 1...	Bond all old work with new—$\frac{8}{13}$	.. ..	. .	..	.
			Carried to Summary	.... .	£1,390	15	3
			Bricklayer.				
			Bricks to be of the best quality, hard, sound, and laid wet $\frac{3}{14}$				
rods.	feet.		Double pressed facing bricks, must match those in existing work $\frac{4}{14}$				
34	266	.....	Reduced brickwork in cement mortar in walling, the joints prepared for cementing, or neatly struck for lime-whiting . . . $\frac{8}{14}$	14/10/-	507	3	7
4	223	.. ..	Reduced brickwork in cement mortar, in patching and making good small pieces	20/-/	96	7	11
Yards.							
275		Supl.....	Allow for extra cost of facing new fronts and chimney stacks with double pressed bricks .. .. $\frac{3}{13}$	4/9	65	6	3
275		,, ...	Washing down with spirits of salts, and neatly tuckpointing ditto in lime putty .... $\frac{2}{13}$	1/9	24	1	3
372		,, ...	Rake out old joints, wash down with spirits of salts, and neatly tuck-point old work in lime putty .... $\frac{2}{13}$	1/9	32	11	0
		No., 12	Terra-cotta chimney pots 12 in. by 12 in., set and flaunched in cement	6/-	3	12	0
Feet.		No., 178	9 in. x 3 in. galvanised air bricks	-/6	4	9	0
422		Supl.	Draw, tooth, and bond old brick walls with new. . . .. . . $\frac{11}{15}$	-/6	10	11	0
73		Run. ...	Carefully take down top courses of old 14 in. wall, and prepare top surface for new wall	-/3	0	18	3
192		,, ...	Carefully take down top courses of old 14 in. wall, 10 in. high, and prepare top surface for new wall	-/3	2	0	8
99		,, ...	Carefully take down top courses of old 14 in. wall, 20 in. high, and prepare top surface for new wall	-/5	2	1	3
32		,, ...	Carefully take down old 18 in. wall, 10 in. high, and prepare top surface for new wall	-/4	0	10	8
34		,, ...	Carefully take down old 18 in. wall, 13 in. high, and prepare top surface for new wall	-/5	0	14	2
285		,, ...	Carefully take down old 18 in. wall, 17 in. high, and prepare top surface for new wall	-/6	7	2	6
60		,, ...	Carefully take down old 18 in. cross parapet wall at main angle, and stone blocking	-/6	1	10	0
		No., 1 ..	Carefully take down grates and mantels	5/-	0	5	0
		No., 3..	Carefully take down grates, hearths, and mantels	7/6	1	2	6
		No., 1 ...	Carefully take down 14 in. chimney-breast, 5 ft. wide and 13 ft. 10 in. high	.....	3	0	0
		No., 1 . .	Carefully take down 18 in. chimney-breast, 3 ft 8 in. wide and 11 ft. high	. ....	2	0	0
		No., 1...	Carefully take down 18 in. chimney breast 4 ft. 6 in. wide and 14 ft. high	.....	3	10	0

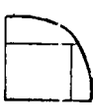
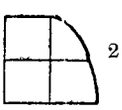
					£ s d
		No , 2	Carefully take down 22 in chimney breasts and stacks 4 ft 4 in wide 30 ft high	40/	4 0 0
		No , 1	Carefully take down chimney shaft 5 ft 6 in x 5 ft and 21 ft high		3 15 0
		No , 1	,, ,, old 14 in wall 6 ft 4 in x 4 ft about machinery in motion		0 10 0
		No , 1	Carefully take down old 14 in wall 17 ft 8 in x 3 ft 8 in		1 5 0
		No , 1	,, ,, ,, 14 in wall 4 ft x 6 ft 6 in		0 9 0
		No , 1	,, ,, ,, 18 in wall 2 ft 6 in x 8 ft		0 10 0
		No , 1	,, ,, ,, ,, 4 ft x 7 ft 6 in		0 15 0
		No , 1	,, ,, ,, ,, 9 ft 8 in x 3 ft 8 in		0 17 6
		No , 1	,, ,, ,, forge		0 5 0
		No , 1	,, ,, ,, blast furnace		0 5 0
		No , 1	Carefully break out opening 5 ft x 1 ft 6 in in old 14 in wall to suit new girder		0 5 0
		No , 1	Carefully break out opening in old 14 in wall 5 ft x 8 ft 6 in		0 15 0
		No , 1	Carefully break out and enlarge opening in old 14 in wall from 2 ft 7 in x 9 ft to 3 ft 4 in x 9 ft		0 10 0
		No , 1	Carefully break out and enlarge opening in old 14 in wall from 5 ft x 7 ft to 8 ft x 7 ft 5 in		0 10 0
		No , 1	Carefully break out and enlarge opening in old 14 in wall from 4 ft x 5 ft to 4 ft 6 in x 10 ft		1 10 0
		No , 1	Carefully break out opening in old wall 14 in thick, to suit window in altered position (angle window at back in Stamp Room)		0 10 0
		No , 1	Carefully break out window opening in old 14 in wall to suit door in altered position (door from Stamp Room to lavatories)	–	1 10 0
		No , 1	Carefully break out opening 3 ft x 10 ft in old 18 in wall		1 10 0
		No , 1	,, ,, ,, 3 ft 4 in x 8 ft 10 in in old 18 in wall		0 15 0
		No , 1	,, ,, ,, in old 18 in wall from 4 ft 6 in x 7 ft 6 in to 6 ft x 11 ft		1 15 0
		No , 1	Carefully break out foundation wall of northern building and make good with brickwork in cement		1 10 0
		No , 1	Cut back face of old brickwork 2 ft 6 in x 5 ft for a depth of 3 in for running new lift weights		1 10 0
		No , 1	Cut back face of old brickwork 1 ft x 15 ft 10 in for a depth of 5 in for lift cylinder		1 0 0
		No , 1	Cut back face of old brickwork 5 ft x 13 ft 10 in for a depth of 5 in		3 10 0
		No , 8	Cut back face of old brickwork 2 ft x 1 ft for a depth of 14 in for insertion of new stonework (front pilasters)	2/6	1 0 0
		No , 4	Carefully cut away brickwork of parapet walls, prepare same as seatings for iron columns, and make good in brickwork, etc , complete	1/6	0 6 0
		No , 10	Carefully cut back face of old brickwork for iron lift guide stays, to bring same into perfect alignment	2/	1 0 0
		No , 52	Drill holes in old walls for bolts and make good	1/	2 12 0
		No , 21	Mortices in old walls for floor joists, etc , and make good in brick work in cement	2/	2 2 0
		No , 8	Mortices in old walls for bolts and pinning in in cement	1/-	0 8 0
		No , 37	Perforations in old walls for bolts and pinning in in cement	1/-	1 17 0
		No , 28	Cut openings in old walls about 18 in x 18 in for insertion of washer plates	2/6	3 10 0
		No , 1	Cut openings in old walls about 3 ft 6 in x 4 ft for flanges of vent flue	10/	0 10 0
		No , 1	Perforation through old 14 in wall, and making good brickwork, cementing, etc , disturbed	5/	0 5 0
		No , 15	Perforation through old 18 in wall, and making good brickwork, cementing, etc , disturbed	5/-	3 15 0
		No , 2	Make good and cement old holes in walls	-/3	0 0 6
		No , 1	Carefully take down strong room door 3 ft 10 in x 6 ft 7 in and frame, remove and refix in different place		5 10 0
		No , 2	Carefully take down and remove iron fire proof doors in southern wall of northern building	30/	3 0 0
		No , 1	Provide and build brick forge 3 ft 6 in x 3 ft 6 in x 2 ft 9 in high over all, finished with 6 in chiselled stone hearth, etc , complete		3 10 0
ft	in		*Urinals*		
147	0	Supl	1¼ in slate, rubbed one side, urinal backs and ends $\frac{7}{10}$	2/3	16 10 9
44	0	,,	1¼ in slate, rubbed both sides, urinal divisions $\frac{7}{10}$	2/5	5 6 4
191	0				
95	0	Run	Labour to rounded edge $\frac{9}{16}$		included
		No , 272	Holes, etc , for screws	-/6	6 16 0
		No , 24	Rounded corners	-/6	0 12 0
ft	in		*Lavatories*		
77	0	Supl	1¼ in slate, rubbed, lavatory top $\frac{9}{10}$	2/3	8 13 3
43	0	Run	Labour to rounded edge $\frac{4}{19}$	/2	0 7 2
		No , 18	Perforations for taps	-/6	0 9 0
		No , 18	Dished holes 14 in diameter for basins $\frac{8}{19}$	5/-	4 10 0
			Steps		
7	0	Run	1½ in x 16 in slate, rubbed step, mortised for door frames	3/6	1 4 6
17	0	,,	1¼ in x 15 in ,, ,, ,,	3/1	2 12 5
7	0	,,	1¼ in x 21 in ,, ,, ,,	4/1	1 8 7
23	0	,,	Labour to rounded edge on 1¼ in slate		included
7	0	,,	,, ,, 1½ in slate		,,
yds	ft	in	*Lavatory Floors*		
147	0	0	Supl	Traegerwellbleck, lapped two corrugations at sides, including all perforations for soil and other pipes, etc , measured net	7/2	52 13 6
147	0	0	,,	Cement concrete floor, average 6 in thick, with top arranged to falls	6/6	47 15 6
147	0	0	,,	Cement floors 1 in thick laid to fall	2/	14 14 0
143	0		Run	Labour, forming hollow gutter 4 in wide in above $\frac{13}{17}$	/3	1 15 9

					£ s. d.
			Bridge.		
ft.	in.				
23	0	Supl.	No. 24-gauge galvanized corrugated roofing iron, properly lapped at sides	-/3	0 5 9
17	0	,,	Cement concrete floor, average 3 in. thick, with top set to fall	3/6 yard	0 6 7
17	0	,,	Cement floor 1 in. thick laid to falls	2/- yard	0 3 9
22	0	Run	1½ in. galvanized iron pipe handrail, including bends and screwed ends	1/6	1 13 0
		No., 4	5 in. diameter tapped roses, screwed to wood	1/-	0 4 0
squares	ft.	in.	*Roofing.*		
42	12	0	Supl. Countess slating, 20 in. x 10 in., from stock, on and including 3 in. x 1 in. new battens	12/-	25 5 5
13	39	0	,, Countess slating, 20 in. x 10 in., from stock, on and including 3 in. x 1 in. new battens, all as last described, but laid vertical	15/-	10 0 10
23	22	0	,, Rendering soffits of slating in hair mortar	3/-	3 9 8
			Carried to Summary		£976 7 4
			Carpenter and Joiner—Flooring.		
28,654	0	Supl.	1 in. hardwood in 9 in. x 3 in. floor joists, and trimmers, &c. $\frac{5}{18}$	13/-	186 5 0
579	0	,,	1 in. hardwood in wall plates, lintel, &c.	13/-	3 15 3
25	0	,,	1 in. hardwood in plate bolted to girder	15/-	0 13 9
68	0	,,	1 in. Oregon in plate bolted to girder	15/-	0 10 2
209	0	,,	1 in. hardwood in wrought and chamfered girder, &c.	20/-	2 1 10
147	67	0	,, 1¼ in. tallow-wood tongued and grooved flooring in 4 in. widths $\frac{7}{18}$	20/3	149 10 4
12	0	0	,, ,, ,, all as last, in patching and making good small pieces $\frac{4}{19}$	30/-	18 0 0
2	48	0	,, 1¼ in. Colonial beech tongued and grooved flooring in 4 in. widths	42/6	5 5 5
25	13	0	,, 1 in. kauri tongued and grooved flooring in 4 in. widths	24/4	30 11 6
7	23	0	,, Cut out and take up old flooring	5/-	1 16 3
	84	0	,, ,, and joists	-/1	0 7 0
	13	0	Run Cut back old flooring for bearing	-/1	0 1 1
			Filling opening on 3rd Floor.		
	31	0	Supl. 1 in. hardwood framed in studding and bearers	square 15/-	0 4 8
	111	0	,, 1 in. Oregon wrought one side tongued and grooved boarding in 6 in. widths	18/6	1 0 6
			Roof and Walling of Composing Room and Main Angle.		
	99	0	Supl. 1 in. Oregon in 8 in. x 1½ in. valley boards		
2,809	0	,,	1 in. Oregon framed in 4 in. x 3 in. plates, &c.		
2,470	0	,,	1 in. ,, 6 in. x 3 in. studs, &c.	15/-	86 6 0
6,110	0	,,	1 in. ,, 6 in. x 4 in. purlins, hips, &c.		
19	0	,,	1 in. ,, 6 in. x 6 in. angle posts		
19	0	,,	1 in. ,, 6 in. x 6 in. splayed angle posts	-/2½	0 4 0
93	0	,,	1 in. ,, 8 in. x 3 in. hips		
1,039	0	,,	1 in. ,, 8 in. x 6 in. head	15/-	9 10 2
136	0	,,	1 in. ,, 3 in. x 2 in. studs and bearers		
20	0	,,	1 in. ,, 4 in. x 3 in. studs, cut to shape and plugged to wall	-/4	0 6 8
143	0	,,	1 in. hardwood in 4 in. x 3 in. gutter-plate	14/-	1 0 0
24	0	,,	1 in. Oregon framed in 12 in. x 2 in. wrought stud	18/-	0 4 4
40	0	,,	1 in. ,, 5 in. x 2 in. wrought all round trimmer	18/-	0 7 2
314	0	,,	1 in. ,, 10 in. x 3 in. wrought all round hip	18/-	2 16 6
864	0	,,	1 in. ,, 4 in. x 3 in. wrought all round and stop chamfered rafter	20/-	8 12 10
390	0	Run	6 in. x 2 in. Oregon framed rib, circular	-/6	9 15 0
172	0	,,	14 in. x 2 in. redwood, framed and wrought	-/8	5 14 8
120	0	,,	6 in. x 4 in. Oregon wrought, rebated, and double-beaded frame	-/10	5 0 0
93	0	,,	6 in. x 4 in. Oregon wrought, rebated, double-beaded mullion	1/-	4 13 0
85	0	,,	6 in. x 4 in. hardwood sunk, weathered, double-beaded, and throated sill	-/10	3 10 10
21	0	,,	2½ in. x 1 in. redwood double-moulded fascia	-/3	0 5 3
167	0	,,	6 in. x 1 in. redwood beaded fascia	-/3	2 1 9
27	0	,,	7 in. x 1 in. redwood double-moulded fascia	-/4	0 9 0
5	0	,,	9 in. x 1 in. ,,	-/6	0 2 6
94	0	,,	9 in. x 1 in. redwood moulded fascia and backings, 3 in. x 1 in. capping and scotia moulding under same	-/10	3 18 4
61	0	,,	4 in. x 2¼ in. redwood rounded window nosing	-/6	1 10 6
291	0	,,	Wood blocking, 15 in. high, 6½ in. projection for zinc cornice	1/6	21 16 6
56	0	,,	,, 24 in. high, 9 in. projection	2/-	5 12 0
		No., 1	1 in. redwood wrought and chamfered spandril, 13 ft. 3 in. x 1 ft. 6 in.	6/6	0 6 6
		No., 1	1 in. redwood wrought and chamfered spandril, 13 ft. 9 in. x 1 ft. 10 in. 	7/6	0 7 6
		No., 18	Cedar moulded, fluted, and carved trusses and consoles, 12 in. wide on face, 2 ft. 9 in. high, and 2 ft. 6 in. projection	30/-	27 0 0
		No., 3	 Wood framed, semi-headed dormer roof vents, with cut ribs, studs, battening, and felt, the inside covered with perforated zinc, secured with mouldings	35/-	5 5 0
		No., 1	 Segmental head to dormer window, with all rafters, bearers, trimmers, bracketing, blocking, boarding, &c., complete, 6 ft. x 3 in. x 1 ft. 6 in. on face, and 1 ft. 6 in. projection	45/-	29 5 0
		No., 12	,, ,, all as last, 9 ft. 6 in. x 1 ft. 6 in. on face, and 2 ft. 4 in. projection		

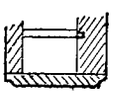
ft.	in.				£ s. d.
		No., 15	2 in. cedar moulded sashes, 3 ft. 0 in. x 2 ft. 5 in.	149 @ 1/3	9 6 3
		No., 4	2 in. ,, ,, 4 ft. 1 in. x 2 ft. 5 in.		
			Lanterns.		
161	0	Supl.	1 in. Oregon, framed in 3 in. x 2 in. plate, &c.	15/-	30 14 10
2,244	0	,,	1 in. ,, ,, in 4 in. x 3 in. ,,		
333	0	,,	1 in. ,, ,, in 6 in. x 4 in. ,,		
1,361	0	,,	1 in. ,, ,, in 8 in. x 6 in. ,,		
4,099	0				
330	0	Run.	4 in. x 3 in. Oregon wrought, rebated, and beaded head	-/6	8 5 0
128	0	,,	6 in. x 3 in. Oregon, wrought all round, and four times chamfered, tie beam	-/9	4 16 0
101	0	,,	6 in. x 4 in. Oregon, wrought, double-rebated, and four times beaded mullion	1/-	5 1 0
6	0	,,	6 in. x 6 in. Oregon double-rebated angle mullion	1/-	0 6 0
341	0	,,	6 in x 4 in. Oregon sunk, weathered, and throated sill	-/9	12 15 9
321	0	,,	1½ in. x ¾ in. redwood bed-mould	-/1	1 6 9
321	0	,,	2 in x 2 in. ,, ,,	-/2	2 13 6
362	0	,,	3 in. x 2 in. redwood cornice	-/3	4 10 6
321	0	,,	2 in. x 1 in. redwood fascia	-/1	1 6 9
324	0	,,	6 in x 1 in. redwood beaded fascia	-/3	4 1 0
321	0	,,	15 in. 1 in redwood wrought fascia	-/7	9 7 3
321	0	,,	3½ in. x 1½ in. redwood rounded window-board	-/5	6 13 9
		No., 3	2 in. sugar pine moulded sashes, 2 ft. 9 in. x 2 ft. 6 in., 781 ft. @ 1/3	1/3	48 16 3
		No., 28	2 in. ,, ,, 3 ft. 3 in. x 2 ft. 6 in.		
		No., 14	2 in. ,, ,, 3 ft. 4 in. x 2 ft. 6 in.		
		No., 32	2 in. ,, ,, 3 ft. 5 in. x 2 ft. 6 in.		
		No , 16	2 in. ,, ,; 3 ft. 6 in. x 2 ft. 6 in.		
		No., 36	Cedar, moulded, built up trusses and brackets, 7 in. wide on face, 36 in. high and 7 in. projection	12/6	22 10 0
			Turret.		
289	0	Supl.	1 in. Oregon, framed in 4 in. x 3 in. joists, &c.	15/-	2 3 4
272	0	,,	1 in. ,, ,, 6 in. x 3 in. studding	15/-	2 0 10
66	0	,,	1 in. ,, ,, 5 in. x 3 in. joists, cut to fall	16/-	0 10 8
8	0	,,	1 in. ,, ,, 3 in. x 2 in. plate	15/-	0 1 2
263	0	Run.	9 in. x 1½ in. Oregon framed ribs, cut to curve of turret dome	-/6	6 11 6
31	0	,,	4 in. x 3 in. Oregon framed plate, circular	-/6	0 15 6
24	0	,,	5 in. x 3 in. ,, ,, ,,	-/8	0 16 0
94	0	,,	6 in x 3 in ,, ,, ,,	-/10	3 18 4
32	0	,,	6 in. x 6 in. ,, ,, ,, built up in three layers.	2/-	3 4 0
18	0	,,	4 in. x 2 in. redwood framed, double moulded rib	-/6	0 9 0
29	0	,,	5 in. x 2 in. redwood framed, moulded rib, circular	1/-	1 9 0
31	0	,,	12 in. x 1½ in. redwood wrought sill for lead, circular	-/10	1 5 10
29	0	,,	½ in. x 5 in. redwood, moulded fascia, circular	-/6	0 14 6
32	0	,,	½ in. x 6 in. ,, ,, ,,	-/6	0 16 0
143	0	,,	1 in. x 8 in. redwood beaded fascia	-/4	2 7 8
29	0	,,	1½ in. x 1½ in. redwood moulding, circular, out of solid	1/-	1 9 0
17	0	,,	3 in. x 2 in. redwood moulding, circular	-/4	0 5 8
72	0	,,	Blocking out for mouldings for coppersmith	-/6	1 16 0
38	0	,,	Blocking and battening for main circular cornice, 15 in. high and 9 in. projection	2/-	3 16 0
		No., 1	Blocking and firring at base of vane for copper	2/-	0 2 0
		No., 8	Wood blocking and casing fitted around iron stanchions, 4 ft. 6 in. high, complete	6/-	2 8 0
		No., 8	12 in. x 3 in cut brackets, 24 in. long, to cap of dome	1/-	0 8 0
		No., 1	4 in x 4 in. Oregon, wrought, framed centre post, 11 ft. 6 in. long, bored in its length for bolt	5/-	0 5 0
81	0	Supl.	⅜ in. kauri, tongued and grooved, jointed lining, in 4 in. widths	22/6	0 18 3
189	0	,,	⅜ in. kauri, tongued, all as last, vertical to circular drum	22/6	2 2 6
73	0	,,	⅜ in. kauri matched and beaded boarding	22/6	0 16 5
32	0	,,	1 in. Oregon boarding for lead, with shot edges	16/-	0 5 1
317	0	,,	,, ,, all as last, circular, circular to dome; add for all cutting and waste	-/6	7 18 6
68	0	,,	1 in Oregon tongued and grooved boarding, in 6 in. widths for lead	sq. 18/-	0 12 3
42	0	,,	,, ,, all as last, vertical to circular drum	18/-	0 7 7
			Roof and Walling of Photo. Gallery, Dark-rooms, &c., &c.		
8,449	0	Supl.	1 in. Oregon, framed in studding of walls	16/-	67 11 10
4,072	0	,,	1 in. ,, ,, rafters, collars, ceiling joists, &c.	16/-	32 11 6
1,125	0	,,	1 in. ,, ,, ,, with wrought ends	17/	9 11 3
67	0	,,	1 in. ,, ,, wrought all round ridge	20/-	0 13 5
217	0	,,	1 in. ,, ,, ,, ,, and stop-chamfered rafters and plates	23/-	2 9 11
111	0	,,	1 in. hardwood, framed, wrought all round brackets, plates, &c.	20/-	1 2 2
478	0	,,	1 in. ,, ,, ,, ,, and stop-chamfered posts, rafters, joists, plates, &c.	25/-	5 19 6
88	0	,,	1 in. hardwood, framed in studs	15/-	0 13 2
115	0	,,	1 in. Oregon, framed in sill	16/-	0 18 5
58	0	Run.	¾ in. cedar scotia	-/1	0 4 10
14	0	,,	1 in. redwood beaded stop	-/1	0 1 2
10	0	,,	3 in x 1 in. redwood beaded fillet	-/1½	0 1 3
61	0	,,	4 in x 1 in. ,, chamfered fascia	-/2	0 10 2
61	0	,,	6 in x 1 in. ,, beaded fascia	-/3	0 15 3
24	0	,,	10 in. x ¾ in. ,, ,, ,, cut and fitted around rafters	-/6	0 12 0
40	0	,,	3½ in x 2 in. ,, moulded cornice	-/4	0 13 4
241	0	,,	4 in x 3 in. Oregon base mould, with splayed top, plugged to wall	-/6	6 0 6
58	0	,,	4 in. x 1½ in. cedar rounded window nosing	-/9	2 3 6
712	0	,,	4 in x 3 in Oregon double rebated, double moulded, and double throated skylight bar	-/9	26 14 0
47	0	,,	5 in x 3 in. Oregon double rebated, double moulded, and double throated skylight hip	-/10	1 19 2

					£ s. d.
ft.	in.				
61	0	Run	8 in. x 6 in. Oregon wrought, rebated, and double-moulded head	1/3	3 16 3
22	0	,,	 5 in. x 4 in. hardwood rebated and double-beaded frame	-/10	0 18 4
61	0	,,	6 in. x 5 in. hardwood rebated, double sunk, double throated, beaded, and three times moulded transom	1/6	4 11 6
9	0	,,	 8 in. x 4 in. hardwood sunk, weathered, and throated sill	1/-	0 9 0
58	0	,,	10 in. x 4 in. hardwood sunk, weathered, rebated, grooved, and moulded sill	2/-	5 16 0
		No., 1	Holing ridge of photographic gallery for ventilation, and dressing lead covering to suit	.....	0 10 0
		No., 3	2 in. cedar moulded fanlight, 3 ft. x 3 ft., 1/3 per foot	11/3	1 13 9
		No., 13	2 in. ,, ,, ,, 3 ft. 7 in. x 3 ft., 1/3 per foot	13/6	8 15 6
		No., 1	2 in. ,, moulded casements, 1 ft. 10 in. x 2 ft. 11 in., divided with moulded bars into No. 2 lights	7/-	0 7 0
		No., 2	2 in. cedar moulded casements, 2 ft. 5 in. x 2 ft. 11 in., divided with moulded bars into No. 2 lights	9/4	0 18 8
		No., 2	2 in. cedar moulded sashes, 3 ft. x 5 ft., divided with moulded bars in No. 4 lights	21/6	2 3 0
		No., 13	2 in. cedar moulded sashes, 3 ft. 7 in. x 5 ft., divided with moulded bars in No. 4 lights	25/6	16 11 6
139	0	Run.	 6 in. x 4 in Oregon double rebated, double throated, and four times moulded mullion	1/9	12 3 3
37	0	,,	 6 in. x 6 in. Oregon double rebated frame next wall	1/8	3 1 8
squares.	feet.		*Roof Sheathing, &c.*		
19	86	,,	1 in. Oregon tongued and grooved roof boarding	18/-	17 17 6
14	74	,,	1 in. Baltic, wrought one side, tongued and grooved beaded boardings	18/9	13 16 5
	57	,,	1 in. redwood, wrought both sides, gutter boarding	-/5	1 3 9
	501	,,	1 in. tongued and grooved wrought gutter boarding, and 3 in. x 2 in. bearers, No. 8 extra for cesspool outlets	-/6 2/6	12 10 6 1 0 0
	8	,,	1½ in. tongued and grooved wrought gutter boarding, and 3 in. x 2 in. bearers	-/8	0 5 4
	11	,,	1 in. Baltic, wrought matched and beaded both sides, boarding in 6 in. widths	-/4	0 3 8
1	80	,,	¾ in. kauri wrought one side, soffit lining to eaves	-/3	2 5 0
3	21	,,	¾ in. Baltic, matched and beaded boarding in 6 in. widths, lining soffit of eaves, from stock	20/-	3 4 2
yards.					
603		Supl.	¼ in. best roofing felt, properly lapped at all joints, measured net.	1/5	42 14 3
584		,,	Galvanised wire netting, 1 in. mesh, securely fixed with staples	-/9	21 18 0
feet.			*Lining, &c.*		
625		,,	1 in. Oregon, framed in studding	16/-	5 0 0
38		,,	Cradling to girders	-/4	0 12 8
squares.	feet.				
1	66	,,	¾ in. kauri matched and beaded ceiling lining	22/6	1 17 6
6	91	,,	¾ in. ,, ,, ,, from store	22/6	7 15 6
	66	,,	¾ in. ,, ,, new ceiling lining in patching and making good	-/4½	1 4 9
19	78	,,	¾ in. kauri tongued and grooved and V-jointed boarding in 4 in. widths	22/6	22 5 1
53	26	,,	¾ in. kauri tongued and grooved, all as last on, and including 3 in. x 1 in. battens	25/-	66 11 6
	83	,,	1 in. kauri tongued and grooved and V-jointed boarding in 4 in. widths	25/-	1 0 9
	63	,,	¾ in. redwood matched and beaded boarding in 6 in. widths and backings, plugged to walls	-/4	1 1 0
	70	,,	¾ in. redwood matched and beaded girder casing	-/3	0 17 6
	66	,,	1 in. ,, ,, ,,	-/5	1 7 6
32	85	,,	No. 26-gauge small corrugation galvanized iron lining, lapped and screwed, and measured net	24/-	39 8 5
18	92	,,	No. 26-gauge small corrugation galvanized iron lining, all as last on, and including battens	26/6	25 1 5
51	68	,,	No. 26-gauge small corrugation galvanized iron lining, lapped and screwed, bent circular	26/6	68 9 6
feet.					
432		,,	¾ in. redwood bed-mould	-/1	4 16 11
632		,,	1 in. ,, scotia moulding		
99		,,	1¼ in. ,, ,,		
257		,,	2 in. ,, ,,	-/1½	1 12 2
68		,,	1½ in. ,, angle bead	-/1	0 5 8
180		,,	2 in. x 2 in. redwood cornice moulding	-/2	4 13 2
367		,,	2 in. x 2 in. ,, quadrant floor fillet		
12		,,	2½ in. x 2 in. ,, floor fillet		
488		,,	3 in. x 2 in. ,, cornice moulding	-/2½	5 1 8
179		,,	1½ in. x 1 in. ,, quadrant fillet, circular	-/2	1 9 10
516		,,	1½ in. x ¾ in. ,, moulded stop	-/1	2 3 0

				£ s. d.
feet.				
87	Run.	2½ in. x ¾ in. redwood moulded stop	-/1½	0 10 11
308	,,	2½ in. x ¾ in. ,, ,, circular	-/3	3 17 0
25	,,	2 in. x ½ in. kauri doubled moulded stop	-/1	0 2 1
6	,,	2 in. x 1 in. Oregon beaded fascia	-/2	0 1 0
13	,,	6 in. x 1 in. ,, ,,	-/3	0 3 3
10	,,	10 in. x 1 in. ,, ,,	-/6	0 5 0
59	,,	4 in. x ¾ in. redwood moulded fascia	-/3	0 14 9
41	,,	¾ in. x 2½ in. chamfered skirting	-/1½	0 5 2
451	,,	¾ in. x 3 in. moulded ,,	-/1½	2 16 5
8	,,	1 in. x 6 in. ,, ,, in making good $\frac{4}{10}$	-/6	0 4 0
	No., 1...	Ledged ceiling trap of ¾ in. kauri pine, V-jointed, with linings, &c., complete	.....	0 5 0
	No., 1...	Hardwood wrought packing piece, about 24 in. x 6 in. x 4 in.	.....	0 1 0
		Door Frames and Linings.		
197	Supl.	1½ in. cedar double rebated jamb-linings	-/8	6 11 4
33	Run.	4 in. x 4 in. Oregon wrought rebated and beaded frame	-/10	1 7 6
4	,,	4 in. x 4 in. ,, ,, ,, circular	1/6	0 6 0
7	,,	4 in. x 2 in. ,, beaded transom	-/4	0 2 4
6	,,	5 in. x 4 in. ,, moulded transom	1/-	0 6 0
3	,,	6 in. x 2 in. ,, splayed transom capping	-/3	0 0 9
12	,,	4 in. x 2 in. redwood transom moulding	-/2½	0 2 6
12	,,	5 in. x 2½ in. ,, ,,	-/4	0 4 0
160	,,	5 in. x 3 in. hardwood rebated, moulded, and beaded door-frame	-/10	6 13 4
46	,,	5 in. x 4½ in. ,, ,, and moulded frame	1/-	2 6 0
8	,,	5 in. x 4 in. ,, moulded and double-rebated transom	1/-	0 8 0
27	,,	5 in. x 3 in. ,, double rebated, double moulded, and double beaded mullion	1/-	1 7 0
7	,,	5 in. x 3 in. hardwood sunk, weathered, and throated sill	-/6	0 3 6
10	,,	6 in. x 3 in. ,, ,, ,, and rebated sill	-/7	0 5 10
4	,,	9 in. x 3 in. ,, rounded-edge door-sill, grooved for water-bar	-/7	0 2 4
15	,,	12 in. x 3 in. ,, ,, ,,	-/8	0 10 0
9	,,	12 in. x 3 in. ,, wrought and framed gate-head, with old stops planted on same	1/-	0 9 0
	No.. 1...	Hardwood wrought and shaped cleat for bolt	-/6	0 0 6
14	Run.	4 in. x 2 in. cedar beaded transom	-/7	0 8 2
7	,,	5 in. x 2 in. ,, ,,	-/8	0 4 8
21	,,	Pine splayed weather fillet, screwed to doors	-/6	0 10 6
		Doors.		
	No., 10...	2 in. sugar-pine four-panel doors, 2 ft. 8 in. x 6 ft. 8 in., moulded one side and bead-flush the other	32/6	16 5 0
	No., 2...	2 in. sugar-pine three-panel doors, 2 ft. 10 in. x 6 ft. 10 in., bead-butt one side and moulded the other; the upper panel divided with moulded bars into No. 4 lights	36/-	3 12 0
	No., 2...	2 in. sugar-pine three-panel doors, 2 ft. 8 in. x 6 ft. 10 in., moulded both sides; the upper panel divided with moulded bars into No. 4 lights	36/-	3 12 0
	No., 2...	2 in. sugar-pine three-panel doors, 3 ft. x 7 ft., all as last described	37/6	7 10 0
	No., 3...	2 in. ,, ,, 3 ft. x 7 ft., bead flush one side and moulded the other; the upper panel divided with moulded bars into No. 4 lights	38/6	5 15 6
	No., 2...	2 in sugar-pine three-panel doors, 3 ft. x 7 ft., all as last described, but bolection moulded one side	40/-	4 0 0
	No., 1...	2 in. sugar-pine four-panel door, 3 ft. x 8 ft., bead flush one side and moulded the other, the upper panel divided with moulded bars into No. 2 lights	42/-	2 2 0
	No., 1...	Pair 2-in. sugar-pine folding doors, 3 ft. 6 in. x 7 ft. over all, each leaf in No. 2 panels bead butt one side and moulded the other, the upper panels for glass, each divided with moulded into No. 2 lights, diminished stiles, rebated, and beaded where meeting	42/-	2 2 0
	No., 1...	1½ in. redwood two-panel door, 2 ft. 9 in. x 5 ft., the panels filled in with 1 in. x ⅛ in. wrought lattice work, secured with beads (forme lift)	16/-	0 16 0
	No., 4...	1½ in. redwood lift sliding doors, 3 ft. 3 in. x 4 ft. 2 in., all as last	16/-	3 4 0
	No., 1...	1½ in. redwood two-panel beaded sliding door, 6 ft. x 5 ft. 6 in., the panels filled in with wrought lattice, &c., as last	40/-	2 0 0
	No., 2...	2 in. redwood moulded fanlights, 3 ft. x 2 ft.	5/-	0 10 0
	No., 1...	2 in. ,, ,, 2 ft. 8 in. x 2 ft., with segmental head	5/-	0 5 0
	No., 2...	2 in. cedar moulded fanlights, 2 ft. 10 in. x 1 ft. 5 in.	5/-	0 10 0
	No., 4...	2 in. ,, ,, 3 ft. x 1 ft. 6 in.	5/8	1 2 8
	No., 3...	2 in. ,, ,, 3 ft. x 1 ft. 9 in.	6/6	0 19 6
	No., 1...	2 in. ,, ,, 3 ft. 6 in. x 1 ft. 9 in.	7/6	0 7 6
		Windows.		
	No., 9...	Pairs 2 in. moulded cedar sashes, double hung with best brass-faced axle-pullies, patent lines and iron weights in cedar box frames, and rebated and weathered hardwood sills; box frames to have 1½ in. pulley-stiles, 1¼ in. heads, 1 in. beads and stops, ⅜ in. parting slips, and ¾ in. linings, each 21 ft. 11 in. sup.	38/6	17 6 6
	No., 1...	,, ,, ,, 24 ft. 10 in. sup.	43/9	2 3 9
	No., 1...	,, ,, ,, 25 ft. 10 in. sup.	45/6	2 5 6
	No., 2...	,, ,, ,, 31 ft. 5 in. sup.	55/-	5 10 0
	No., 1...	,, ,, ,, 45 ft. 5 in. sup., measured over all, semi-headed	91/-	4 11 0
	No., 1...	,, ,, ,, 46 ft. 6 in. sup., measured over all, semi-headed	93/-	4 13 0
	No., 2...	Pairs 2 in. cedar moulded sashes and frames, all as first described, each sash divided with moulded bars into No. 6 light, 28 ft. 6 in. sup.	52/3	5 4 6

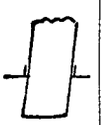
					£ s d
	No , 1	Pair 2 in cedar moulded sashes and frames, all as last item, each sash divided with moulded bars into No. 2 lights 25 ft 6 in sup From store		46/9	2 6 9
	No , 1	Pair 2 in redwood sashes and frames, all as first described, 27 ft. sup		40/	2 0 0
	No , 6	Openings, each containing No 2 pairs 2 in cedar moulded sashes and cased frames, all as first described, with cased mullion to match, each 51 ft sup		94/	28 4 0
	No , 1	Opening, all as last item, 56 ft 2 in sup		103/	5 3 0
	No , 7	Openings, all as last item, 57 ft 4 in. sup		105/	36 15 0
	No , 7	,, ,, 58 ft sup		106/6	37 5 6
	No , 1	2 in cedar moulded sash, 3 ft x 3 ft 9 in , divided with moulded bars into No 4 lights		15/	0 15 0
	No , 1	2 in cedar moulded sash, 3 ft x 5 ft 2 in , in No 4 lights		18/8	0 18 8
	No , 9	2 in ,, 5 ft x 2 ft 7 in , in No 8 lights		17/4	7 16 0
	No , 9	2 in ,, 5 ft x 3 ft 5 in , in No 3 lights		22/8	10 4 0
	No , 18		2 in cedar moulded sash, 1 ft 11 in x 1 ft 10 in , in No 3 lights, with circular side	6/6	5 17 0
	No., 18		2 in cedar moulded sash, 2 ft 8 in x 3 ft 5 in , in No 4 lights, with circular side .	10/-	9 0 0
	No , 1	2 in redwood moulded sash, 3 ft x 5 ft. 2 in , divided with moulded bars into No 4 lights		14/2	0 14 2
	No , 3	2 in redwood moulded sash, 3 ft 8 in x 4 ft 11 in , divided with moulded bars in No 4 lights		16/6	2 9 6
	No , 24	2 in cedar moulded casements, 1 ft 6 in x 4 ft 2 in , divided with moulded bars into No 3 lights		8/6	10 4 0
	No , 2	2 in. cedar moulded casements, 1 ft 9 in x 5 ft 7 in , in No 2 lights		13/	1 6 0
	No , 2	2 in ,, ,, 2 ft 2 in x 4 ft 1 in , in No 3 lights		11/9	1 3 6
	No , 12	2 in ,, ,, 3 ft x 4 ft 2 in , in No 6 lights		16/8	10 0 0
	No , 2	2 in redwood casements, 1 ft 9 in x 6 ft 2 in , in No 2 lights		9/10	0 19 8
	No , 2	1¼ in redwood moulded fixed sash (borrowed light), 2 ft 7 in. x 2 ft 7 in , each divided with moulded bars into No 2 lights		6/2	0 12 4
	No , 16	1¾ in redwood fanlights, 3 ft 2 in x 1 ft 7 in , each divided with moulded bars into No 3 lights		3/9	3 0 0
	No , 2	1¾ in redwood fanlights, 3 ft 8 in x 1 ft 7 in , in No 3 lights		4/3	0 8 6
	No , 37	Allow for setting box frames in green baize and white lead, $\frac{10}{26}$		2/6	4 12 6
	No , 40	,, ,, in cement .		1/	2 0 0
Ft in					
46 0	Run	4 in x 5 in Oregon double rebated and double beaded frame and beads		/6	1 3 0
337 0	,,	6 in x 5 in hardwood rebated and double beaded frame		/11	15 8 11
61 0	,,	6 in x 4 in ,, ,,		1/	3 1 0
179 0	,,	5 in x 4 in. cedar rebated and double moulded frame, *circular*		4/6	40 5 6
148 0	,,	6 in x 4 in cedar rebated and double beaded frame		1/6	11 2 0
90 0	,,	6 in x 5 in cedar sunk, weather, double, rebated, and double moulded transom		1/10	8 5 0
70 0	,,	8 in x 4 in hardwood, sunk, weathered, and throated transom		1/	3 10 0
101 0	,,	5 in x 4 in hardwood, sunk, weathered, double rebated, moulded, grooved, and throated sill		1/	5 1 0
10 0	,,	6 in x 4 in ,, ,, ,, ,,		1/1	0 10 10
106 0	,,	6 in x 3 in hardwood, sunk, weathered, rebated, grooved, and beaded sill		1/	5 6 0
107 0	,,	5 in x 4 in cedar, double rebated, double throated, and four times moulded mullion		1/9	9 7 3
8 0	,,	1½ in redwood transom moulding		-/1	0 0 8
60 0	,,	2½ in. ,, ,, ,,		-/2	0 10 0
63 0	,,	3 in x 2¼ in redwood transom moulding		-/3	0 15 9
		Skylight, &c , over Jobbing Room			
518 0	Supl.	1 in Oregon framed in wrought, rebated, and moulded principals		22/	5 14 0
216 0	Run .	4 in x 3 in Oregon double champered, double rebated, and double throated skylight bar		-/8	7 4 0
50 0	,,	6 in x 2½ in ,, ,, ,, wall plate to match		/8	1 13 4
	No , 2	2 in redwood, moulded sash 3 ft 6 in x 3 ft 1 in. divided with moulded bars into No 4 lights		10/-	1 0 0
	No , 1	2 in redwood moulded sash 5 ft 2 in x 2 ft 10 in divided with moulded bars into No 6 lights		13/6	0 13 6
	No , 2	,, ,, ,, 3 ft 6 in x 6 ft 10 in into No 6 lights		16/6	1 13 0
	No , 1	,, ,, ,, 5 ft 2 in x 4 ft 10 in into No 9 lights		23/	1 3 0
	No , 2	,, ,, spandril sashes 4 ft. 10 in x 3 ft 3 in divided with moulded bars into No 4 lights		8/-	0 16 0
	No , 2	,, ,, spandril sashes 5 ft 1 in. x 4 ft 2 in in No 6 light		10/6	1 1 0
	No , 2	,, ,, spandril sashes 4 ft 10 in x 5 ft 10 in in No 8 lights		14/	1 8 0
		Architraves, &c			
578 0	Run.	3 in redwood moulded architrave		/11½	3 12 3
9 0	,,	,, ,, ,, *circular*		-/6	0 4 6
39 0	,,	3½ in x 2 in redwood moulded architrave		/2½	0 8 2
23 0	,,	4 in x 1½ in ,, ,, ,,		-/3	0 5 9
11 0	,,	4 in. x 2 in. ,, ,, ,,		/3	0 2 9
9 0	,,	4 in x 2 in ,, ,, ,, *circular*		-/6	0 4 6
103 0	,,	6 in x 1½ in. ,, ,, ,,		/4	1 14 4
555 0	,,	7 in x 7¾ in. ,, ,, ,, specially moulded		-/6	13 17 6

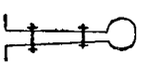
ft	in				£	s	d
157	0	Run	1½ in redwood rounded window nosing	-/3	1	19	3
55	0	,,	1½ in x 6 in ,, ,, board	/4	0	18	4
29	0	,,	2 in x 4½ in ,, ,, ,,	-/4	0	9	8
97	0	,,	2 in x 6 in ,, ,, ,,	/5	2	0	5
6	0	,,	1½ in x 9 in redwood window board rounded on both edges	/9	0	4	6
104	0	,,	1½ in x 6 in cedar rounded window board	/6	2	12	0
21	0	,,	1½ in x 7 in ,, ,, ,,	/7	0	12	3
11	0	,,	1½ in x 8 in ,, ,, ,,	/8	0	7	4
5	0	,,	1½ in x 9 in ,, ,, ,, (from store)	/9	0	3	9
42	0	,,	1 in scotia under window board	/1	0	3	6
11	0	,,	1¾ in ,, ,, ,,	/1	0	0	11
227	0	,,	2 in x 2 in bed mould window board	/2	1	17	10
8	0	,,	2½ in x 2 in ,, ,, ,,	2	0	1	4
141	0	,,	1 in x 3 in kauri, tongued window lining	-/2	1	3	6
23	0	,,	1 in x 5 in tongued door lining	/2½	0	4	10
123	0	,,	1 in x 5 in cedar tongued window lining	/4	2	1	0
16	0	,,	1 in x 6 in tongued window lining	/4	0	5	4
4	0	,,	1 in x 7 in cedar window lining (from store)	/6	0	2	0
16	0	,,	1 in x 8 in tongued window lining	/5	0	6	8
11	0	,,	1 in x 8 in cedar window lining (from store)	/7	0	6	5
12	0	,,	1 in x 4 in chamfered muntin casing	/2	0	2	0
104	0	,,	¾ in x 9 in redwood double moulded casing	/5	2	3	4
13	0	,,	1 in x 10 in cedar beaded double moulded casing	/7	0	7	7
12	0	,,	1 in x 11 in redwood beaded double moulded casing	/5	0	5	0
48	0	,,	1 in x 6 in redwood double chamfered transom fascia	/3	0	12	0
13	0	,,	1 in x 11 in redwood double beaded fascia and backings	/7	0	7	7
			Staircase to 4th floor, &c				
131	0	Supl	1 in Oregon framed in carriages				
17	0	,,	1 in hardwood framed in joists (landing)				
60	0	,,	1 in kauri tongued risers glued, blocked, and bracketed				
100	0	,,	1½ in kauri tread with rounded nosing, grooved, glued, blocked, and bracketed				
12	0	,,	1½ in kauri wrought all round square treads				
15	0	,,	2 in Oregon wrought all round strings prepared for treads	See below			
68	0	,,	2 in kauri wrought all round strings prepared for treads and risers				
8	0	,,	2 in kauri wrought all round moulded strings ,, ,,				
10	0	,,	1 in kauri grooved and tongued flooring in 4 in widths (landing)				
86	0	,,	¾ in kauri, tongued and grooved, V jointed, boarding in 4 in widths, soffit				
27	0	Run	Kauri scotia under tread				
71	0	,,	Cedar ,, ,,				
13	0	,,	1 ft x 4 in hardwood wrought riser	/3	0	3	3
3	0	,,	1½ in kauri nosing				
1	0	,,	1 in x 6 in kauri fascia				
31	0	,,	4 in x 3 in kauri moulded handrail				
		No , 3	Kauri turned roses		33	0	0
		No , 50	1½ in x 1½ in kauri square balusters				
		No , 3	2 in x 2 in ,, ,,				
		No , 3	4 in x 4 in kauri newels, 3 feet long with shaped ends				
		No , 3	4 in x 4 in ,, 5 ft 2 in long ,,				
			Closets and Urinals				
73	0	Supl.	1 in Oregon framed for studding	16/	0	11	8
1,985	0	,,	1 in Oregon framed in wrought all round purlins for iron bolted to angle iron and W C framing	22/	21	16	8
78	0	,,	1 in redwood lavatory, top pierced for basins, and chased for pipes	/6	1	19	0
109	0	,,	1 in kauri, tongued and grooved, jointed boarding, in 4 in width lavatory backs	22/	1	4	0
sq 14	92	0 ,,	1¼ in kauri, wrought and V jointed both sides, tongued and grooved boarding in 6 in widths, W C divisions	27/	20	2	10
53	0	Run	¾ in x ¾ in redwood moulding				
43	0	,,	1 in x ¾ in ,, ,,	/1	10	8	10
1,839	0	,,	1 in x 1 in ,, scotia				
571	0	,,	1⅛ in x ¾ in ,, beaded door stop				
43	0	,,	3 in x 2 in Oregon, wrought all round rib, bolted to angle iron, circular	/6	1	1	6
43	0	,,	4 in x 1 in redwood capping and scotia moulding, circular	/3	0	10	9
43	0	,,	4 in x 1 in ,, beaded barge board, circular	/6	1	1	6
49	0	,,	6 in x 1 in ,, ,, fascia	/3	0	12	3
98	0	,,	9 in x 3 in Oregon, wrought all round, double beaded bearer channelled for soil pipes, including all wrought blockings bolted to girder	1/3	6	2	6
		No , 2	1 in redwood chamfered blocks, 18 in x 12 in , painted complete	/6	0	1	0
		No , 71	Kauri wrought, shaped, and chamfered blocks, 6 in x 3 in x 2 in , and fixing	-/3	0	17	9
		No , 11	1½ in sugar pine framed closet doors, 2 ft 3 in x 6 ft , bead flush one side and square the other, filled in with ¾ in kauri, tongued and grooved, V jointed boarding in 4 in widths	16/	8	16	0
		No , 20	1½ in sugar pine framed closet doors, 2 ft 8 in x 6 ft , all as last described	17/6	17	10	0
			Goods Lift in Area				
28	0	Supl	1 in tallow wood, framed in bearers	/2	0	4	8
1,076	0	,,	1 in Oregon, wrought all round guides, frames, &c,	22/	11	16	9
113	0	,,	1 in ,, ,, runners grooved for lift weights	25/	1	8	3
32	0	,,	1 in tallow wood, wrought all round runners screwed to guides	25/	0	8	0
71	0	,,	1 in kauri, tongued and grooved, V jointed, lift casing in 6 in widths	22/	0	15	7
92	0	,,	1¼ in kauri, tongued and grooved, V jointed both sides, lift casing	27/-	1	4	10
18	0	Run	Angle bead	/1	0	1	6
43	0	,,	2 in x 1 in kauri, wrought all round beaded fillet	/1	0	3	7
63	0	,,	1½ in x 1½ in tallow wood wrought runners for lift weights	/4	1	1	0

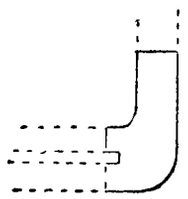
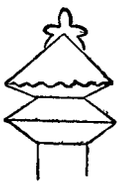
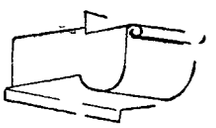
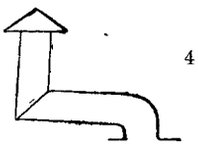
	ft.				£ s. d.
	50	Run.	¾ in. x 2¼ in. kauri, double beaded, wrought all round fascia ...	-/2	0 8 4
	50	,, ..	1½ in. x 2½ in. ,, ,, ,, . .	-/3	0 12 6
		No., 1	Cut up old concrete floor, 4 ft. 6 in. x 6 ft, and excavate for new floor at lower level		2 0 0
		No., 1	Cut out pit 18 in. x 18 in. for hand-line gear, and fix bearers and hand line wheels . . .	. .	1 10 0
		No, 1	Cut away stone kerb to lift opening at ground floor level	..	0 5 0
		No., 4 .	Check stops, 6 in. x 6 in x 4 in .	2/6	0 10 0
		No., 1	Take down old goods lift from basement to third floor, with all runners, guides, drums, wheels, bearers, brackets, lines, enclosures, &c., complete	..	10 0 0
		No., 1	Goods lift machinery, complete. (See Atlas Co.'s vouchers) . .	. ..	..... .
		No., 1	Gallery to cylinder, complete. (See Atlas Co.'s vouchers)	.. .	.... . .
Squares	ft.		*Form Lift.*		
	23	Supl.	1 in. hardwood framed in bearers	-/2	0 3 10
	467	,, .	1 in. Oregon framed in wrought all-round bearers, guides, &c. ...	22/-	5 2 9
	67	,, . .	1¼ in. kauri, wrought both sides, tongued and grooved V jointed boarding and bearers	30/-	1 0 1
5	62	,, ...	1 in. kauri, wrought both sides, tongued and grooved V-jointed boarding and bearers in 4 in. widths, and 3 x 2 bearers	25/-	7 0 6
	38	Run. .	¾ in. redwood moulding	-/1	0 3 2
	95	,, ...	1½ in. x 1½ in. tallow wood, wrought runners	-/4	1 11 8
	14	,,	3½ in. x 1 in. double beaded framed door-head . .	-/3	0 3 6
	16	,, ...	4 in. x 3 in. Oregon, wrought, rebated, and beaded standards ...	-/6	0 8 0
	107	,, ...	 Box-standard formed of 3 in. x 2 in. stud, 1½ in. x 1½ in. pulley stile, 3½ in. x 1 in. double-moulded lining, and 3 in. x 1 in. fascia	1/-	5 7 0
	20	,, .	4 in. x 3 in. Oregon, wrought, double-chamfered, and grooved capping	-/6	0 10 0
	12	,, ...	6 in. x 4 in. Oregon, wrought, rebated, chamfered, and beaded capping-mitred	-/10	0 10 0
		No., 4	Check stops, 6 in. x 6 in. x 4 in. . . .	2/6	0 10 0
		No, 2	Fix handline wheels	5/-	0 10 0
		No., 1 ..	Form lift machinery, complete. (Atlas Co 's vouchers)	.	595 0 0
			Alterations, &c, Goods Lift, Northern Building		
	145	Supl	1 in. Oregon, framed in studding, &c.	16/-	1 3 2
	324	,, .	1 in. Oregon, framed in wrought all round cylinder frame, &c.	22/-	3 11 3
2	77	,,	1 in kauri, tongued, grooved, and beaded boarding in 6 in. widths, and 3 in x 1 in. bearers .	25/-	3 9 3
1	41	,, .	No. 26-gauge galvanised corrugated iron lining, lapped at joints and ends, and screwed, and 3 in. x 1 in. battens. Part new and part from store	25/-	1 15 3
	2	Run.	1 in x 9 in. redwood fascia . . .	-/6	0 1 0
	24	,, ...	1 in. x 9 in. kauri moulded fascia	-/6	0 12 0
	11	,, .	1 in x 12 in. kauri, wrought on one side, fascia . .	-/8	0 7 4
	10	,,	1 in. x 12 in. kauri chamfered fascia .	-/8	0 6 8
		No., 1	Carefully take down old lift framing and enclosure, 21 ft. 4 in. girt, from floor to underside of roof-lining, complete		3 0 0
		No., 1	Carefully take down the whole of lift machinery, wheels, gearing-ropes, weights, cylinder, beams, bearers, guides, runners, &c, &c., complete, on all floors	.	12 0 0
		No., 1	Carefully cut out and enlarge opening in stud enclosure, to increase height	...	0 10 0
		No., 1..	Re-erect and refix all guides, runners, bearers, and beams, on all floors complete	..	25 0 0
			Sundries.		
	48	Supl. .	1½ in. cedar, moulded, both sides partition, two panels high, the upper panels for glass—from stock	2/-	4 16 0
	147	,, ..	Tallow-wood wrought decking, of 2 in. x 1 in. battens, spaced 1 in. apart upon 3 in. x 3 in. bearers	-/4½	2 15 2
	105	,, . .	1 in. shelving and bearers	-/6	2 12 6
	405	,,	1 in. shelving from stock, and new bearers	-/6	10 2 6
	136	,, ...	1 in divisions to ditto, and brackets, &c.	-/6	3 8 0
	48	,,	1½ in. Kauri wrought printing shelf	-/8	1 12 0
	167	Run ..	Rolls for lead	-/2	1 7 10
	136	,, ..	Ditto circular	-/3	1 14 0
	90	,,	3 in. x 1 in. Oregon bearer, plugged to wall	-/3	1 2 6
	34	,, . ..	6 in. x ¾ in. Baltic, wrought all round step . .	-/3	0 8 6
	156	,, .. .	Beaded pipe casing	1/-	7 16 0
	10	,, ...	1 in x 4 in. kauri beaded hat-rail	-/6	0 5 0
	8	,, .	6 in. x 4 in. redwood moulded capping	-/10	0 6 8
		No., 31	Wood cleat blocks for casement openers . .	-/3	0 7 9
		No., 42 .	Wood brackets or stays built into wall and perforated for 4 in. lead down pipe . .	1/-	2 2 0
		No, 1 .	Set framed bearers, two tiers high, under chemical press, the lower tier fitted with shelf 5 ft. 3 in. long		0 15 0
		No., 1	Kauri pine table, 5 ft. x 3 ft. 10 in. and 2 ft. 9 in. high . .		1 15 0
			Centres.		
	8	Run	3 in. x 1 in. turning piece	-/1	0 0 8
		No, 1	Semi centre to 5 ft. 5 in. opening, and 5 in. soffit		
		No, 2	,, 4 ft. 4 in. ,, 9 in. ,, ...		
		No, 1	,, 5 ft. 10 in. ,, 9 in. ,, ...		
		No, 2	,, 7 ft. 6 in. ,, 9 in. ,,	7/6	4 2 6
		No, 2	,, 8 ft. 2 in. ,, 9 in. ,, . .		
		No, 1	,, 8 ft. 6 in. ,, 9 in. ,, .		
		No, 2	,, 6 ft. 1 in. ,, 14 in. ,,		
		No, 9	,, 11 ft 1 in. ,, 18 in. ,,	30/	13 10 0

			£ s. d.
No , 2	Segmental centres to 4 ft 4 in opening and 5 in. soffit		
No , 1	,, ,, 3 ft 1 in ,, 9 in ,,		
No , 1	,, ,, 3 ft 7 in. ,, 9 in ,,		
No , 2	, ,, 4 ft 2 in. , 9 in ,,		
No , 8	,, ,, 6 ft 5 in ,, 9 in ,,		
No , 8	,, ,, 6 ft 7 in ,, 9 in ,,		
No , 7	,, ,, 7 ft 2 in ,, 9 in. ,,	7/6	13 10 0
No , 1	,, ,, 3 ft 4 in ,, 14 in ,,		
No , 2	,, ,, 6 ft 1 in ,, 14 in ,,		
No , 2	,, ,, 6 ft 6 in ,, 14 in ,,		
No , 1	,, ,, 3 ft 4 in ,, 18 in ,,		
No , 1	,, ,, 3 ft 10 in ,, 18 in. ,,		
	Jobbing Work, &c		
No , 1	Carefully take down old staircase and landing with enclosing partitions, &c , complete—hydraulic room	. .	1 10 0
No , 1	Carefully take down old staircase and landing, &c , complete, in No 2 fount room		1 5 0
No , 1	Carefully take down old staircase and landing, &c , complete, from jobbing to binding room		1 10 0
No , 8	Carefully cut down and remove double fronted paper racks, four tiers in height, size 4 ft x 5 ft x 7 ft 6 in , for the insertion of stancheons, afterwards reframing, making good with bearers, fitting around stancheons, and re erecting Include for removing and stacking paper in bulk, and afterwards replacing same in racks	£5	40 0 0
No., 1	Carefully cut shelving three tiers high for insertion of stancheons, fit around same and make good Include for removing and afterwards replacing stationery	15/-	0 15 0
No , 10	Carefully cut shelving ten tiers high for insertion of stancheons, fit around same and make good. Include for removing and afterwards replacing stationery	£7	70 0 0
No , 2	Carefully take down pin presses in ruling room, remove and re erect in different place	10/-	1 0 0
No , 1	Carefully take down partition 23 ft 6 in. x 12 ft 6 in in No 2 fount room	20/-	1 0 0
No , 1	Carefully take down half glass enclosure 16 ft x 11 ft 6 in in old engravers' room		1 10 0
No , 1	Carefully take down enclosure, shelving, and desks, &c , &c readers' room, 1st floor		1 10 0
No . 1	Carefully take down galvanised iron w c divisions about 24 ft long, inserting studding and afterwards re erecting		4 10 0
No., 1	Carefully cut opening 5 ft 7 in x 2 ft 8 in in Oregon stud partition lined both sides, for insertion of borrowed lights, and trim opening with new timbers complete		0 15 0
No., 2	Carefully shoring and supporting stone window sills, sashes, and frames	15/-	1 10 0
No , 2	Carefully shoring and timbering floors, &c , over openings 4 ft wide, from floor below	10/-	1 0 0
No , 1	Carefully shoring and timbering floors, &c , to L-shaped opening 9 ft x 6 ft	10/-	0 10 0
No , 1	Carefully shoring and timbering floors, &c , over No 2 fount room staircase	10/-	0 10 0
No , 7	Carefully needle and shore main cross girders while inserting columns, $\frac{4}{14}$	25/-	8 15 0
No., 1	Carefully needle and shore whilst inserting girders over strong room doors	15/-	0 15 0
No , 1	,, ,, old 18 in wall whilst enlarging opening	15/-	0 15 0
No , 1	,, ,, old 18 in wall over opening 3 ft wide	15/-	0 15 0
No , 1	Carefully cut away flooring and joists 3 ft x 9 in. .	2/6	0 2 6
No , 53	Carefully cut through floor joists, trim around openings with new materials, and make good . .	20/-	53 0 0
No , 35	Carefully cut away sides and soffits of girder casing, fit same to stancheons, columns, &c , and refix and make good	15/	26 5 0
No , 2	Carefully take down girder casing and cradling to girder 15 ft 8 in long, cut, adapt, refix, and make good with new materials, as required	40/-	4 0 0
No , 4	House new 10 in x 4 in wood girder to old	5/-	1 0 0
No., 2	Carefully take down sheet of corrugated ceiling lining for passage of columns and refix	2/6	0 5 0
No., 1	Carefully cut down end of lavatory enclosure to form casing for belting	20/-	1 0 0
No , 2	Carefully take out and remove pairs of old sashes and frames complete ..	10/-	1 0 0
No., 3	Carefully take out and remove pairs of old sashes and frames including stone sill, complete	12/6	1 17 6
No , 1	Carefully take out and remove pairs of casement doors and sills, complete	12/6	0 12 6
No , 1	Carefully take out old door and framing over same in opening 3 ft 6 in. x 12 ft 6 in , including linings, architraves, &c , complete	15/-	0 15 0
No , 1	Carefully take out old door and frame, alter and refix in different place, and rehang to open outwards .		2 0 0
No., 16	Carefully cut away heads of old solid sash frames, in situ, to window openings 4 ft 6in wide, and prepare frames for new transom, &c , to increase height	20/	16 0 0
No , 2	,, ,, ,, ,, and linings, all precisely as last	25/-	2 10 0
No , 1	Take off lock and bolts from old fire engine room door, and fix doors with and including new H W plate, secured to doors and floor	10/	0 10 0
No , 1	Plug wall for and refix old jamb linings to new opening 3 ft x 7 ft , and rehang old door	15/-	0 15 0
No , 1	Refix only cut ornamental valance, 15 in high and 7 ft 6 in. long, and brackets	5/-	0 5 0
	Carried to Summary		£3,095 9 11

			Ironmonger..		£ s. d.
	No., 72 ...		Pairs 3 in. cast iron butts	-/5	1 10 0
	No., 68 ...		,, 3½ in. ,, ,,	-/6	1 14 0
	No., 30 ...		,, 4 in. ,, ,,	-/7	0 17 6
	No., 8 ...		,, 2½ in ,, ,,	-/5	0 3 4
	No., 2 ...		4 in. brass barrel bolts	-/9	0 1 6
	No., 2 ...		6 in. ,, ,,	1/-	0 2 0
	No., 6 ...		Brass sunk handles	1/-	0 6 0
	No., 6 ...		,, sash lifts	5/-	0 2 6
	No., 2 ...		Approved brass sash fasteners	1/6	0 3 0
	No., 29 ...		,, ,, casement fasteners	1/9	2 10 9
	No., 1 ...		Pair brass plate sash suspenders	-/6	0 0 6
	No., 2 ...		Sets of cords, pulleys, and cleats	5/-	0 10 0
	No., 8 ...		Sets of cords, quadrant fanlight openers and fittings	7/6	3 0 0
	No., 30 ...		Brass slide casement stays	3/-	4 10 0
	No., 2 ...		Brass casement stays with screws	2/6	0 5 0
	No., 9 ..		Sets of No. 2-13 inch brass sliding sash stays	3/6	1 11 6
	No., 8		Preston's fanlight openers p.c. 10/6 each and cords complete	13/-	5 4 0
	No., 31 ...		Preston's improved brass quadrant casement racks, p.c., 10/6 each, and cords complete	13/-	20 3 0
	No., 9 ...		Wrought-iron quadrant racks and cords complete	4/-	1 16 0
	No., 1 ...		6 in. carpenter's rim lock	3/6	0 3 6
	No., 1 ...		Set brass furniture	.....	(included).
	No., 22 ...		Chubb's patent mortice locks	10/-	11 0 0
	No., 2 ...		Sets brass furniture with milled edges	4/6	0 9 0
	No., 20 ...		Sets brass reeded furniture	7/-	7 0 0
	No., 1 ...		"Eclipse" patent door check	20/-	1 0 0
	No., 2 ...		9 in. brass pillar handles	2/6	0 5 0
	No., 9 ...		Brass ring spring catches, 1/9	2/3	1 0 3
	No., 24 ...		Brass hat and coat hooks	1/3	1 10 0
	No., 5 ...		Sets lead balance weights, with sash cords, brass wheels, and brass faced axle pulleys	8/-	2 0 0
	No., 2 ...		Sets fanlight openers and shafting complete, to photo. gallery—Mountney & Co.'s vouchers	.....	20 6 0
	No., 1 ...		Brass swivel pulley, brass screw eye, and cords complete	7/6	0 7 6
			Carried to Summary	.....	89 11 10
cwt.	qr.	lb.	*Smith and Founder.*		
1	0	0	.....	Wrought-iron in tie rods	-/4 lb.	1 17 4
27	2	0	.....	Steel in principals to photo. gallery—East and Clune	20/8	28 8 4
292	0	14	.....	Wrought-iron in main roof, principals—East and Clune	20/-	292 2 6
382	0	0	.....	,, in closets and urinals, walls, and roof—Mountney & Co.	Say at 19/10½	482 7 4
103	1	18	.....	,, in roof, &c., of turret and dome, also wrought-iron in tie-rods of roof, main angle—Mountney and Co...		
14	3	0	.....	,, in templates under girders—Dunlop and Mountney...	-/4½ lb.	30 19 6
3	2	0	.....	,, in No. 56 cramps to stonework, galvanised—Dunlop and Co. $\frac{4}{10}$	28/-	4 18 0
26	1	24	.....	Wrought-iron in straps and bolts	30/-	39 14 0
30	2	20	.....	Wrought-iron in girder plates and connections, drilled for bolts	42/	64 8 6
3	1	18	.....	Wrought galvanised iron in ties and plates, drilled for bolts	42.-	7 3 3
9	2	6	.....	Wrought-iron in brackets and purlin rafters, &c., riveted or bolted..	20.-	9 11 1
	No., 1 ...			Templates complete for roof principals, 9 @ 15/-	.....	6 15 0
				Rolled Joists.		
6	2	0	.....	In 10 in. x 6 in. rolled iron joists	11/-	3 11 6
1,112	1	11	.....	In steel joists and girders of various sizes and sections, also stancheons (J. Barre Johnstone & Co's. vouchers.)	12/-	667 8 2
14	1	4	.....	In built iron girder. From stock	14/-	10 0 0
				Columns.		
452	0	16	.....	Cast-iron in columns, from vouchers Atlas Co., Morts' Dock, and Mountney & Co.	11/6	259 19 8
27	0	19	.....	Cast-iron in columns, from store	11/6	15 12 5
1	1	20	.....	Cast-iron in wedges for columns	-/4½ lb.	3 0 0
1	3	16	.....	Cast-iron in packing plates for columns	-/4½ lb.	3 19 6
	No., 1 ..			Carefully take down old column in hydraulic room, and all timbers connected	.....	0 10 0
	No., 1 ...			Allow for additional hoisting of 1st floor columns to 2nd floor level, also 2nd floor columns to 3rd floor level, and lowering same through apertures in floors, 44 @ 20/-		44 0 0
	No., 1 ...			Allow for all patterns and alterations to same, complete	.....	.....
ft.				*Sundries.*		
28	Supl.			Galvanised sheets with rounded corners, fixed with round-headed screws around tubs, &c., photo. rooms	-/4	0 9 4
6	Run.			⅜ in. x ¾ in. wrought-iron weather bar	-/6	0 10 0
14	,, ...			⅜ in. x 1 in. ,, ,,		
	No., 4 ...			Galvanised iron clips and bolts around, 3 in. x 3 in. tee iron	1/3	0 5 0
	No., 1 ...			Allow for taking down iron handrail around closets and lavatories, 1st floor, cutting and fitting same between altered iron columns, and supplying any deficiency with suitable material, part new, part old	.....	1 10 0
	No., 1 ...			Take down hood to old forge, and refix with hangers to flue-pipe and hood	.....	0 15 0
	No., 1 ...			Allow for carefully disconnecting and removing box-girder 16 ft. long over jobbing-room	.....	2 0 0
	No., 509..			Drilling holes in girders, &c., in situ	-/6	12 14 6
	No., 3 ...			Cut out old rivets and enlarge holes for bolts	-/6	0 1 6
	No., 7 ...			Cut off all old rivet heads to form seating for columns	2/6	0 17 6
				Carried to Summary	.....	£1,995 9 1

cwt qr lb				£ s d.
		Plumber		
3 2 18		Milled lead and labour templates	18/	3 5 11
275 3 9		,, ,, in roofs, lead flat, flashings, gutters, small part in making good	18/	248 4 11
12 1 1		,, ,, in safes and covering to floors	18/-	11 0 8
Feet				
57	Supl	No 22 gauge galvanised iron gutter lining with soldered and riveted joints	/6	1 8 6
		Zinc Work		
515	,,	No 14 gauge zinc, with welted joints, secured with screws, include for clips and solder	/10	21 9 2
30	Run	No 14 gauge zinc moulded cornice 18 in high, including mitres, &c	2/	3 0 0
64	,,	Perforated zinc soffit 6 in wide, secured with staples	/3	0 16 0
		Ornamental zinc work, &c , Bush & Co 's vouchers		390 12 9
	No., 99	Approved zinc soakers	1/-	4 19 0
Squares ft		*Galvanised Iron Roofing*		
53	Supl	No 26 gauge galvanised corrugated iron roofing, properly lapped and secured, measured net	22/6 sq	0 11 11
39 36	,,	No 26 gauge galvanised corrugated iron roofing, bent to curve properly lapped and secured, measured net	24/6 sq	48 4 4
30 53	,,	No 26 gauge galvanised corrugated iron roofing, bent to curve, properly lapped and secured, measured net, inclusive of 3 in x 1 in battens	25 / sq	38 3 3
40 33	,,	No 26 gauge galvanised small corrugated iron roofing, properly lapped and secured, measured net	24/ sq	48 7 11
24 7	,,	,, ,, all as last, inclusive of 3 in x 1 in battens	26/6 sq	31 17 10
5 20	,,	No 26 gauge galvanised small corrugated iron roofing, properly lapped and secured, bent to curve, measured net	26/6 sq	6 17 10
205	Run	Rolled edge to last	/1	0 17 1
198	,,	Bending small corrugated iron to curve of bell cast	/2	1 13 0
70	,,	Galvanised iron hip 8 in gut, properly secured and with dressed ends	-/6	1 15 0
		Eaves, Gutters, and Down pipes		
399	,,	4 in galvanised iron half round eaves gutter, including all angles, outlets, stopped ends, &c	/8	13 6 0
49	,,	5 in ,, ,,	-/10	2 0 10
9	,,	6 in ,, ,,	1/	0 9 0
17	,,	4 in galvanised iron moulded eaves gutter, including all angles, outlets, stopped ends, &c	/8	0 11 4
437	,,	5 in ,, ,, ,,	/10	18 4 2
554	,,	8 in x 4 in , No 22 gauge, galvanised iron special made eaves gutter, with straps, bolts, and nuts, angles, outlets, stopped ends, &c , complete (Murray & Co)	1/	27 14 0
138	,,	2 in galvanised iron down pipe, including all bends, shoes, ears, spikes, &c	/5	2 17 6
23	,,	2½ in ,, ,, ,,	/6	0 11 6
150	,,	3 ,, ,, ,, ,,	/7½	4 13 9
462	,,	4 ,, ,, ,, ,,	/10	19 5 0
21	,,	6 ,, ,, ,, ,,	1/3	1 6 3
266	,,	4 in diameter cast iron down pipe, including all bends, shoes, ears, spikes, &c	1/2	15 10 4
104	,,	2 in diameter lead down pipe, including all bends, ears, spikes, &c	1/	5 4 0
231	,,	4 ,, ,, ,, ,, ears and spikes	2/	23 2 0
	No , 12	Extra for bends	2/6	1 10 0
	No , 42	Lead collars and flanges, soldered on	5/	10 10 0
	No , 1	9 in x 9 in galvanised head to down pipe	12/-	11 8 0
	No , 2	12 in x 9 in ,, ,,		
	No , 2	12 in x 12 in ,, ,,		
	No , 1	18 in x 18 in ,, ,,		
	No , 7	15 in. ,, ,,		
	No , 6	Octagonal ,, ,,		
	No , 7	Galvanised iron hopper covers to down pipe heads	5/-	1 15 0
	No , 19	Domical galvanised wire gratings	1/6	1 8 6
	No , 1	Allow for taking down and afterwards refixing old cast iron down pipe by lavatory block	5/-	0 5 0
Feet		*Water closets*		
216	Run	1¼ in lead fall pipe from flushing cisterns, in 5 ft 6 in lengths	/9	8 2 0
124	,,	2 in lead vent pipe	1/-	6 4 0
122	,,	4 in lead soil pipe	2/	12 4 0
		No , 10, extra for bends	2/6	1 5 0
		No , 9, brass cleaning screws	5/6	2 9 6
		No , 1, connection to sewer		3 0 0
18	,,	4 ft cast iron soil pipe, lead joints	1/2	1 1 0
132	,,	4 in galvanised iron vent pipe	-/10	5 10 0
		No , 2 cowls to ditto	5/	10 0 0
	No , 34	2 in lead vent bends, average 12 in long, including joints	3/	5 2 0
	No , 9	4 in diam lead connections, say 6 in long, with flanges and joints	10/-	4 10 0
	No , 31	4 in diam lead soil pipe bends, 2 ft 9 in long, with joints, flanges, and collars, complete	25/-	38 15 0
	No , 31	"Tower" pedestal w c's , seats, and 4 in lead traps complete	each	200 0 0
	No , 9	Tylor s "compound" w c s , with seats, and 4 in lead trap	£5	
	No , 40	"Tower" flushing cisterns and brackets, complete	Included	in last
	No , 1	Allow for carefully taking down No 2 old w c's with all old fittings, pipes, enclosures, flagging, &c , complete, and relaying and making good slate floor, inserting cleaning screws, &c , in soil pipes and stopping up pavings and pipes, &c , &c , complete		

				£ s. d.
		Urinals		
ft. 40	Run.	¾ in. lead supply from flushing cisterns	-/6	1 0 0
57	,,	2 in. diameter lead waste and vent pipe	1/-	2 17 0
		No. 3 lead collars and joints	3/-	0 9 0
	No., 16	2 in. diameter short lead outlets and joints complete	2/-	1 12 0
	No., 2	2 in. diameter lead bends 2 ft. long and joints complete	2/6	0 5 0
	No., 18	Tylor's angle backed urinals	35/-	31 10 0
	No., 4	Tylor's 2 gallon flushing cisterns and brackets	45/-	9 0 0
	No., 2	2 gallon automatic flushing cisterns and brackets	45/-	4 10 0
	No., 2	1 gallon ,, ,, ,,	25/-	2 10 0
	No., 3	2 in brass cleaning screws	3/3	0 9 9
	No., 1	Allow for carefully taking down No. 5 old urinals, glass floor, cleaning old pipes, traps, &c., refixing same, and providing and fixing new water supply pipes and connections complete	.	15 0 0
		Lavatories.		
35	Run.	1½ in. diameter lead vent pipe	-/10	1 9 2
86	,,	2 in. diameter lead waste pipe	1/-	4 6 0
13	,,	4 in. ,, ,,	2/-	1 6 0
42	,,	4 in. diameter cast-iron waste pipe	1/2	2 9 0
66	,,	2 in. diameter galvanised iron vent-pipe	-/2	0 11 0
	No., 1..	Cowl to ditto	5/-	0 5 0
14	Run.	4 in. diameter galvanised iron vent pipe	-/10	0 11 8
	No., 1	Cowl to ditto	5/-	0 5 0
	No., 18	1¼ in. lead overflow pipes from basins and joints, complete	3/	2 14 0
	No., 18	1¼ in. lead vent junctions and joints, complete	3/-	2 14 0
	No., 18	1½ in. lead syphon traps and joints	7/-	8 8 0
	No., 6	2 in. ,, ,,		
	No., 6	2 in. lead bends 1 ft. 9 in. long, and joints	2/6	0 15 0
	No., 6	4 in. diameter lead diminishing sockets and joints	7/6	2 5 0
	No., 6	4 in. brass bell traps	5/-	1 10 0
	No., 1	Lead collar to 2 in. pipe and joints	3/-	0 3 0
	No., 18	16 in. diameter Tylor's lavatory basins, with flushing rims, brass washer, and vulcanite plug	23/-	20 14 0
		Water Service.		
18	Run.	¾ in. galv. wrought-iron piping, with all necessary tees, holdfasts, &c.	-/6	0 9 0
259	,,	1 in. ,, ,,	-/9	9 14 3
75	,,	1¼ in. ,, ,,	1/-	3 15 0
177	,,	1½ in. ,, ,,	1/3	11 1 3
104	,,	2 in. ,, ,,	1/6	7 16 0
33	,,	2½ in. ,, ,,	2/6	4 2 6
85	,,	¾ in lead service pipe, including all bends, tacks, &c., complete	-/6	2 2 6
25	,,	1 in. ,, ,, ,,	-/8	0 16 8
13	,,	1¼ in. ,, ,, ,,	-/9	0 9 9
11	,,	2 in. ,, ,, ,, wastes,	1/-	0 11 0
10	,,	3 in ,, ,, ,, toning room	1/6	0 15 0
	No., 40	½ in lead branches, 12 in long, to flushing cisterns, and joints	2/-	4 0 0
	No., 17	¾ in. ,, from supply to lavatory basins ,,	2/6	2 2 6
	No., 2	1 in. ,, 12 in long, to flushing cisterns ,,	3/-	0 6 0
	No., 4	Connections of 2½ in galvanised pipe to cisterns and engines, with all bolts and packing complete	10/-	2 0 0
	No., 4	2 in lead bent wastes, 3 ft. 6 in long, with tafted joints or collars	7/6	1 10 0
	No., 1	¾ in. approved stopcock	5/6	0 5 6
	No., 2	1 in. ,,	7/6	0 15 0
	No., 1..	1½ in. ,,	12/6	0 12 6
	No., 1	2 in ,,	20/-	1 0 0
	No., 9.	¾ in. brass h.p. screw-down bib cocks, screwed for hose connections	7/6	3 7 6
	No., 18	¾ in. ,, ,, lavatory valves, with tinned joints and back-nuts, cross bar-handles, flanges, and sockets complete	Included with basins.	
	No., 1	Allow for all connections of new to old services		1 5 0
	No., 1	Allow for taking down, cleaning, altering, and extending water supply to Government Printer's w.c's, and paint pipes	.	0 15 0
	No., 1	Allow for temporary water supply from new w.c.s. block to lavatory and urinal, &c., in stamp room		1 10 0
	No., 1	Allow for cutting and disconnecting all water service pipes on roofs over jobbing room where disturbed	. ..	Included in connections to old services.
		Water Spray.		
59	Run ..	1½ in. perforated copper piping with all galvanised stays, clips, and screws	3/4	9 16 8
	No., 2	1½ in. brass cleaning cocks	3/6	0 7 0
19	Run	 Galvanised iron bonnet over ridge, about 15 in. x 15 in including all battens and bracketing, &c., complete	3/-	2 17 0
		Sundries.		
32	Run .	6 in x 6 in. galvanised iron vent flue, with soldered joints, fixed with G.I. clips and screws to plugs in wall	2/-	3 4 0
	No., 1 .	Galvanised iron taper pieces from 6 in x 6 in at bottom to 6 in. diameter at top, total height 5 ft. 8 in., with galvanised iron stay bolted around pipe, and screwed to window head	. .	1 0 0
62	Run .. .	6 in. x 6 in. No 24 gauge copper furnace flue with lapped, soldered, and riveted joints	3/4	10 6 8
	No., 4 ..	Extra for bends	5/-	1 0 0
	No., 2	12 in. x 12 in. copper flanges soldered and riveted to flue pipe	2/6	0 5 0

				£ s. d.
	No., 1	 Copper junction to last flue-pipe, with connection at bottom to No. 2, 6 in. x 6 in. flues, soldered and riveted, 2 ft. high over-all	..	0 15 0
ft.	No., 3	Wrought-iron hangers, 1 in. x ¼ in., each 3 ft. 6 in. long, screwed to ceiling	1/6	0 4 6
66	Run. .	9 in. diameter galvanised iron vent-tube, in roofs	2/-	6 12 0
	No., 6 .	Extra for trumpet-mouths, 16 in. diameter, with flanges, and all bearers in ceiling-joists complete	7/6	2 5 0
	No., 1	 Galvanised iron cowl to 6 in. diameter vent-pipe ..	7/6	0 7 6
	No., 5 .	Galvanised iron cowl to 9 in. diameter vent-pipe. ..	10/-	2 10 0
	No., 7 .	Galvanised iron flanged inlet tubes, 14 in. x 4 in. x 10 in. .. .	6/-	2 2 0
	No., 31	Galvanised iron flanged inlet vents faces, 13 in. x 13 in.—lanterns	6/-	9 6 0
	No., 8 .	 Galvanised iron inlet hoppers, 16 in. x 17 in. x 8 in. over-all	7/6	3 0 0
	No , 6	Galvanised iron inlet tubes, 9 in. x 3 in , and 5 ft. 6 in. high over-all	12/-	3 12 0
	No., 15	 4 in diameter copper vent outlets, fitted with flanges at bottom and galvanised iron cowls at top	17/6	13 2 6
	No , 1	Galvanised iron bullseye vent, 20 in. diameter, through 9 in. stud wall, with rolled edge each side .	15/-	0 15 0
	No., 1	Galvanised iron vent all as last filled in with galvanised iron louvres	30/-	1 10 0
	No., 487	Zinc clips, galvanised screws and lead washers— skylight bars .	-/1½	3 0 11
	No , 2 ..	Refix only 4 ft. 6 in lengths of downpipe, solder connections, and supply new ears	2/6	0 5 0
	No , 1	Allow for altering and making good wastes from third floor of northern building, and refix traps complete .	...	3 0 0
	No , 1	Allow for carefully taking down range of lavatory basins, with all wastes, traps supply pipes, lavatory top and enclosure complete—stamp room'	.....	3 0 0
		Gas Service.		
37	Run ...	⅜ in. brass gas tube, and all joints, &c.	-/3	0 9 3
11	,, . .	½ in. black iron pipe, inclusive of all necessary tees, elbows, junctions, holdfasts, &c.	-/3	0 2 9
125	,, ..	¾ in. ,, ,, ,, ,, .	-/5	2 12 1
54	,, .	1 in. ,, ,, ,, ,,	-/7	1 11 6
4	,, ..	1¼ in. ,, ,, ,, ,, ...	-/8	0 2 8
	No., 4 .	Bronze gas brackets and cedar roses	5/-	1 0 0
	No., 1	Stop-cock, with movable key and brass flap in floor . . .	7/6	0 7 6
	No , 1	Allow for carefully disconnecting gas service, and taking down gas pipes in jobbing room to No 5 (twelve light gas rings and reflectors)	..	1 5 0
	No., 2	Allow for carefully taking down altering, adapting, and re-erecting gas main in Bent-street wing to rooms 83 ft. long		14 16 0
	No , 1	Allow for carefully taking down and disconnecting gas service pipes and twelve light rings and reflectors in No. 2 fount-room for insertion of girders, and afterwards re-erecting and supplying all deficiencies with new material .		3 10 0
	No , 1	Allow for temporary gas service to blast furnace, basement, with new pipes and connection complete . .		0 17 6
	No , 1	Allow for temporary gas service to antimony furnace and pan, making flues, and connecting same to forge flues .		0 17 6
	No , 1	Allow for temporary gas service in jobbing-room to No 5-12 light rings and reflectors, the pipes hung up to ceiling .		1 15 0
	No , 1	Allow for extending gas service from staircase to leather store and photographers' store on ground floor, supplying and fixing wall bracket and pendant, fitted with opal globes, including all cutting and making good, complete	....	3 6 6

					£ s. d
		No , 1	Allow for disconnecting and altering gas service in readers' room, first floor, by form lift, and making connection into strong room		1 5 0
		No , 1	Allow for temporary gas service to engraver's room from Government Printer's w.c 's .. .		0 15 0
		No , 1	Allow for cutting and disconnecting gas supply by Government Printer's w c , and inserting new connection from No. 2 fount room and refixing, complete		0 15 0
		No , 1	Allow for supplying and fixing 16 ft supl best asbestos mill-board under gas heaters		1 5 0
			Carried to Summary		1,614 17 3
			Plasterer		
yds	ft				£ s. d
750	0	Supl.	Cement, plain face, ½ in thick, with chamfered salient angles, jointed to imitate stonework	1/-	37 10 0
	162	,,	,, ,, circular	/3	2 0 6
	17	,,	,, ,, weathering	-/3	0 4 3
255	0	,,	Cement, plain face, ½ in thick, with chamfered salient angles, jointed to imitate stonework, in patching and making good	3/-	38 5 0
	37	,,	,, ,, circular	/4	0 12 4
	38	Run	Making good cementing over old pipe chase	/3	0 9 6
		No , 8	Cement moulded profiled, trusses, 10 in x 20 in on face, 4 in projection .	4/-	1 12 0
32	0	Supl	Hack off old plaster ceiling	/2½	0 6 8
159	0	,,	Hack off old plastered walls, and prepare for cementing	-/4½	2 19 8
			Carried to Summary		83 19 11
			Painter and Glazier		£ s d
3,965	0	,,	Twice limewhite on walls, &c	/2½	41 6 1
296	0	,,	Three coats asbestos paint on small corrugated iron, measured as though flat	/8	9 17 4
873	0	,,	Three coats Duresco on wood, &c	-/7	25 9 3
1,104	0	,, .	Three coats Duresco on small corrugated iron, measured as though flat	-/8	36 16 0
	314	Run	,, ,, on piping	-/1	1 6 2
2,454	0	Supl	Clean down, prepare, stop, and paint, three coats oil colour, on wood, &c .	-/9	92 0 6
	1,237	Run	,, ,, on architraves	/1	5 3 1
		No , 26	,, ,, on doors both sides		
		No , 31	,, ,, on closet doors, both sides		
		No , 6	,, ,, on lattice doors, both sides	4/-	24 16 0
		No , 58 .	,, ,, on pairs of sashes and frames, both sides		
		No , 3	,, ,, ,, with bars		
		No , 48	,, ,, on fan lights, both sides		
		No , 26	,, ,, ,, with bars		
		No . 12	,, ,, on roof sashes with bars, both sides		
		No , 100.	,, ,, on sashes with bars, both sides	4/-	69 12 0
		No , 93	,, ,, on lantern sashes, both sides		
		No , 15	,, ,, on photo gallery sashes, both sides		
		No , 36	,, ,, on consoles		
		No , 18	,, ,, on trusses and consoles		
486	0	Supl	Clean down, prepare, and paint three coats oil colour, on small corrugated iron, measured as though flat	-/10	20 5 0
2	0	,,	,, ,, on corrugated iron roofing ,,	1/-	0 2 0
147	0	,,	,, ,, on traegerwellblech ,,	1/6	11 0 6
	1,327	Run	,, ,, on eaves, gutter, down pipe, &c	-/4	22 2 4
	1,175	,,	,, ,, on iron bar	/1	4 17 11
		No , 48	,, ,, on iron columns		
		No , 10	,, ,, on large iron lift brackets or stays		
		No , 8	,, ,, on vent inlets, 16 in x 17 in x 8 in.	4/-	22 0 0
		No , 7	,, ,, on inlet tubes, 14 in x 4 in. x 10 in		
		No , 37	,, ,, on flushing cisterns		
		No , 4	,, ,, on cowls		
		No , 1	,, ,, on bull's eye vent	4/-	7 8 0
		No , 1	,, ,, on louvred bull's eye vent		
		No , 31	,, ,, on 13 in x 13 in inlet vents		
25	0	Supl	Clean down, prepare, and paint two coats of oil colour on old wood	-/9	0 18 9
		No , 1	,, ,, on old door, both sides	4/	0 8 0
		No , 1	,, ,, on iron cowl		
713	0	Supl	,, ,, on iron	-/9	26 14 9
3	0	,,	,, ,, on corrugated iron roofing, measured as though flat	1/-	3 0 0
47	0	,,	Clean down, prepare, and paint one coat of oil colour on old wood	-/6	1 3 6
1,311	0	,,	,, ,, of oxide paint on iron	/4	21 17 0
	10	Run	,, ,, on iron bar	-/1	0 0 10
147	0	Supl	Clean down prepare, stop, size, and twice varnish on wood	2/-	14 14 0
		No , 3	,, ,, on roses	-/6	0 1 6
		No , 53	,, ,, on balusters	1/-	2 13 0
		No , 6	,, ,, on newels	2/	0 12 0
66	0	Supl	Two coats vinegar and black lead on zinc work	/9	2 9 6
	570	Run	,, ,, on eaves, gutter, and down pipe	/4	9 10 0
	554	,,	,, ,, on 8 in x 4 in eaves gutter	-/4	9 4 8
	151	Supl.	Stippling glass to obscure	/1	0 12 7

ft.		*Glazier.*		£ s. d.
385	Supl.	21 oz. sheet-glass ...	-/4½	7 4 5
1,853	,,	26 oz. ,,	-/5½	42 9 4
378	,,	32 oz. ,,	-/6	9 9 0
64	,,	British polished plate-glass	2/6	8 0 0
1,458	,,	,, ,, ground	2/-	145 16 0
121	,,	$\frac{5}{16}$ in. rolled ribbed plate-glass, in 7 ft. 9 in. lengths	-/11	5 10 11
362	,,	$\frac{1}{2}$ in. rough plate-glass, in 8 ft. lengths	1/6	27 3 0
	No., 166..	Copper wire suspension pieces, 12 in. long	-/1½	1 0 9
	No., 11	Hacking out and removing old broken glass to panes of skylight, 1 ft. 5 in. x 7 ft. 9 in., in situ	2/-	1. 2 0
		Carried to Summary. ... £	... ..	733 0 8

SUMMARY.

	£ s. d.
General Bill	883 10 0
Excavator, labourer, and drainer	71 3 0
Mason and slater	1,390 15 3
Bricklayer	1,037 15 7
Carpenter and joiner	3,095 9 11
Ironmonger	89 11 10
Smith and founder	1,995 9 1
Plumber	1,614 17 3
Plasterer	83 19 11
Painter and glazier	733 0 8
	10,995 12 6

Credit—	£ s. d.	
Value of old materials	200 0 0	
Authority for closets	450 0 0	
,, alteration design main angle	600 0 0	
,, roofing felt	30 0 0	
		1,280 0 0
Total		9,715 12 6
Add for provisional sums as opposite		1,151 12 0
Comparative total ...		£10,867 4 6

		£ s d
Page 5—Contingencies		500 0 0
Pages 34, 35 {£1,020 / 595} for lifts		405 0 0
Page 40—Rolled joists		33 0 0
Cramps	{£56 0 0 / 4 18 0}	51 2 0
Hoop iron bond		32 0 0
Page 52—Surveyor		127 10 0
		£1,151 12 0

MEMO.—For comparative purposes all provisional amounts contained in the original bills of quantities should be added to the above total. This bill contains no such amounts.

F.

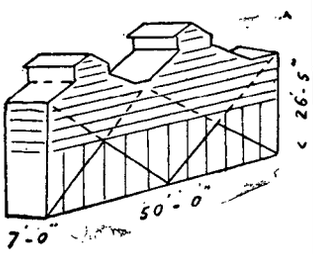
[Appended by the Committee]

MEASUREMENT of Alterations and Additions executed by day-labour at the Government Printing Office, Phillip and Bent streets, Sydney, but not inclusive of items covered by special authority (excepting alterations to design of main corner, roofing-felt, and closets and lavatories), for the Department of Public Works, Government Architect's Branch.

August, 1897.

NOTE.—References to original Bills of Quantities made $\frac{\text{ITEM}}{\text{PAGE}}$ · thus $\frac{2}{9}$ = the second item on page 9.

	Preamble to General Bill.		£ s. d.
	Allow for clerk of works' office, provided with the usual fittings complete $\frac{2}{2}$	... .	10 0 0
	Allow for carrying on the works without interference with the business of the office $\frac{3}{2}$	. . .	71 17 6
	Allow for underpinning cross wall of main angle in basement $\frac{4}{2}$		
	Allow for all risk of damage to property, or accidents to individuals, from whatever cause arising $\frac{5}{2}$		
	Allow for maintaining the works, making good all defects, and keeping same in thorough repair for twelve months after completion		
	Allow for entering upon the work whenever required, taking away all old material which remains the property of the Government $\frac{1}{4}$		
	Allow for providing, maintaining, and afterwards removing all necessary hoardings in accordance with municipal regulations $\frac{2}{4}$	...	12 0 0
	Allow for giving all notices, paying all fees &c, complying with municipal and all other regulations $\frac{3}{4}$	.....	10 0 0
	Allow for the use of all scaffolding, plant, &c, for the works ..... $\frac{5}{4}$	... ..	25 0 0

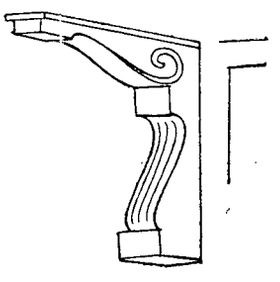
				£ s. d.
		Allow for water for the works with temporary supply, and pay all rates, &c.	.....	10 0 0
		Allow for providing all necessary closet accommodation for the men	.....	2 10 0
		Allow for the services of a watchman every night and Sunday during the progress of the works	.....	42 0 0
		Allow for removing all rubbish from the building and site, cleaning all windows, scrubbing all floors, and leaving the premises ready for occupation		
		Allow for work to adjoining premises	.....	10 0 0
		Allow for site for materials	.....	15 0 0
		Allow for temporary scaffolding and tarpaulins in every apartment where work is being performed, for protection of employees and machinery in motion.		
		 Allow for temporary wooden enclosure 50 ft. long x 7 ft. wide and 26 ft. 5 in. total height around girder in jobbing-room, cirse boarding same with 1 in. tongued and grooved boarding to contour of roofs, with similar flooring	.....	33 15 0
		Allow for carefully taking down roof, lead flats, iron principals, lantern lights, with all timbers, glass, and other works connected, disconnect down-pipes, cut and remove eaves gutters, strip slating, flashings, &c., over jobbing-room, 30 ft. x 33 ft. 8 in.	.....	30 0 0
		Allow for carefully taking down roof, &c., all as last described, over jobbing-room, 30 ft. x 20 ft.		
		Allow for carefully taking down roof with all timbers, ironwork, and other works connected, disconnecting down-pipes and eaves gutters, &c., complete over old numbering-room, 31 ft. 10 in. x 18 ft. 8 in.		
		Allow for carefully taking down roof, &c., all as last, over ruling-room, 58 ft. 5 in. x 26 ft. 2 in.		
		Allow for carefully taking down roof, &c., all as last, over stairwell next ruling-room, 15 ft. 10 in. x 26 ft. 2 in.		
		Allow for carefully taking down principal roof, &c., all as last, over Bent-street wing, 86 ft. 9 in. x 36 ft. 8 in.		
		Allow for carefully taking down iron principal roof, &c., all as last, over main angle, 40 ft. 8 in. x 40 ft. 1 in. extreme		
		Allow for carefully taking down principal roof, &c., all as last, disconnecting pipes, and removing tank over Phillip-street wing, 85 ft. 10 in. x 39 ft. 1 in		
Feet. 950	Run.	Cut away eaves of old roof complete for erection of new walls		
950	,, ...	Temporary galvanised sheet-iron guttering and capping over walls to protect rooms below, and include for all connections to down pipes	535 at 1/-	26 15 0
		Allow for carefully cutting through roofs, lead flats, lantern lights, &c., span for passage of wall of superstructure, and providing and fixing temporary flashings on each side		
		,, ,, ,, ,, over 20-ft. span, all as last described		
		Allow for cutting No. 8 openings in old roof of ruling-room for insertion of new cross-girders, including temporary flashings.		
		Allow for carefully taking down old boarded ceiling and timbers, &c., complete, over ruling-room, 57 ft. 3 in. x 23 ft. 10 in. including all necessary staging.		
		Allow for carefully taking down photo. gallery, lead flats, dark room, covered verandah, stairway, and landing over 33 ft. x 22 ft., including disconnecting and taking down all gas and water pipes, water-sprays, taking up lead floors, removing all office fittings, &c., &c., complete.		
		Allow for carefully taking down old store shed with half-glass front, iron roof, &c., &c., by goods lift in area.		
		Allow for carefully taking tank-stand between lavatory block and No. 2 fount-room, including cast-iron columns, girders, tanks, decking, and timbers of platform, about 10 ft. x 10 ft.; disconnecting and removing all pipes, &c., &c., including all staging and tackle, complete.		
		Allow for carefully taking down photographers' fittings, troughs, &c., in present sewing-room, disconnecting all pipes, and removing to photographers' new quarters.		
		Allow for cutting away and carefully taking down No. 2 old w.c's., with all old fittings, enclosures, flagging, &c., complete, relaying and making good slate floor, disconnecting soil-pipes, and inserting new cleaning screws and disconnecting and stopping all soil, waste, and supply-pipes, complete.		
		Allow for cutting away and carefully taking down lavatory range and enclosure in stamp-room, containing No. 1 urinal, No. 2 closets, and No. 2 lavatory basins and shelves, disconnecting and stopping all service and waste pipes, and making good and cementing damaged walls, range 8 ft. long and 5 ft. 6 in. wide.		
		Carried to Summary	.....	301 17 6

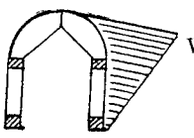
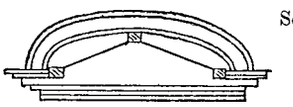
Yds.				£ s d.
		Excavator, Labourer, and Drainer		
8	Cube . . .	Excavation in rock in stanchion, foundations, and basketting out	2/-	0 16 0
7	„ . ..	Excavation in rock, about machinery in motion, and basketting out	2/-	0 14 0
8	„	Cement concrete in foundations to stanchions, well rammed	35/-	14 0 0
3	Supl.	Cement concrete in 6 in layer under floor, goods lift in area	6/-	0 18 0
8	„	„ „ „ about machinery in motion	6/-	2 8 0
3	„ .	Cement flooring 1 in. thick, floated to a smooth surface ..	2/-	0 6 0
8	„ ...	„ „ „ about machinery in motion	2/-	0 16 0
	No, 1	Cut and pin standard in old basement concrete floor and make good in cement	12/-	0 12 0
	No, 8	Cut away old basement concrete floor for foundations of stanchions, and afterwards make good cement paving around stanchions, floated smooth	12/-	4 16 0
	No, 1 ...	Cut out old concrete floor and make good with new, forming new channel gutter in same 10 ft long	5/-	0 5 0
	No., 1 .	Cut away asphalt gutter for seat of iron column, and afterwards make good asphalt around column base	10/-	0 10 0
Feet		*Drainer.*		
256	Run. .	6 in. diameter glazed earthenware drain pipe, jointed in cement and laid complete, inclusive of excavation, average 3 ft 6 in deep	1/6	19 4 0
	No, 1	Connect above with sewer in Bent street	... ..	1 0 0
	No, 7	4 in glazed earthenware gully traps, junctions, covers, and setting complete	10/-	3 10 0
	No, 7	9in glazed earthenware gully traps and junctions, covers, &c., complete - NOTE —The price allowed, 10s, is for 12 x 12 in original quantities	10/-	3 10 0
	No, 7 .	Cut out old D traps and sink-stones	5/-	1 15 0
	No, 7	Perforations through stone flagging in lane for down-pipes, including wrought-iron covers 18 in x 12 in. cut and fitted to down-pipe	5/-	1 15 0
38	Run.	Carefully take up stone flag paving for drains, and afterwards relay and make same good with cement joints	1/-	1 18 0
153	„	Carefully take up and afterwards relay stone guttering and adjoining stone cubes in roadway for drains	1/-	7 13 0
		Carried to Summary	.....	66 6 0
		Mason		
		Stone to be from an approved quarry, and to match as nearly as possible the existing stonework		
		Slate to be the best Welsh		
		Stone to be pointed with neat putty joints		
5	Cube	Freestone, and all labour in chiselled column bases	2'6	0 12 6
34	„ ...	„ „ in templates and corbels	2 6	4 5 0
89	„ ...	„ in chiselled window-sills	3,5	15 4 1
89	„ ...	„ in rubbed window-sills	3/7	15 18 11
427	„ ...	„ in rubbed pilasters on 2nd and 3rd floor, part with rusticated joints	3/-	64 1 0
16	„ ...	Freestone in rubbed pilasters all as last, with checked face	3/-	2 8 0
107	„ .	„ in making good rubbed pilasters, ground and 1st floors, in small pieces	3 6	18 14 6
82	„ ...	„ in rubbed window dressings, 2nd floor	3/1	12 12 10
85	„	„ in rubbed mullions, heads, and caps, 2nd floor . (Original price 2s 10½d)	3 1	13 2 1
393	„	„ in rubbed window dressings to 3rd floor semi openings	3 -	58 19 0
58	„	„ in rubbed window dressings to 3rd floor, square-headed openings . .	3/-	8 14 0
196	„	„ in rubbed window dressings and pediment, 3rd floor windows at main angle	3/-	29 8 0
921	„ .	„ in rubbed string on 3rd floor	3/10½	47 19 4½ / 130 9 6
45	„	„ in rubbed moulded trusses to string on 3rd floor	4/-	9 0 0
2,246	„ ...	„ in rubbed moulded main cornice	3/1	346 5 2
438	„	„ in rubbed moulded dentilled cornice	3/1	67 10 6
247	„	„ in rubbed moulded terminals and bases	3/1	38 1 7
339	„ ...	„ in rubbed blocking	3/1	52 5 3
36	„ ...	„ in name-tablet	3 1	5 11 0
154	„ ...	„ in rubbed moulded chimney caps	3/-	23 2 0
32	„ . .	„ in rubbed moulded scrolls between last	3/-	4 16 0
20	„ . . .	„ in rubbed moulded capping under last	3/-	3 0 0
74	„ ...	„ in 14 in walling, with chiselled faces	..	10 0 0
19	„	„ in chiselled moulded scrolls and spandril filling		
133	Run. . . .	6½ in x 11 in freestone, chiselled, weathered, and throated coping ..	3/-	19 19 0
39	„	Groove in stone sill for flashing and pointing with oil and cement .	1/-	1 19 0
	No, 1 ..	Carving name-tablet, 11 ft 8 in. x 3 ft. 1 in., overall	.....	10 10 0
	No, 15	Carving parapet terminals.		
		Jobbing Work, &c		
35	Cube	Freestone taken down, redressed, re-erected, and set complete .. .	1/6	2 12 6
8	„ ...	„ „ „ „ from pitched to rubbed face, re-erected and set complete	1/6	0 12 0
11	„	Freestone in foundations to machine pit, in piecing and making good, about machinery in motion, part old material	2/-	1 2 0
25	Supl.	6" freestone flagging in patching and making good, about machinery in motion	2/-	2 10 0
217	„	Labour only dressing from pitched to rubbed face, in situ ..... . (The material was considered to pay for cost of removal)	1/-	10 17 0
20	Run. ..	Carefully take down stone cornice and blocking 3 ft 3 in high, front walls.		
16	„	Carefully take down stone cornice at main angle (say) 7 ft high.		
	No, 2 ...	Carefully take down old stone chimney stack and cap at main angle		
	No., 1 ...	Carefully break out opening in old 18 in. wall from 5 ft. 5 in. x 6 ft. 6 in. to 10 ft. 10 in x 9 ft.	... .	4 0 0

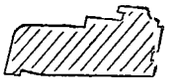
				£ s. d.
	No., 1 ...	Carefully take down blocking, parapet and scroll to ramp of southern wall of northern building.		
	No., 1 ..	Carefully take and remove old stone coping between chimney stack and water tower and afterwards reset same at higher levels . $\frac{5}{10}$		
	No , 18 ..	Carefully take down, protect, and afterwards clean, hoist, and reset moulded window heads to 2nd floor openings	10/- each	9 0 0
	No., 1 ..	Cutting back projection of main cornice of northern building at 4th floor level and making junction to new cornice.		
	No., 27 ...	Carefully cut old stonework 1 ft. 5 in x 1 ft , 5 in. deep for insertion of new, in situ	4/- each.	5 8 0
	No , 2 ...	Carefully cut old stonework 1 ft. 9 in x 1 ft , 14 in. deep for insertion of new, in situ	4/- each.	0 8 0
	No., 8 ...	Carefully cut old stonework 3 ft x 1 ft., 14 in. deep for insertion of new, in situ	4/- each.	1 12 0
	No., 4 ..	Carefully cut old stonework 2 ft. x 1 ft., 16 in. deep for insertion of new, in situ	4/-	0 16 0
	No., 4 ...	Carefully cut old stonework 3 ft. x 1 ft , 16 in. deep for insertion of new, in situ	4/-	0 16 0
	No , 1 ...	Carefully cut old stonework 1 ft. 9 in. x 1 ft , 17 in deep for insertion of new, in situ	4/-	0 4 0
	No., 2 ...	Working splayed check, 18 in. girt and 7 ft. high in old stonework in situ	7/-	0 14 0
	No , 1 ...	Carefully take down, rework, hoist, and reset in different place stone window dressings to openings 5 ft. 5 in. x 6 ft. 2 in.	.....	3 0 0
	No , 2 ...	6 in. x 18 in. freestone chiselled kerbs 12 in. long, in patching and making good about machinery in motion	6/- each.	0 12 0
	No., 1 ...	7 in. freestone chiselled winder 3 ft. 6 in. x 3 ft. 8 in. extreme, set in cement	2/6	0 2 6
	No., 1 ..	7 in x 18 in. freestone chiselled step, in patching and making good including cutting away old stone and brickwork for same From store	2/6	0 2 6
	No., 1 ..	Cut out joints, wash down, and repoint all old stonework through out	...	10 0 0
	No , 1 ...	Bond all old work with new		
		Carried to Summary	.....	£ 1,020 17 5 47 19 4½
		To Summary	.....	1 068 16 9½
		Bricklayer.		
		Bricks to be of the best quality, hard, sound, and laid wet		
		Double-pressed facing bricks must match those in existing work. .		
Rods 34	ft. 266	.....	Reduced brickwork in cement mortar in walling, the joints prepared for cementing, or neatly struck for lime whiting	12/15/-	446 5 0
4	223	....	Reduced brickwork in cement mortar, in patching and making good small pieces	13/15/-	65 6 3
	Yds. 275	Supl.	Allow for extra cost of facing new fronts and chimney-stacks with double pressed bricks	4/9	65 6 3
	275	,, ...	Washing down with spirits of salts, and neatly tuckpointing new fronts and chimney stacks in lime-putty	1/9	24 1 3
	372	,, ...	Rake out old joints, wash down with spirits of salts, and neatly tuckpoint old work in lime-putty	1/9	32 11 0
		No., 12..	Terra-cotta chimney-pots 12 in. x 12 in., set and flaunched in cement	10/-	6 0 0
		No., 178..	9 in. x 3 in. galvanised air-bricks	-/7	5 3 10
	Feet. 422	Supl.	*Jobbing Work, &c.* Draw, tooth, and bond old brick walls with new .. .. (This work was allowed for in original quantities, and the old materials were supposed to pay for removal)	-/6	10 11 0
	73	Run.	Carefully take down top courses of old 14 in. wall, and prepare top surface for new wall.		
	192	,, ...	Carefully take down 14 in. wall 10 in. high, and prepare top surface for new wall		
	90	,, ...	Carefully take down 14 in. wall 20 in. high, and prepare top surface for new wall.		
	32	,, ...	Carefully take down old 18 in. wall 10 in high, and prepare top surface for new wall.		
	34	,, ...	Carefully take down old 18 in wall 13 in. high and prepare top surface for new wall.		
	235	,, ...	Carefully take down old 18 in. wall 17 in high, and prepare top surface for new wall.		
	60	,, ...	Carefully take down old 18 in. cross-parapet wall at main angle and stone blocking		
		No , 1 ..	Carefully take down grates and mantels.		
		No , 3 ...	,, ,, grates, hearths, and mantels.		
		No., 1 .	Carefully take down 14 in. chimney-breast 5 ft. wide and 13 ft 10 in. high		
		No., 1 ...	Carefully take down 18 in. chimney-breast 3 ft 8 in wide and 11 ft high.		
		No , 1 ...	Carefully take down 18 in. chimney breast, 4 ft. 6 in. wide and 14 ft. high	20/-	1 0 0
		No , 2 .	Carefully take down 22 in. chimney breasts, and stacks 4 ft 4 in wide, 30 ft. high	30/-	3 0 0
		No , 1 .	Carefully take down chimney shafts 5 ft. 6 in x 5 ft. and 21 ft. high	25/-	1 5 0
		No , 1 ...	Carefully take down old 14 in. wall 6 ft 4 in. x 4 ft. about machinery in motion	15/-	0 15 0

				£ s. d.
	No, 1..	Carefully take down old 14 in. wall 17 ft. 8 in. x 3 ft. 8 in.	10/-	0 10 0
	No, 1..	,, ,, 14 in. wall 4 ft. x 6 ft. 6 in	6/-	0 6 0
	No., 1.	,, ,, 18 in. wall 2 ft 6 in x 8 ft.	5/-	0 5 0
	No, 1	,, ,, 18 in wall 4 ft x 7 ft 6 in.	6/-	0 6 0
	No., 1	,, ,, 18 in wall 9 ft. 8 in. x 3 ft. 8 in.	7/-	0 7 0
	No, 1.	Carefully take down old forge	.....	1 0 0
	No, 1.	Carefully take down old blast furnace		
	No., 1..	Carefully break out opening 5 ft. x 1 ft 6 in. in old 14 in. wall to suit new girder	... ..	1 6 0
	No, 1...	Carefully break out opening in old 14 in wall, 5 ft x 8 ft. 6 in.		
	No, 1.	Carefully break out and enlarge opening in old 14 in. wall from 2 ft. 7 in. x 9 ft. to 3 ft. 4 in. x 9 ft.	.....	0 2 6
	No., 1	Carefully break out and enlarge opening in old 14 in. wall from 5 ft. x 7 ft to 8 ft. x 7 ft. 5 in	.....	0 3 6
	No, 1.	Carefully break out and enlarge opening in old 14 in. wall from 4 ft. x 5 ft to 4 ft. 6 in. x 10 ft.	.....	0 5 0
	No., 1	Carefully break out opening in old wall 14 in. thick, to suit window in altered position (angle window at back in stamp room)	.....	1 10 0
	No., 1.	Carefully break out window opening in old 14 in wall to suit door in altered position (door from stamp room to lavatories)	.....	1 10 0
	No, 1...	Carefully break out opening 3 ft x 10 ft in old 18 in. wall	... ..	1 0 0
	No, 1	,, ,, 3 ft. 4 in. x 8 ft 10 in in old 18 in wall	... ..	1 0 0
	No, 1	,, ,, in old 18 in. wall from 4 ft. 6 in. x 7 ft 6 in to 6 ft x 11 ft	.....	1 5 0
	No, 1	Carefully break out foundation-wall of northern building, and make good with brickwork in cement	... .	0 15 0
	No, 1	Cut back face of old brickwork 2 ft 6 in. x 5 ft. for a depth of 3 in. for running new lift weights	... .	0 7 6
	No, 1	Cut back face of old brickwork 1 ft. x 15 ft 10 in for a depth of 5 in for lift cylinder	... ..	1 4 0
	No, 1.	Cut back face of old brickwork 5 ft x 13 ft 10 in. for a depth of 5 in.	.....	1 15 0
	No., 8..	Cut back face of old brickwork 2 ft. x 1 ft for a depth of 14 in for insertion of new stonework, in situ front pilasters	....	1 0 0
	No, 4.	Carefully cut away brickwork of parapet walls, prepare same as seatings for iron columns, and make good in brickwork, &c., complete	2/-	0 8 0
	No., 10..	Carefully cut back face of old brickwork for iron lift guide stays, to bring same into perfect alignment	1/6	0 15 0
	No., 52	Drill holes in old walls for bolts, and make good	1/6	3 18 0
	No, 21	Mortices in old walls for floor joists, &c., and make good in brickwork in cement	1/-	1 1 0
	No, 8.	Mortices in old walls for bolts and pinning in in cement	1/6	0 12 0
	No, 37	Perforations ,, ,, ,,	1/-	1 17 0
	No, 28...	Cut openings in old walls about 18 in. x 18 in. for insertion of washer plates	1/6	2 2 0
	No, 1.	Cut openings in old walls about 3 ft. 6 in x 4 ft. for flanges of vent flue	6/-	0 6 0
	No, 1	Perforation through old 14 in. wall, and making good brickwork, cementing, &c., disturbed	6/-	0 6 0
	No, 15	Perforation through old 18 in. walls, and making good brickwork, cementing, &c, disturbed	3/-	2 5 0
	No, 2	Make good and cement old holes in walls	2/6	0 5 0
	No, 1	Carefully take down strong room door, 3 ft. 10 in. x 6 ft 7 in, and frame, remove, and refix in different place	40/-	2 0 0
	No., 2...	Carefully take down and remove iron fire-proof doors in southern wall of northern building	20/-	1 0 0
	No, 1.	Provide and build brick forge, 3 ft. 6 in. x 3 ft. 6 in by 2 ft. 9 in high over all, finished with 6 in. chiselled stone hearth, &c. complete	.....	3 14 0
Feet.		*Urinals*		
147	Supl.	1¼ in. slate, rubbed one side urinal, backs and ends $\frac{7}{10}$	2/6	18 7 6
44	,,	1¼ in. slate, rubbed both sides urinal divisions $\frac{7}{10}$	2/6	5 10 0
95	Run	Labour to rounded edge $\frac{9}{10}$		
	No, 272...	Holes, &c, for screws.		
	No, 24.	Rounded corners.		
		Lavatories.		
77	Supl.	1¼ in. slate rubbed lavatory top $\frac{9}{17}$	2/6	9 12 6
43	Run.	Labour to rounded edge $\frac{4}{10}$	-/2	0 7 2
	No., 18	Perforations for taps	-/6	4 19 0
	No, 18	Dished holes, 14 in. diameter, for basins $\frac{8}{10}$	5/-	
		Steps.		
7	Run.	1½ in. x 16 in slate rubbed step, morticed for door frames	3/1	1 3 4
17	,,	1¼ in. x 15 in. ,, ,, ,,	3/1½	2 13 1½
7	,,	1¼ in x 21 in. ,, ,, ,,	4/4½	1 10 7½
23	,,	Labour to rounded edge on 1¼ in. slate.		
7	,,	,, ,, 1½ ,,		
Yds.		*Lavatory Floors.*		
147	Supl	Traegerwellblech lapped two corrugations at sides, including all perforations for soil and other pipes, &c, measured net	7/-	51 9 0
147	,,	Cement concrete floor average 6 in thick, with top arranged to falls	6 -	44 2 0
147	,,	Cement floor 1 in thick laid to fall	2/6	18 7 6
Feet.				
143	Run.	Labour forming hollow gutter 4 in. wide in above $\frac{13}{17}$		

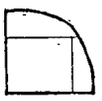
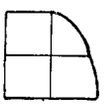
					£ s. d.
	Feet.		*Bridge.*		
	23	Supl.	No. 24 gauge galvanised corrugated roofing iron, properly lapped at sides	-/6	0 11 6
	17	„	Cement concrete floor, average 3 in. thick, with top set to fall	.....	0 12 0
	17	„	Cement floor 1 in. thick laid to falls	.....	0 5 0
	22	Run.	1½ in. galvanised iron-pipe handrail, including bends and screwed ends	2/6	2 15 0
		No., 4.....	5 in. diameter tapped roses screwed to wood	3/-	0 12 0
			Roofing.		
			Removing, clearing, battens and nails, slating, rendering, 15s.		
Sqs.	ft.				
42	12	Supl.	Countess slating, 20 in. x 10 in. from stock, on and including 3 in. x 1 in. new battens	15/-	31 12 0
13	39	„	Countess slating all as last described, but laid vertical	17/-	11 4 6
23	22	„	Rendering soffits of slating in hair mortar.		
			Carried to Summary	.....	903 4 10
			Carpenter and Joiner.		
			Flooring.		
	28,654	„	1 in. hardwood in 9 in. x 3 in. floor joists, and trimmers, &c. ..... $\frac{5}{18}$	13/- /	186 5 0 / 2 0 6
	579	„	1 in. hardwood in wall plates, lintol, &c.	13/-	3 15 0
	25	„	1 in. hardwood in plate bolted to girder	13/-	0 3 3
	68	„	1 in. Oregon in „ „	15/-	0 10 1
	209	„	1 in. hardwood in wrought and chamfered girder, &c.	20/-	2 2 0
117	67	„	1¼ in. tallow-wood tongued and grooved flooring in 4 in. widths... $\frac{7}{18}$	20/3	149 10 3
12	0	„	1¼ in. „ „ „ all as last, in patching and making good small pieces ..... $\frac{4}{10}$	20/3	12 3 0
2	48	„	1¼ in. Colonial beech tongued and grooved flooring in 4-in. widths	32/-	4 0 0
25	13	„	1 in. kauri tongued and grooved flooring in 4 in. widths	27/6	33 19 0
7	23	„	Cut out and take up old flooring	2/6	0 18 0
	84	„	„ „ and joists	5/-	0 4 0
	13	Run.	Cut back old flooring for bearing.		
			Tilling opening on 3rd floor.		
	31	Supl.	1 ft. hardwood, framed in studding and bearers	20/-	0 6 6
	111	„	1 in. Oregon wrought, one side tongued and grooved, boarding in 6 in. widths	18/-	1 0 0
			Roof and walling of composing-room and main angle.		
	99	„	1 in. Oregon in 8 in. x 1½ in. valley boards	15/-	0 15 0
	2,809	„	1 in. Oregon, framed in 4 in. x 3 in. plates, &c.	15/-	21 0 0
	2,470	„	1 in. „ „ 6 in. x 3 in. studs, &c.	15/-	18 10 0
	6,110	„	1 in. „ „ 6 in. x 4 in. purlins, hips, &c.	16/-	48 17 8
	19	„	1 in. „ „ 6 in. x 6 in. angle posts	15/-	0 3 0
	19	„	1 in. „ „ 6 in. x 6 in. splayed angle posts	15/-	0 3 0
	93	„	1 in. „ „ 8 in. x 3 in. hips	15/-	0 15 0
	1,039	„	1 in. „ „ 8 in. x 6 in. head	15/-	7 16 0
	136	„	1 in. „ „ 3 in. x 2 in. studs and bearers	15/-	1 0 0
	20	„	1 in. „ „ 4 in. x 3 in. studs cut to shape and plugged to wall	15/-	0 3 0
	143	„	1 in. hardwood in 4 in. x 3 in. gutter plate	13/-	0 19 6
	24	„	1 in. Oregon, framed in 12 in. x 2 in. wrought stud	20/-	0 5 0
	40	„	1 in. Oregon, framed in 5 in. x 2 in. wrought all round trimmer ...	20/-	0 8 0
	314	„	1 in. Oregon, framed in 10 in. x 3 in. wrought all round hip	20/-	3 3 0
	864	„	1 in. Oregon, framed in 4 in. x 3 in. wrought all round, and stop chamfered rafter	20/-	8 13 3
	390	Run.	6 in. x 2 in. Oregon, framed rib circular	20/-	4 5 6
	172	„	14 in. x 2 in. redwood, framed and wrought sill	22/-	1 18 6
	120	„	6 in. x 4 in. Oregon, wrought, rebated, and double-beaded frame ...	20/-	1 4 0
	93	„	6 in. x 4 in. Oregon, wrought, rebated, double-beaded mullion	20/-	0 18 6
	85	„	6 in. x 4 in. hardwood, sunk, weathered, double-beaded and throated sill	20/-	0 17 6
	21	„	2½ in. x 1 in. redwood double-moulded fascia	6/-	0 1 3
	167	„	6 in. x 1 in. redwood beaded fascia	-/2½	1 14 9
	27	„	7 in. x 1 in. redwood double-moulded fascia	-/3	0 6 9
	5	„	9 in. x 1 in. „ „ „	-/4	0 1 8
	94	„	9 in. x 1 in. redwood moulded fascia and backings, 3 in. x 1 in. capping and scotia moulding under same	1/-	3 2 8
	61	„	4 in. x 2½ in. redwood rounded window nosing	-/4	1 0 4
	291	„	Wood-blocking 15 in. high 6½ in. projection for zinc cornice	-/4	4 17 0
	56	„	„ 24-in. high 9 in. projection	-/6	1 8 0
		No., 1.....	1 in. redwood wrought and chamfered spandril 13 ft. 3 in. x 1 ft. 6 in.	1/6	1 10 0
		No., 1.....	„ „ „ 13 ft. 9 in. x 1 ft. 10 in.	1/6	1 19 0
		No., 18 ...	Cedar-moulded, fluted, and carved trusses and consoles, 12 in. wide on face, 2 ft. 9 in. high, and 2 ft. 6 in. projection	2/10/-	45 0 0



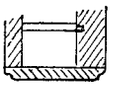
				£ s. d.
	No, 3 ..	 Wood-framed, semi headed dormer roof vents, with cut ribs, studs, battening and felt, the inside covered with perforated zinc secured with mouldings	4/-	12 0 0
	No, 1	 Segmental head to dormer window, with all rafters, bearers, trimmers bracketing, blocking, boarding, &c, complete, 6 ft. 3 in x 1 ft 6 in on face, and 1 ft 6 in. projection	40 -	2 0 0
	No, 12 ...	Segmental head to dormer window, with all rafters, bearers, trimmers, bracketing, blocking, boarding, &c, complete, 9 ft. 6 in x 1 ft 6 in on face, and 2 ft 4 in. projection	60/-	36 0 0
	No, 15 ..	2 in cedar moulded sashes 3 ft x 2 ft 5 in.	9/-	6 15 0
	No., 4	2 in. „ 4 ft 1 in x 2 ft 5 in.	12/6	2 10 0
Feet		*Lanterns.*		
161	Supl.	1 in. Oregon framed in 3 in. x 2 in. plate, &c.	15 -	30 15 0
2,244	„ . .	1 in. „ in 4 in. x 3 in „		
333	„	1 in. „ in 6 in. x 4 in. „		
1,361	„ .	1 in. „ in 8 in x 6 in „		
330	Run	4 in. x 3 in. Oregon wrought, rebated, and beaded head	18/-	8 3 0
128	„ .	6 in. x 3 in Oregon wrought all round and four times chamfered tie beam		
101	„	6 in x 4 in Oregon wrought double rebated, and four times beaded mullion		
6	„ .	6 in. x 6 in Oregon double rebated angle mullion ...		
341	„ . ..	6 in x 4 in Oregon sunk, weathered, and throated sill . . .		
321	, ..	1½ in x 1 in redwood bed mould	-/2	2 13 6
321	„ .	2 x 2 redwood bed mould	-/2	2 13 6
362	„ .	3 x 2 „ cornice	4	6 0 8
321	„ ...	2 x 1 „ fascia	-/1	1 6 9
324	„ ...	6 x 1 „ beaded fascia	-/2½	3 7 6
321	„	15 x 1 „ wrought fascia	-/6	8 0 6
321	„	3½ x 1½ „ rounded window board	-/3	4 0 3
	No, 3	2 in sugar pine moulded sashes, 2 ft 9 in x 2 ft 6 in.	9/-	1 7 0
	No., 28 ..	2 in. „ „ 3 ft. 3 in x 2 ft 6 in	10/-	14 0 0
	No., 14 ...	2 in. „ „ 3 ft. 4 in x 2 ft 6 in. . ..	10/-	7 0 0
	No, 32	2 in. „ „ 3 ft. 5 in x 2 ft. 6 in .	10/-	16 0 0
	No, 16 .	2 in. „ „ 3 ft 6 in x 2 ft. 6 in	10/-	8 0 0
	No, 36	Cedar moulded built up trusses and brackets, 7 in wide on face, 36 in. high, and 7 in projection	10/-	18 0 0
		Turret.		
289	Supl. ..	1 in. Oregon framed in 4 in x 3 in. joists, &c.	16/	5 6 9
272	„ ..	1 in. „ in 6 in x 3 in. studding		
66	„ ...	1 in. „ in 5 in x 3 in joists cut to fall		
8	„	1 in. „ in 3 in x 2 in plate		
263	Run.	9 in. x 1½ in. Oregon framed ribs cut to curve of turret dome ...	20/-	4 10 0
31	„ . .	4 in x 3 in. „ framed plate circular		
24	„	5 in. x 3 in. „ „		
94	„ ...	6 in. x 3 in. „ , ...		
32	„ ...	6 in. x 6 in. „ „ built up in three layers		
18	„ .	4 in. x 2 in redwood framed double moulded rib . .	26/6	1 1 0
29	„	5 in x 2 in , „ moulded rib, circular		
31	„	12 in x 1½ in. „ wrought sill for lead, circular ...		
29	„ ...	½ in x 5 in „ moulded fascia, circular	10/-	0 3 0
32	„ . .	½ in. x 6 in. „ „	10/-	0 3 0
143	„	1 in x 8 in. „ beaded fascia	-/3½	2 1 8½
29	„	1½ in x 1½ in. „ moulding, circular out of solid	-/8	0 19 4
17	„ ..	3 in x 2 in redwood moulding, circular	-/8	0 11 4
72	„	Blocking out for mouldings for coppersmith ...	-/6	1 16 0
38	„ .	Blocking and battening for main circular cornice, 15 in. high and 9 in projection	2/-	3 16 0
	No, 1..	Blocking and firring at base of vane for copper	3'-	3 0 0
	No, 8	Wood blocking and casing fitted around iron stanchions, 4 ft. 6 in high, complete	15/-	6 0 0
	No., 8	12 in x 3 in. cut brackets, 24 in long to cap of dome	5,-	2 0 0
	No, 1 .	4 in. x 4 in. Oregon wrought framed centre post, 11 ft 6 in. long, bored in its length for bolt	15/-	0 15 0
81	Supl.	¼ in. kauri tongued and grooved jointed lining in 4 in widths	27/6	1 2 0
189	„ ...	¾ in. kauri all as last, vertical to circular drum	-/9	7 1 9
73	„ ...	¾ in. kauri matched and beaded boarding	25/-	0 18 9
32	„	1 in Oregon boarding for lead, with shot edges .	20/-	0 6 8
317	„ .	1 in Oregon boarding, all as last, circular, circular to dome; add for all cutting and waste	65/-	10 5 10
68	„	1 in Oregon tongued and grooved boarding, in 6 in. widths, for lead	20/-	0 13 4
42	„ ...	1 in. Oregon, all as last, vertical to circular drum	65,-	1 6 0
		Roof and walling of Photo Gallery, dark rooms, &c, &c		
8,449	„	1 in Oregon, framed in studding of walls	16 -	100 4 0
4,072	„	1 in. Oregon, framed in rafters, collars, ceiling, joists, &c.		

	Feet.				£	s.	d.
	1,125	Supl.	1 in. Oregon framed in rafters, with wrought ends	20/-	20	0	0
	67	„	1 in. Oregon framed in wrought all round ridge				
	217	„	1 in Oregon, framed in wrought all-round, and stop-chamfered rafters and plates				
	111	„	1 in. hardwood framed, wrought all round brackets, plates, &c.				
	478	„	1 in. hardwood framed, wrought all-round and stop-chamfered posts, rafters, joist, plates, &c				
	88	„	1 in. hardwood, framed in studs	16/-	1	12	0
	115	„	1 in Oregon, framed in sill				
	58	„	¾ in. cedar scotia	-/1	0	4	10
	14	„	1 in redwood beaded stop	-/1	0	1	2
	10	„	3 in. x 1 in. redwood beaded fillet	-/1	0	0	10
	61	„	4 in x 1 in. „ chamfered fascia	-/2	0	10	2
	61	„	6 in. x 1 in. „ beaded fascia	-/2½	0	12	8
	24	„	10 in x ¾ in. „ „ „ cut and fitted around rafters	-/4	0	8	0
	40	„	3½ in. x 2 in. redwood moulded cornice	-/4	0	13	4
	241	„	4 in. x 3 in. Oregon base mould, with splayed top, plugged to wall	-/5	5	0	5
	58	„	4 in x 1½ in. cedar rounded window nosing	-/4	0	19	4
	712	„	4 in. x 3 in. Oregon double rebated, double moulded, and double throated skylight bar	-/3	8	18	0
	47	„	5 in x 3 in. Oregon double rebated, double moulded, and double throated skylight hip	20/-	0	11	9
	61	„	8 in. x 6 in Oregon wrought, rebated, and double moulded head	20/-	2	8	8
	22	„	5 in x 4 in. hardwood rebated and double beaded frame	20/-	0	6	3
	61	„	 6 in. x 5 in. hardwood rebated, double sunk, double throated, beaded, and three times moulded transom	20/-	1	10	6
	9	„	8 in. x 4 in. hardwood sunk, weathered, and throated sill	20/-	0	4	10
	58	„	 10 in. x 4 in. hardwood sunk, weathered, rebated, grooved, and moulded sill	20/-	2	8	7
		No., 1	Holing ridge of photographic gallery for ventilation and dressing lead covering to suit.				
		No., 3	2 in cedar moulded fanlight, 3 ft x 3 ft	1/3	1	13	9
		No, 13	2 in. „ „ 3 ft. 7 in x 3 ft	1/3	8	15	6
		No, 1	2 in cedar moulded casements, 1 ft 10 in x 2 ft. 11 in, divided with moulded bars into 2 lights	1/3	0	7	0
		No., 2	2 in cedar moulded casements, 2 ft 5 in. x 2 ft 11 in., with moulded bars into 2 lights	1/3	0	18	6
		No., 2	2 in. cedar moulded sashes, 3 ft x 5 ft., divided with moulded bars in 4 lights	1/3	1	17	6
		No., 13	2 in cedar moulded sashes, 3 ft. 7 in. x 5 ft. with moulded bars in 4 lights	1/3	14	12	6
	139	Run.	 6 in. x 4 in Oregon double rebated, double throated and four times moulded mullion	-/6	3	9	6
	37	„	 6 in. x 6 in. Oregon double rebated, double throated and four times moulded mullion, frame next wall	-/6	0	18	6
Sqs.	ft.		*Roof, Sheathing, &c.*				
19	86	Supl.	1 in Oregon tongued and grooved roof boarding	16/-	15	17	9
14	74	„	1 in Baltic, wrought one side, tongued and grooved beaded boardings	20/-	14	14	9
	57	„	1 in redwood wrought both sides gutter boarding	-/3	0	14	3
	501	„	1 in. tongued and grooved wrought gutter boarding, and 3 in. x 2 in bearers, 8 extra for cesspool outlets	-/4 2/6	8 1	7 0	0 0
	8	„	1½ in tongued and grooved wrought gutter boarding, and bearers	-/4	0	2	8
	11	„	1 in. Baltic wrought, matched, and beaded both sides boarding in 6 in. widths	21/-	0	2	6
1	80	„	¾ in kauri wrought one side soffit lining to eaves	20/-	1	16	0
8	21	„	¼ in. Baltic matched and beaded boarding in 6 in widths, lining soffit of eaves	20/-	3	4	3
	Yds.						
	603	„	¼ in. best roofing-felt, properly lapped at all joints, measured net	1/-	30	3	0
	584	„	Galvanised wire-netting, 1 in. mesh, securely fixed with staples	-/5	12	3	4
	Feet.		*Lining, &c*				
	625	„	1 in Oregon framed in studding	16/-	5	0	0
	38	„	Cradling to girders	16/-	0	6	6
1	66	„	⅜ in. kauri matched and beaded ceiling lining	20/-	1	13	4
6	91	„	¼ in. „ „ „ from store	9/-	3	2	6
	66	„	¾ in. „ „ „ „ new from store in patching and making good	22/-	0	14	8
19	78	„	¾ in. kauri tongued and grooved and V-jointed boarding in 4 in widths	22/-	21	15	6
53	26	„	¾ in. kauri, all as last on and including 3 in. x 1 in. battens	24/-	63	18	0

Sqs.	ft.				£ s. d.
	83	Supl.	1 in. kauri tongued and grooved and V-jointed boarding in 4 in. widths	25/-	1 0 0
	63	,,	¾ in redwood matched and beaded boarding in 6 in. widths and backings plugged to walls	22/-	0 14 6
	70	,,	¾ in redwood matched and beaded girder casing	22/-	0 15 6
	66	,,	1 in. ,, ,,	25/-	0 16 8
32	85	,,	No. 26-gauge small corrugation galvanised iron lining, lapped and screwed and measured net	24/-	39 8 8
18	92	,,	No 26-gauge small corrugation galvanised iron lining, lapped and screwed and measured net, all as last on and including battens	27/-	95 6 0
51	68	,,	No. 26-gauge small corrugation galvanised iron lining, lapped and screwed, bent circular		
	432	Run.	¾ in redwood bed-mould	-/1	1 16 0
	632	,,	1 in. ,, scotia moulding	-/1	2 12 8
	99	,,	1¼ in. ,, ,,	-/1½	0 12 4½
	257	,,	2 in. ,, ,,	-/2	2 2 10
	68	,,	1½ in. ,, angle bead	-/1½	0 8 6
	180	,,	2 in. x 2 in. redwood cornice moulding	-/2	1 10 0
	367	,,	2 in. x 2 in. ,, quadrant floor fillet	-/2	3 11 2
	12	,,	2½ in. x 2 in. ,, floor fillet	-/2	0 2 0
	488	,,	3 in. x 2 in. ,, cornice moulding	-/3	6 2 0
	179	,,	1½ in. x 1 in. ,, quadrant fillet circular	-/1½	1 2 4½
	516	,,	1½ in. x ¾ in. ,, moulded stop	-/1	2 3 0
	87	,,	2½ in. x ¾ in. ,, ,,	-/2	0 14 6
	308	,,	2½ in. x ¾ in. ,, ,, circular	-/4	5 2 8
	25	,,	2 in. x ½ in kauri doubled moulded stop	-/1	0 2 1
	6	,,	2 in. x 1 in. Oregon beaded fascia	-/2	0 1 0
	13	,,	6 in x 1 in. ,, ,,	-/2	0 2 2
	10	,,	10 in. x 1 in. ,, ,,	-/3	0 2 6
	59	,,	4 in x ¾ in. redwood moulded fascia	-/2	0 9 10
	41	,,	¾ in. x 2½ in. chamfered skirting	-/1½	0 5 1½
	451	,,	¾ in. x 3 in. moulded skirting	-/2	3 15 2
	8	,,	1 in x 6 in. moulded skirting in making good	-/2	0 1 4
		No, 1	Ledged ceiling trap of ¾ in. kauri pine, V-jointed, with lining &c, complete	10/-	0 10 0
		No., 1	Hardwood wrought packing piece, about 24 in. x 6 in. x 4 in.	1/-	0 1 0
			Door Frames and Linings.		
	197	Supl.	1½ in cedar double rebated jamb linings	-/8	6 11 4
	33	Run.	4 in. x 4 in. Oregon wrought, rebated, and beaded frame	-/8	1 2 0
	4	,,	4 in x 4 in ,, ,, ,, circular	1/-	0 4 0
	7	,,	4 in x 2 in. Oregon beaded transom	-/2	0 1 2
	6	,,	5 in x 4 in. ,, moulded transom	.....	0 2 6
	3	,,	6 in. x 2 in ,, splayed transom capping	-/3	0 0 9
	12	,,	4 in. x 2 in. redwood transom moulding	-/2	0 2 0
	12	,,	5 in x 2½ in. ,, ,,	-/3	0 3 0
	160	,,	5 in x 3 in. hardwood rebated, moulded, and beaded door frame	-/6	4 0 0
	46	,,	5 in. x 4½ in. ,, rebated and moulded frame	-/9	1 14 6
	8	,,	5 in x 4 in. ,, moulded and double rebated transom	-/9	0 6 0
	27	,,	5 in x 3 in. ,, double rebated, double moulded, and double beaded mullion	-/7	0 15 9
	7	,,	5 in x 3 in hardwood, sunk, weathered and throated sill	-/4	0 2 4
	10	,,	6 in x 3 in hardwood, sunk, weathered, and rebated sill	-/5	0 4 2
	4	,,	9 in. x 3 in. hardwood, rounded edge door-sill, grooved for water bar	-/9	0 3 0
	15	,,	12 in x 3 in. ,, ,, ,,	-/9	0 11 3
	9	,,	12 in x 3 in. hardwood wrought and framed gate head, with old stops planted on same	-/9	0 6 9
		No, 1	Hardwood wrought and shaped cleat for bolt	1/-	0 1 0
	14	Run.	4 in x 2 in. cedar beaded transom	-/6	0 7 0
	7	,,	5 in x 2 in ,, ,,	-/7	0 4 1
	21	,,	Pine splayed weather fillet, screwed to doors	-/6	0 10 6
			Doors		
		No., 10	2 in sugar pine four panel doors, 2 ft. 8 in. x 6 ft. 8 in, moulded one side and bead flush the other	25/-	12 10 0
		No., 2	2 in sugar pine three-panel doors, 2 ft. 10 in. x 6 ft. 10 in, bead-butt one side and moulded the other, the upper panel divided with moulded bars into 4 lights	27/-	2 14 0
		No, 2.	2 in sugar pine three-panel doors, 2 ft. 8 in x 6 ft. 10 in., moulded both sides, the upper panel divided with moulded bars into 4 lights	27/-	2 14 0
		No, 4.	2 in. sugar pine three panel doors, 3 ft. x 7 ft., all as last described	30/-	6 0 0
		No, 3	2 in sugar pine three panel doors, 3 ft x 7 ft, bead flush one side and moulded the other, the upper panel divided with moulded bars into 4 lights	30/-	4 10 0
		No, 2	2 in sugar pine three-panel doors, 3 ft. x 7 ft, all as last described, but bolection moulded one side	30/-	3 0 0
		No., 1	2 in sugar pine four-panel door, 3 ft. x 8 ft, bead-flush one side and moulded the other, the upper panel divided with moulded bars into 2 lights	34/-	1 14 0
		No, 1..	Pair 2 in sugar pine folding doors, 3 ft. 6 in x 7 ft over all, each leaf in 2 panels, bead butt one side and moulded the other, the upper panels for glass, each divided with moulded bars into 2 lights, diminished stiles, rebated and beaded where meeting	40/-	2 0 0
		No, 1	1½ in. redwood two-panel door, 2 ft 9 in x 5 ft, the panels filled in with 1 in x ⅛ in wrought lattice work, secured with beads (form lift)	25/-	1 5 0
		No., 4...	1½ in. redwood lift sliding doors, 3 ft 3 in. x 4 ft. 2 in., all as last	23/-	4 12 0
		No, 1 .	1½ in redwood two panel beaded sliding-door, 6 ft x 5 ft. 6 in., the panels filled in with wrought lattice, &c, as last	40/-	2 0 0
		No., 2	2 in redwood moulded fanlights, 3 ft x 2 ft.	7/6	0 15 0
		No., 1	2 in. ,, ,, 2 ft. 8 in. x 2 ft, with segmental head	6/8	0 6 8

				£ s. d.
No., 2 ...	2 in. cedar, moulded fanlights, 2 ft. 10 in. x 1 ft. 5 in.	6/-	0 12 0
No., 4 ..	2 in. „ „ 3 ft. x 1 ft. 6 in.	6/-	1 4 0
No., 3 ...	2 in. „ „ 3 ft. x 1 ft. 9 in.	6/8	1 0 0
No., 1 ...	2 in. „ „ 3 ft. 6 in. x 1 ft. 9 in.....	7/6	0 7 6
	Windows.		
No., 9 ...	Pairs 2 in. moulded cedar sashes, double hung with best brass-faced axle pulleys, patent lines and iron weights, in cedar box frames, and rebated and weathered hardwood cills; box frames to have 1½ in. pulley stiles, 1¼ in. heads, 1 in. beads and stops, ⅜ in. parting slips, and ¾ in. linings, each 21 ft. 11 in., sup.	2/9	27 4 6
No., 1 ...	„ „ „ 24 ft. 10 in., sup.	2/9	3 8 9
No., 1 ...	„ „ „ 25 ft. 10 in., „	2/9	3 11 6
No., 2 ...	„ „ „ 31 ft. 5 in., „	2/9	8 11 6
No., 1 ...	„ „ „ 45 ft. 5 in., „ measured over all, semi-headed	2/9	6 5 0
No., 1 ...	„ „ „ 46 ft. 6 in., sup., measured over all, semi-headed	2/9	6 7 9
No., 2 ...	Pairs 2 in. cedar moulded sashes and framed, all as first described, each sash divided with moulded bars into No. 6 light, 28 ft. 6 in., sup.....	3/-	8 11 0
No., 1 ...	Pairs 2 in. cedar, moulded sashes and frames, all as last item, each sash divided with moulded bars into No. 2 lights, 25 ft. 6 in., sup., from store.....	2/9	3 10 1½
No., 1 ...	Pairs 2 in. redwood sashes and frames, all as first described, 27 ft. sup.....	2/-	2 14 0
No., 6 ...	Openings, each containing No. 2 pairs 2 in. cedar moulded sashes and cased frames, all as first described, with cased mullion to match, each 51 ft. 2 in., sup.	2/9	42 4 6
No., 1 ...	Opening, all as last item, 56 ft. 2 in. sup.	2/9	7 14 6
No., 7 ...	Openings, „ 57 ft. 4 in. „	2/9	55 3 8
No., 7 ...	„ „ 58 ft. „	2/9	56 16 6
No., 1 ...	2 in. cedar moulded sash, 3 ft. x 3 ft. 9 in, divided with moulded bars into No. 4 lights	1/3	0 11 3
No., 1 ...	2 in. „ 3 ft. x 5 ft. 2 in., in No. 4 lights	1/3	0 15 6
No., 9 ...	2 in. „ 5 ft. x 2 ft. 7 in., in No. 8 „	1/3	5 17 0
No., 9 ...	2 in. „ 5 ft. x 3 ft. 5 in., in No. 3 „	1/3	7 13 0
No., 18 ...	 2 in. cedar moulded sash, 1 ft. 11 in. x 1 ft. 10 in., in No. 3 lights, with circular side	6/-	5 8 0
No., 18 ...	 2 in. cedar moulded sash, 2 ft. 8 in. x 3 ft. 5 in., in No. 4 lights, with circular side	12/-	10 16 0
No., 1 ...	2 in. redwood, moulded sash, 3 ft. x 5 ft. 2 in., divided with moulded bars into No. 4 lights	12/6	0 12 6
No., 3 ...	2 in. redwood moulded sash, 3 ft. 8 in. x 4 ft. 11 in., divided with moulded bars, in No. 4 lights	-/10 to 15/-	2 5 0
No., 24 ...	2 in. cedar moulded casements, 1 ft. 6 in. x 4 ft. 2 in., divided with moulded bars into No. 3 lights	1/3	9 12 0
No., 2 ...	2 in. „ „ 1 ft. 9 in. x 5 ft. 7 in. in No. 2 lights	12/3	1 4 6
No., 2 ...	2 in. „ „ 2 ft. 2 in. x 4 ft. 1 in. in No. 3 lights	11/3	1 2 6
No., 12 ...	2 in. „ „ 3 ft. x 4 ft. 2 in. in No. 6 lights	15/8	9 8 0
No., 2 ...	2 in. redwood „ 1 ft. x 9 in. x 6 ft. 2 in. in No. 2 lights	9/-	0 18 0
No., 2 ...	1¾ in. redwood moulded fixed sash (borrowed light), 2 ft. 7 in. x 2 ft. 7 in. each, divided with moulded bars into No. 2 lights.....	5/-	0 10 0
No., 16 ...	1¾ in. „ „ fanlights, 3 ft. 2 in. x 1 ft. 7 in. each, divided with moulded bars into No. 3 lights.....	4/6	3 12 0
No., 2 ...	1¾ in. „ „ „ 3 ft. 8 in. x 1 ft. 7 in. in No. 3 lights	5/-	0 10 0
No., 37 ...	Allow for setting box frames in green baize and white lead.....	2/6	4 12 6
No., 40 ...	„ „ „ „ in cement		
ft. in.			
46 0	Run. ..... 4 in. x 3 in. Oregon double rebated and double beaded frame and beads	25/-	0 11 6
337 0	„ ..... 6 in. x 3 in. hardwood rebated and double beaded frame.....	25/-	6 6 3
61 0	„ ..... 6 in. x 4 in. „ „ „ „	25/-	1 10 6
179 0	„ ..... 5 in. x 4 in. cedar „ „ moulded frame, circular...	2/-	17 18 0
148 0	„ ..... 6 in. x 4 in. „ „ „ beaded frame	1/2	8 12 8
90 0	„ ..... 6 in. x 5 in. „ sunk weathered, double rebated, and double moulded transom	1/4	6 0 0
70 0	„ ..... 8 in. x 4 in. hardwood, sunk, weathered, and throated transom	25/-	2 6 6
101 0	„ ..... 5 in. x 4 in. „ „ double rebated, moulded, grooved, and throated sill	25/-	2 2 0
10 0	„ ..... 6 in. x 4 in. „ „ „ „	25/-	0 5 0
106 0	„ ..... 6 in. x 3 in. hardwood sunk, weathered, rebated, grooved, and beaded sill	25/-	1 11 9
107 0	„ ..... 5 in. x 4 in. cedar double rebated, double throated, and four times moulded mullion	1/-	5 7 0
8 0	„ ..... 1½ in. redwood transom moulding.....	-/2	0 1 4
60 0	„ ..... 2½ in. „ „	-/3	0 15 0
63 0	„ ..... 3 in. x 2¼ in. „ „	-/3	0 15 9

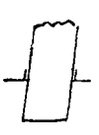
ft.	in.					£	s.	d.
			Skylight, &c., over Jobbing-room.					
518	0	Supl. ...	1 in Oregon framed in wrought, rebated, and moulded principals	20/-		5	3	7
216	0	Run. . .	4 in x 3 in Oregon double chamfered, double rebated, and double throated skylight bar	20/-		2	3	3
50	0	,, ...	6 in x 2½ in. ,, ,, wall plate to match	20/-		0	12	6
		No, 2 .	2 in redwood moulded sash, 3 ft 6 in. x 3 ft 1 in divided with moulded bars into No. 4 lights	9/-		0	18	0
		No, 1	,, ,, , 5 ft 2 in x 2 ft. 10 in. divided with moulded bars into No 6 lights	12/		0	12	0
		No, 2	, ,, ,, 3 ft 6 in x 6 ft. 10 in into No 6 lights	20/		2	0	0
		No., 1 ...	,, ,, ,, 5 ft 2 in x 1 ft 10 in into No 9 lights	20/-		1	0	0
		No, 2 ...	,, ,, , spandril sashes, 1 ft 10 in. x 3 ft. 3 in divided with moulded bars into No 4 lights	16/-		1	12	0
		No., 2	, ,, ,, ,, 5 ft. 1 in x 4 ft. 2 in. in No 6 lights	20/-		2	0	0
		No, 2 ...	,, ,, ,, 4 ft 10 in. x 5 ft 10 in in No. 8 lights	25/-		2	10	0
			Architraves, &c.					
578	0	Run.	3 in redwood moulded architrave	10/6		3	0	8
9	0	,, ...	,, ,, circular	-/8		0	6	0
39	0	,,	3½ in x 2 in redwood moulded architrave	-/3		0	9	9
23	0	,, ...	4 in x 1½ in. ,, ,, ...	-/2½		0	5	0
11	0	,,	4 in x 2 in ,, ,, ...	-/3		0	2	9
9	0	,, ...	4 in x 2 in , ,, circular	-/6		0	4	6
103	0	,,	6 in x 1½ in. ,, ,,	-/3½		1	10	0
555	0	,, ..	7 in x 1¼ in. ,, ,, specially moulded	-/6½		15	0	7
157	0	,, .	1½ in redwood rounded window nosing	-/2		1	6	2
55	0	,, . .	1½ in. x 6 in. redwood rounded window board .. .	-/4½		1	0	7½
29	0	,, ...	2 in x 4½ in. ,, ,, ,, . ..	-/4		0	9	8
97	0	,, ..	2 in x 6 in. ,, ,, ,, .	-/4		1	12	4
6	0	,, ..	1½ in x 9 in ,, window board, rounded on both edges ..	-/6		0	3	0
101	0	,, ...	1½ in x 6 in cedar rounded window board	-/6		2	12	0
21	0	,, ...	1½ in. x 7 in. ,, ,, ,, ...	-/7		0	12	3
11	0	,, .	1½ in x 8 in ,, ,, ,, ...	/8		0	7	4
5	0	,,	1½ in x 9 in. ,, ,, ,, from store	-/8		0	3	4
42	0	,,	1 in scotia under window board	-/1		0	3	6
11	0	,,	1¾ in. ,, , ,	-/1½		0	1	6
227	0	,,	2 in x 2 in bedmould ,, ...	-/2		1	18	0
8	0	,, .	2½ in x 2 in ,, ,, ...	-/2		0	1	4
141	0	,, ...	1 in. x 3 in Kauri tongued window lining	-/1½		0	17	8
23	0	,, ...	1 in x 5 in. tongued door lining	-/2		0	3	10
123	0	,, .	1 in. x 5 in cedar tongued window lining	-/4		2	1	0
16	0	,, .	1 in x 6 in. tongued window lining	-/3		0	4	0
4	0	,, .	1 in x 7 in cedar ,, from store	-/5		0	1	8
16	0	,,	1 in x 8 in tongued ,, ...	-/4		0	5	4
11	0	,, .	1 in x 8 in cedar ,, from store	-/6		0	5	6
12	0	,, ...	½ in. x 4 in. chamfered muntin casing	-/1		0	1	0
104	0	,,	¼ in. x 9 in. redwood double moulded muntin casing .. .	-/4		1	14	8
13	0	,, ...	1 in x 10 in. cedar beaded ,, ...	-/6		0	6	6
12	0	,,	1 in. x 11 in redwood beaded ,, ...	-/2		0	2	0
48	0	,, ...	1 in x 6 in ,, double chamfered transom fascia . . .	-/3		0	12	0
13	0	,, .	1 in. x 11 in , double beaded fascia and backings	-/4		0	4	4
			Staircase to 4th Floor, &c.					
131	0	Supl.	1 in Oregon framed in carriages					
17	0	,, . . .	1 in. hardwood framed in joists (landing).					
60	0	,, ...	1 in. Kauri tongued risers, glued, blocked, and bracketed					
100	0	,, ...	1½ in Kauri tread, with rounded nosing, grooved, glued, blocked, and bracketed					
12	0	,, ...	1½ in Kauri, wrought all round, square treads					
15	0	,, ...	2 in Oregon, wrought all round, strings prepared for treads		. .	25	0	0
68	0	,,	2 in Kauri, wrought all round, strings prepared for treads and risers					
8	0	,, ...	2 in Kauri, wrought all round, moulded strings ,, ,,					
10	0	,, ...	1 in. Kauri grooved and tongued flooring, in 4 in widths (landing)					
86	0	,, ...	⅜ in Kauri tongued and grooved V-jointed boarding, in 4 in widths, soffit					
27	0	Run ...	Kauri scotia under tread.					
71	0	,, .	Cedar ,, ,,					
13	0	,, ...	1 in. x 4 in hardwood wrought riser.					
3	0	,,	1½ in Kauri nosing.					
1	0	,,	1 in x 6 in. Kauri fascia					
31	0	,, ...	4 in x 3 in. Kauri moulded handrail.					
		No, 3	Kauri turned roses					
		No, 50 .	1½ in x 1½ in. Kauri square balusters.					
		No., 3 ...	2 in x 2 in. , ,,					
		No., 3	4 in x 4 in. Kauri newels, 3 ft long with shaped ends					
		No, 3 ..	4 in. x 4 in. ,, 5 ft. 2 in long ,,					
			Closets and Urinals.					
73	0	Supl.	1 in Oregon framed for studding	15/-		0	11	0
1,985	0	,, ...	1 in. Oregon framed in, wrought all round, purlins for iron bolted to angle iron, and wire framing	15/-		15	0	0
78	0	,,	1 in. redwood lavatory top, pierced for basins, and chased for pipes	25/-		0	19	6
109	0	,,	1 in Kauri tongued and grooved V jointed boarding, in 4 in widths,					
squares			lavatory backs	22/-		1	4	0
14	92	0	,, 1¼ in Kauri, wrought and V-jointed, both sides tongued and grooved, boarding in 6 in widths, wire divisions ...	27/-		20	2	10
53	0	Run ...	¾ in x ⅜ in. redwood moulding	/1		0	4	5
43	0	, ...	1 in x ¼ in. ,, ...	-/1		0	3	7
1,839	0	,, . . .	1 in x 1 in. redwood scotia	-/1		7	13	3
571	0	,, . .	1½ in x ⅜ in redwood beaded door stop . .	-/2		4	15	2
43	0	,,	3 in x 2 in Oregon, wrought all round, rib, bolted to angle iron, circular	-/6		1	1	6

					£ s d.
ft	in.				
43	0	Run ...	4 in x 1 in redwood capping and scotia moulding, circular	-/5	0 18 0
43	0	„ ...	4 in x 1 in redwood beaded barge board, circular .	/4	0 14 4
49	0	„ ..	6 in x 1 in redwood beaded fascia .	-/2½	0 10 3
98	0	„	9 in. x 3 in Oregon, wrought all round, double beaded bearer channelled for soil pipes, including all wrought blockings, bolted to girder	16/-	0 16 0
		No, 2	1 in redwood chamfered blocks, 18 in x 12 in, painted, complete	1/-	0 2 0
		No, 71	Kauri wrought shaped and chamfered blocks, 6 in x 3 in x 2 in, and fixing . .	/4	1 3 6
		No., 11	1½ in sugar pine framed closet doors, 2 ft 3 in x 6 ft, bead flush one side and square the other, filled in with ¾ in Kauri, tongued and grooved V jointed boarding, in 4 in widths	25/-	13 0 0
		No, 20	1½ in „ „ 2 ft. 8 in x 6 ft, all as last described	27/-	27 0 0
			Goods Lift in area		
28	0	Supl.	1 in tallow wood, framed in bearers . .	16/	0 4 6
1,076	0	„	1 in Oregon, wrought all round, guides, frames, &c	15/	8 1 6
113	0	„	1 in „ „ runners grooved for lift weights	16/-	0 18 1
32	0	„	1 in. tallow wood, wrought all round, runners, screwed to guides	15/-	0 4 10
71	0	„	1 in Kauri, tongued and grooved, V-jointed lift casing, in 6 in widths	22/-	0 15 7
92	0	„	1¼ in Kauri, tongued and grooved, V jointed both sides lift casing	22/-	1 0 3
18	0	Run .	Angle bead	/2	0 3 0
43	0	„ .	2 in x 1 in Kauri, wrought all round, beaded fillet ...	/1	0 3 7
63	0	„	1¼ in x 1½ in tallow wood wrought runners, for lift weights ..	-/2	0 10 6
50	0	„	¾ in x 2¼ in Kauri, double-beaded, wrought all round, fascia	-/2	0 8 4
50	0	„	1½ in x 2½ in. „ „ „ „ . .	-/3	0 12 6
		No, 1	Cut up old concrete floor, 4 ft 6 in x 6 ft, and excavate for new floor at lower level , ...		0 10 0
		No, 1	Cut out pit, 18 in x 18 in, for hand line gear, and fix bearers and hand-line wheels		0 10 0
		No., 1	Cut away stone kerb to lift-opening at ground floor level	.....	0 5 0
		No, 4	Check stops, 6 in x 6 in x 4 in		0 4 0
		No, 1 ..	Take down old goods lift from basement to third floor, with all runners, guides, drums, wheels, bearers, brackets, lines, enclosures, &c, complete .		6 0 0
		No, 1	Goods lift machinery, complete. (See Atlas Company's vouchers)		
		No, 1	Gallery to cylinder, „ „ „ .		
			Form Lift		
Squares.					
23	0	Supl.	1 in hardwood, framed in bearers	16	0 3 8
467	0	„	1 in Oregon, framed in, wrought all round, bearers, guides, &c	1⁸/-	4 4 0
67	0	„	1¼ in Kauri, wrought both sides, tongued and grooved, V jointed boarding and bearers , . ..	30/	1 0 1
5 62	0	„	1 in „ „ , „ 11 4 in widths, and 3 in x 2 in bearers	30/-	8 8 7
38	0	Run ...	¾ in redwood moulding .	/1	0 3 2
95	0	„	1½ in x 1½ in. tallow wood wrought runners	/1½	0 12 0
14	0	„	3½ in x 1 in double beaded framed door head .	-/2½	0 3 0
16	0	„	4 in x 3 in Oregon, wrought, rebated, and beaded standards	20/-	0 3 3
107	0	„	 Box standard, formed of 3 in x 2 in stud, 1¼ in x 1½ in pulley stile 3½ in x 1 in. double moulded lining, and 3 in. x 1 in fascia	/3	4 0 3
20	0	„ .	4 in x 3 in Oregon, wrought, double chamfered and grooved capping	20/	0 4 0
12	0	„ ...	6 in x 4 in Oregon, wrought, rebated, chamfered and beaded capping, mitred	20/-	0 4 10
		No, 4	Check stops, 6 in x 6 in. x 4 in.	1/-	0 4 0
		No, 2 ...	Fix hand line wheels	2/6	0 5 0
		No, 1	Form lift machinery, complete, Atlas Co.'s vouchers		
			Alterations, &c, Goods Lift, Northern Building		
145	0	Supl ...	1 in Oregon, framed in studding, &c.	15/-	
324	0	„	1 in Oregon, framed in wrought all round cylinder frame, &c.	18/-	
2 77	0	„ .	1 in Kauri, tongued grooved, and beaded boarding, in 6 in widths and 3 in. x 1 in bearers.		
1 41	0	„	No 26 gauge galvanised corrugated iron lining, lapped at joints and ends and screwed, and 3 in x 1 in battens. Part new and part from store.		
2	0	Run ..	1 in. x 9 in. redwood fascia		
24	0	„	1 in x 9 in Kauri moulded fascia		
11	0	„ ...	1 in x 12 in Kauri wrought on one side fascia.		
10	0	„	1 in x 12 in Kauri chamfered fascia		
		No, 1 ...	Carefully take down old lift framing and enclosure, 21 ft. 4 in gut, from floor to underside of roof lining, complete		
		No, 1 ...	Carefully take down the whole of lift machinery, wheels, gearing ropes, weights, cylinder, beams, bearers, guides, runners, &c, complete, on all floors.		
		No, 1 .	Carefully cut out and enlarge opening in stud enclosure, to increase height		
		No, 1 ...	Re-erect and refix all guides, runners, bearers, and beams on all floors, complete.		
			Sundries		
48	0	Supl. ...	1½ in cedar, moulded both sides, partition two panels high, the upper panels for glass, from stock	2/	4 16 0
147	0	„ ...	Tallow wood wrought decking of 2 in x 1 in, battens spaced 1 in apart, upon 3 in. x 3 in bearers , ...	30/-	2 4 1
105	0	„	1 in. shelving and bearers	35/-	1 16 9

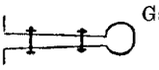
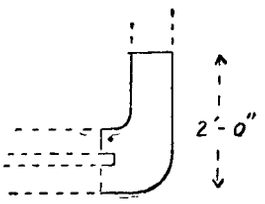
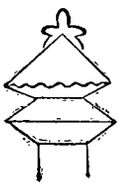
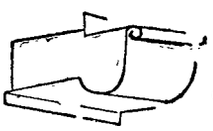
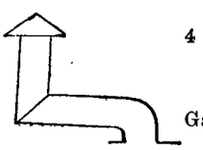
ft.	in.				£	s.	d.
495	0	Supl.	1 in. shelving from stock and new bearers	35/-	7	1	9
136	0	„	1 in. divisions to ditto and brackets, &c.	35/-	2	7	8
48	0	„	1½ in. Kauri wrought printing shelf	-/6	1	4	0
167	0	Run	Rolls for lead	-/2	1	7	10
136	0	„	Rolls for circular	-/3	1	14	0
90	0	„	3 in. x 1 in. Oregon bearer, plugged to wall	-/1½	0	11	3
34	0	„	6 in. x ¾ in. Baltic, wrought all round stop	-/2½	0	7	1
156	0	„	Beaded pipe casing	-/6	3	18	0
10	0	„	1 in. x 4 in. Kauri beaded hat rail	-/3	0	2	6
8	0	„	6 in. x 4 in. redwood moulded capping	.....	0	4	0
		No., 31 ...	Wood cleat blocks for casement openers	1/-	1	11	0
		No., 42 ...	Wood brackets or stays built into wall and perforated for 4 in. lead down-pipe	1/-	2	2	0
		No., 1 ...	Set framed bearers, two tiers high, under chemical press, the lower tier fitted with shelf 5 ft. 3 in. long	25/-	1	5	0
		No., 1 ...	Kauri pine table, 5 ft. x 3 ft. 10 in. and 2 ft. 9 in. high	30/-	1	10	0
			Centres.				
8	0	Run.	3 in. x 1 in. turning piece.				
		No., 1 ...	Semi-centre to 5 ft. 5 in. opening, and 5 in. soffit.				
		No., 2 ...	„ 4 ft. 4 in. „ 9 in. „				
		No., 1 ...	„ 5 ft. 10 in. „ 9 in. „				
		No., 2 ...	„ 7 ft. 6 in. „ 9 in. „				
		No., 2 ...	„ 8 ft. 2 in. „ 9 in. „				
		No., 1 ...	„ 8 ft. 6 in. „ 9 in. „				
		No., 2 ...	„ 6 ft. 1 in. „ 14 in. „				
		No., 5 ...	„ 11 ft. 1 in. „ 18 in. „	25/-	6	5	0
		No., 2 ...	Segmental centres to 4 ft. 4 in. opening, and 5 in. soffit.				
		No., 1 ...	„ 3 ft. 1 in. „ 9 in. „				
		No., 1 ...	„ 3 ft. 7 in. „ 9 in. „				
		No., 2 ..	„ 4 ft. 2 in. „ 9 in. „				
		No., 8 ...	„ 6 ft. 5 in. „ 9 in. „				
		No., 8 ...	„ 6 ft. 7 in. „ 9 in. „				
		No., 7 ..	„ 7 ft. 2 in. „ 9 in. „				
		No., 1 ...	„ 3 ft. 4 in. „ 14 in. „				
		No., 2 ...	„ 6 ft. 1 in. „ 14 in. „				
		No., 2 ...	„ 6 ft. 6 in. „ 14 in. „				
		No., 1 ...	„ 3 ft. 4 in. „ 18 in. „				
		No., 1 ...	„ 3 ft. 10 in. „ 18 in. „				
			Amount allowed in original bill	.....	1	10	0
			Jobbing Work, &c.				
		No., 1 ...	Carefully take down old staircase and landing, with enclosing partitions, &c., complete—Hydraulic room.				
		No., 1 ...	Carefully take down old staircase and landing, &c., complete, in No. 2 fount-room.				
		No., 1 ...	Carefully take down old staircase and landing, &c., complete, from jobbing to binding room.				
		No., 8 ...	Carefully cut down and remove double-fronted paper racks, four tiers in height, size 4 ft. x 5 ft. x 7 ft. 6 in., for the insertion of stanchions; afterwards reframing, making good with bearers, fitting around stanchions, and re-erecting. Include for removing, and stacking paper in bulk, and afterwards replacing same in racks	30/-	12	0	0
		No., 1 ...	Carefully cut shelving three tiers high for insertion of stanchions, fit around same, and make good. Include for removing and afterwards replacing stationery	20/-	1	0	0
		No., 10 ...	Carefully cut shelving all as last, but shelving ten tiers high	40/-	20	0	0
		No., 2 ...	Carefully take down pin-presses in ruling-room, remove, and re-erect in different place	10/-	1	0	0
		No., 1 ...	„ partition 23 ft. 6 in. x 12 ft 6 in. in No. 2 fount-room	.....	1	10	0
		No., 1 ...	„ half-glass enclosure 16 ft. x 11 ft. 6 in. in old engraver's room	.....	1	3	0
		No., 1 ...	„ enclosure, shelving, and desks, &c., &c., readers room, first floor	.....	0	10	0
		No., 1 ...	„ galvanised iron w.c., divisions about 24 ft. long, inserting studding, and afterwards re-erecting	.....	2	0	0
		No., 1 ...	Carefully cut opening 5 ft. 7 in. x 2 ft. 8 in. in Oregon stud partition, lined both sides, for insertion of borrowed lights, and trim opening with new timbers, complete	.....	0	12	0
		No., 2 ...	Carefully shoring and supporting stone window-sills, sashes, and frames	5/-	0	10	0
		No., 2 ...	Carefully shoring and timbering floors, &c., over openings 4 ft. wide from floor below	.....	0	15	0
		No., 1 ...	„ „ „ to L-shaped opening 9 ft. x 6 ft.	.....	0	12	6
		No., 1 ...	„ „ „ over No. 2 fount-room staircase	.....	0	5	0
		No., 7 ...	Carefully needle and shore main cross-girders while inserting columns				
		No., 1 ...	„ „ whilst inserting girders over strong-room doors.				
		No., 1 ...	„ „ old 18 in. wall whilst enlarging opening.				
		No., 1 ...	„ „ old 18 in. wall over opening 3 ft. wide.				
		No., 1 ...	Carefully cut away flooring and joists 3 ft. x 9 in.				
		No., 53 ...	Carefully cut through floor-joists, trim around openings with new materials, and make good.				
		No., 35 ...	Carefully cut away sides and soffits of girder casing, fit same to stanchions, columns, &c., and refix, and make good.				
		No., 2 ...	Carefully take down girder casing and cradling to girder 15 ft. 8 in. long, cut, adapt, refix, and make good with new materials as required	.....	1	0	0

				£ s. d.
	No, 4	House, new 10 in. x 4 in. wood girder to old.		
	No, 2 ..	Carefully take down sheet of corrugated ceiling lining for passage of columns, and refix.		
	No, 1	Carefully cut down end of lavatory enclosure to form casing for belting	... ..	1 5 0
	No., 2	Carefully take out and remove pairs of old sashes and frames, complete.		
	No, 3	Carefully take out and remove pairs of old sashes and frames, including stone sill.		
	No, 1 .	Carefully take out and remove pairs of casement doors and sills, complete		
	No, 1 ...	Carefully take out old door and framing over same in opening 3 ft. 6 in x 12 ft 6 in, including linings, architraves, &c, complete		
	No, 1 ..	Carefully take out old door and frame, alter and refix in different place and rehang to open outwards	.....	1 10 0
	No., 16 ..	Carefully cut away heads of old solid sash frames, in situ, to window openings, 4 ft. 6 in. wide, and prepare frames for new transom, &c, to increase height.		
	No, 2	Carefully cut away heads of old solid sash frames and linings, all precisely as last.		
	No., 1	Take off lock and bolts from old fire-engine room door, and fix doors with and including new H W plate secured to doors and floor	.. .	0 15 0
	No, 1 ..	Plug wall for and refix old jamb linings to new opening, 3 ft. x 7 ft, and rehang old door	... .	1 0 0
	No., 1 ..	Refix only cut ornamental valence, 15 in. high and 7 ft 6 in. long, and brackets	...	0 10 0
		Carried to Summary	. . ..	2,085 9 1½
		Ironmonger.		
	No, 72	Pairs 3 in cast iron butts	-/8	2 8 0
	No., 68 ..	,, 3½ in. ,, ...	-/9	2 11 0
	No, 30 ..	,, 4 in. ,, ...	1/-	1 10 0
	No, 8 .	,, 2½ in. ,, ...	-/7	0 4 8
	No., 2	4 in. brass barrel bolts	1/3	0 2 6
	No, 2	6 in. ,, ...	1/7	0 3 2
	No., 6	Brass sunk handles	1/-	0 6 0
	No, 6	Brass sash lifts	-/5	0 2 6
	No, 2 .	Approved brass sash fasteners	1/6	0 3 0
	No, 29 ..	,, casement fasteners	3/-	4 7 0
	No., 1 .	Pair brass plate sash suspenders	3/-	0 3 0
	No., 2 .	Sets of cords, pulleys, and cleats	3/6	0 7 0
	No, 8	,, quadrants fanlight openers, and fittings	9/-	3 12 0
	No, 30 ..	Brass slide casement stays	2/6	3 15 0
	No, 2 .	,, casement stays, with screws	3/-	0 6 0
	No, 9	Sets of No. 2 13 in brass sliding sash stays	5/-	2 5 0
	No, 8 .	Preston's fanlight openers, p c 10s 6d. each and cords, complete ...	12/6	5 0 0
	No, 31	,, improved brass quadrant casement racks, p c 10s. 6d. each and cords, complete	12/6	19 7 6
	No, 9	Wrought-iron quadrant racks and cords, complete	5/6	2 9 6
	No, 1 ...	6 in. Carpenter's rim lock	3/6	0 3 6
	No, 1 .	Set brass furniture	6/-	0 6 0
	No, 22 ...	Chubb's patent mortice locks	10/-	11 0 0
	No, 2 ..	Sets brass furniture, with milled edges	3/-	0 6 0
	No., 20 .	,, brass-reeded furniture	6/-	6 0 0
	No., 1 ..	"Eclipse" patent door check	20/-	1 0 0
	No., 2	9 in brass pillar handles	20/-	2 0 0
	No, 9 ..	Brass ring spring catches	1/3	0 11 3
	No, 24 ...	Brass hat and coat hooks	1/6	1 16 0
	No, 5 .	Sets lead balance weights, with sash cords, brass wheels, and brass-faced axle pulleys	8/-	2 0 0
	No, 2	Sets fanlight openers and shafting, complete, to photo gallery—Mountney & Co's vouchers		
	No., 1.	Brass swivel pulley, brass screw eye, and cords, complete	6/-	0 6 0
		Carried to Summary	... ..	74 11 7
cwt. qr. lb.		*Smith and Founder.* (This work was done by contract)		
1 0 0	... .	Wrought-iron in tie rods	17/6	0 17 6
27 2 0	... .. .	Steel in principals to photo. gallery—East and Clune	18/-	24 15 0
292 0 14	. . ..	Wrought iron in main roof principals—East and Clune . .	15/-	219 2 0
382 0 0	.. . .	,, in closets and urinals, walls and roof—Mountney & Co	15/.	286 10 0
103 1 18	.. . ..	,, in roof, &c, of turret and dome, also wrought-iron in tie rods of roof, main angle—Mountney & Co.	15/-	77 11 6
14 3 0	'	,, in templates under girders—Dunlop and Mountney .	11/-	8 2 3
3 2 0	.....	,, in No 56 cramps to stonework (galvanised)—Dunlop & Co .. . . .. $\frac{4}{40}$	28/-	4 18 0
26 1 24	... ..	,, in straps and bolts	18/.	23 16 9
30 2 20	....	,, in girder plates and connections, drilled for bolts	18/-	27 12 4
3 1 18	. .. .	Wrought galvanised iron in ties and plates drilled for bolts .	28 -	4 15 6
9 2 6	.... .	Wrought-iron in brackets and purlin rafters, &c, riveted or bolted	15/-	7 3 6
	No. 1	Templates complete for roof principals.		
		Rolled Joists.		
6 2 0	... . .	In 10 in x 6 in rolled iron joists	11/-	3 11 6
1,112 1 11	.. ..	In steel joists and girders of various sizes and sections, also the stanchions—J. Barre Johnstone & Co.'s vouchers . .	13/-	723 0 9
14 1 4	.. .	In built iron girder—From stock	15/-	10 14 5

cwt. qr. lb				£ s d
			Columns.	
452 0 16	.. . ..		Cast iron in columns—From vouchers, Atlas Co., Mort's Dock, and Mountney & Co.	11/10/- 260 0 0
27 0 19	. .. ..		,, ,, ,, From store	11/10/- 15 10 10
1 1 20	... . .		Cast-iron in wedges for columns	} 11/- 1 16 6
1 3 16	. .		,, packing plates for columns	
	No., 1		Carefully take down old column in hydraulic-room, and all timbers connected	
	No, 1		Allow for additional hoisting of 1st floor columns to 2nd floor level, also 2nd floor columns to 3rd floor level, and lowering same through apertures in floors	
	No., 1...		Allow for all patterns and alterations to same, complete (included in prices for work).	
ft in.			*Sundries.*	
28 0	Supl. ..		Galvanised sheets with rounded corners, fixed with round-headed screws around tubs, &c, photo-rooms	-/6 0 14 0
6 0	Run		$\frac{3}{8}$ in. x $\frac{3}{4}$ in. wrought iron weather-bar	-/1 0 0 6
14 0	,, . . .		$\frac{3}{8}$ in. x 1 in. ,, ,, ...	-/1 0 1 2
	No, 4 .		Galvanised iron clips and bolts around 3 in x 3 tee iron .. .	1/6 0 6 0
	No., 1		Allow for taking down iron handrail around closets and lavatories, first floor, cutting and fitting same between altered iron columns, and supplying any deficiency with suitable material (part new, part old)	100/- 5 0 0
	No, 1		Take down hood to old forge and refix with hangers to flue-pipe and hood	.. ... 1 15 0
	No., 1		Allow for carefully disconnecting and removing box girder 16 ft long over jobbing-room.	
	No., 509 ..		Drilling holes in girders, &c, in situ	-/6 12 4 6
	No., 3 .		Cut out old rivets, and enlarge holes for bolts	1/- 0 3 0
	No, 7 .		Cut off all old rivet-heads to form seating for columns	2/- 0 14 0
			Carried to Summary	.. 1,720 16 6
cwt. qr. lb.			*Plumber.*	
3 2 18	... .		Milled lead and labour temp'ates	}
275 3 9	.....		,, ,, in roof, lead flat, flashings, gutters, small part in making good	} 18/- 262 11 6
12 1 1	....		,, ,, in safes and covering to floors	}
ft. in.				
57 0	Supl.		No 22 gauge galvanised iron gutter lining, with soldered and riveted joints	1/- 2 17 0
			Zinc Work.	
515 0	,, ...		No. 10 gauge zinc with welted joints, secured with screws, include for clips and solder	45/- 11 11 9
30 0	Run . .		No. 10 gauge zinc with moulded cornice, 18 in. high, including mitres, &c	4/- 6 0 0
64 0	,, .		Perforated zinc soffit, 6 in. wide, secured with staples	-/6 1 12 0
			Ornamental zinc work, &c—Bush & Co.'s vouchers.	
	No, 99 .		Approved zinc soakers	-/3 1 4 9
sq. ft in.			*Galvanised Iron Roofing*	
53 0	Supl		No 26 gauge galvanised corrugated iron roofing, properly lapped and secured, measured nett	22/6 0 12 0
39 36 0	,, ...		,, ,, ,, bent to curve ,, ...	24/6 48 4 6
30 53 0	,,		,, ,, , inclusive of 3 in x 1 in. battens	27/- 41 4 6
40 33 0	,,		No. 25 galvanised small corrugated iron roofing, properly lapped and secured, measured net	24/- 48 8 0
24 7 0	,, .. .		,, ,, all as last, inclusive of 3 in x 1 in battens	27/- 32 10 0
5 20 0	,, ...		No 26 gauge galvanised small corrugated iron roofing, properly lapped and secured, bent to curve, measured net	27/- 7 0 6
205 0	Run.		Rolled edge to last	
198 0	,, ...		Bending small corrugated iron to curve of bell cast	-/1 0 16 6
70 0	,, . . .		Galvanised-iron hip, 8 in. girt, properly secured, and with dressed ends	-/6 1 15 0
			Eaves, Gutters, and Down pipes.	
399 0	,, ...		4 in. galvanised iron half round eaves gutter, including all angles, outlets, stopped ends, &c	-/8 13 0 6
49 0	,,		5 in ,, ,, ,, ..	-/9 1 16 9
9 0	,, ...		6 in. ,, ,, ,, ...	-/10 0 7 6
17 0	,, ...		4 in. galvanised-iron moulded eaves gutter, including all angles, outlets, stopped ends, &c	-/8 0 11 4
437 0	,, . . .		5 in. ,, ,, ,, .	-/9 16 7 9
554 0	,, .. .		8 in x 4 in No 22 gauge galvanised-iron special made eaves gutter, with straps, bolts and nuts, angles, outlets, stopped ends, &c, complete Murray & Co	1/2 32 6 2
138 0	,, ...		2 in galvanised-iron down-pipe, including all bends, shoes, cars, spikes, &c.	-/6 3 9 0
23 0	,, .. .		2½ in ,, ,, ,, ..	-/7 0 13 5
150 0	,, ...		3 in. ,, ,, ,, ...	-/7½ 4 13 9
462 0	,, ...		4 in. ,, ,, ,,	-/7½ 14 8 9
21 0	,, .		6 in. ,, ,, ,, ...	1/2 1 4 6
266 0	,,		4 in diameter cast iron down pipe, including all bends, shoes, cars, spikes, &c	1/2 15 10 4
104 0	,, . ..		2 in. diameter lead down-pipe, including all bends ears, spikes, &c .	1/2 6 1 4
231 0	,, ...		4 in diameter lead down-pipe, including all ears and spikes .	2/- 23 2 0
	No, 12 .		Extra for bends	5/- 3 0 0
	No, 42..		Lead collars and flanges, soldered on	3/9 7 17 6
	No, 1 .		9 in. x 9 in. galvanised head to down-pipe	3/6 0 3 6
	No, 2		12 in. x 9 in ,, ,, ...	4/- 0 8 0
	No, 2		12 in x 12 in. ,, ,, ...	4/6 0 9 0
	No, 1		18 in. x 18 in ,, ,, ...	5/6 0 5 6
	No, 7 .		15 in. ,, ,, ...	5/- 1 15 0
	No., 6...		Octagonal ,, ,, ...	5/- 1 10 0



				£ s. d.
	No, 7 ...	Galvanised iron hopper covers to down pipe heads	2/-	0 14 0
	No, 19	Domical galvanised iron wire gratings	2/-	1 18 0
	No., 1 ..	Allow for taking down and afterwards refixing old cast-iron down pipe by lavatory block.		
		Water-closets.		
ft. in.				
216 0	Run	1¼ in lead fall-pipe from flushing cisterns, in 5 ft. 6 in. lengths ..	-/8	7 4 0
124 0	,, ...	2 in. lead vent pipe	1/-	6 4 0
122 0	,, ...	4 in. lead soil-pipe	2/3	13 14 6
	No., 10	Extra for bends	5/-	2 10 0
	No, 9 .	Brass cleaning screws , ...	5/-	2 5 0
	No, 1 ..	Connection to sewer ... , ...	5/-	0 5 0
18 0	Run . . .	4 in. cast-iron soil-pipe, lead joints	1/2	1 1 0
132 0	,, ...	4 in galvanised iron vent pipe	-/8	4 8 0
	No., 2 ..	Cowls to ditto	4/- each	0 8 0
	No, 34 ..	2 in. lead vent bends, average 12 in long, including joints . .	2/6	4 5 0
	No, 9	4 in diameter lead connections, say 6 in. long, with flanges and joints	3/9	1 13 9
	No, 31	4 in diameter lead soil-pipe bends, 2 ft 9 in. long, with joints flanges, and collars complete . . .	7/6	11 12 6
	No, 31	"Tower" pedestal w c's, seats, and 4 in lead traps, complete	50/-	77 10 0
	No, 9	Tylor's "Compound" w c's, with seats and 4 in lead traps ...	90/-	40 10 0
	No, 40	"Tower" flushing cisterns and brackets complete . ..	30/-	60 0 0
	No, 1	Allow for carefully taking down 2 old w c's, with all old fittings, pipes, enclosures, flagging, &c, complete, and relaying and making good slate floor, inserting cleaning screws, &c., in soil pipes, and stopping up pavings and pipes, &c, &c, complete .	60/-	3 0 0
		Urinals		
40 0	Run	¾ in lead supply from flushing cisterns	-/6	1 0 0
57 0	,, . .	2 in. diameter lead waste and vent-pipe	1/-	2 17 0
	No, 3	Lead collars and joints	1/6	0 4 6
	No., 16	2 in diameter short lead outlets and joints, complete	1/6	1 4 0
	No, 2	2 in diameter lead bends, 2 ft. long, and joints, complete	2/6	0 5 0
	No, 18	Tylor's angle backed urinals	27/6	24 15 0
	No, 4	Tylor's two gallon flushing cisterns and brackets .	30/-	6 0 0
	No, 2	Two gallon automatic flushing cisterns and brackets	50/-	5 0 0
	No, 2 .	One gallon ,, ,, ,,	42/6	4 5 0
	No, 3	2 in brass cleaning screws	2/-	0 6 0
	No, 1 ..	Allow for carefully taking down 5 old urinals, glass floor, cleaning old pipes, traps, &c, refixing same and providing and fixing new water supply pipes and connections complete	.....	6 0 0
		Lavatories		
35 0	Run .. .	1½ in diameter lead vent pipe	-/10	1 9 2
86 0	,, ...	2 in. diameter lead waste pipe	1/-	4 6 0
13 0	,,	4 in diameter lead waste pipe	2/-	1 6 0
42 0	,,	4 in. diameter cast-iron waste pipe	1/3	2 12 6
66 0	,, ..	2 in. diameter galvanised iron vent pipe	-/6	1 13 0
	No, 1 ..	Cowl to ditto	2/6	0 2 6
14 0	Run	4 in diameter galvanised iron vent pipe	-/8	0 9 4
	No, 1 .	Cowl to ditto	4/6	0 4 6
	No., 18 ..	1¼ in. lead overflow pipes from basins and joints, complete	2/6	2 5 0
	No, 18	1¼ in. lead vent junctions and joints, complete	2/6	2 5 0
	No., 18 .	1½ in. lead syphon traps and joints	6/-	5 8 0
	No., 6 ..	2 in. ,, ,, ...	8/-	2 8 0
	No, 6	2 in. lead bends, 1 ft. 9 in long, and joints	2/6	0 15 0
	No, 6 .	4 in. diameter lead diminishing sockets and joints	2/6	0 15 0
	No., 6 ..	4 in. brass bell traps	4/6	1 7 0
	No, 1	Lead collar to 2 in. pipe and joints	1/6	0 1 6
	No, 18	16 in diameter Tylor's lavatory basins, with flushing rims, brass washer, and vulcanite plug	7/6	6 15 0
		Water Service		
18 0	Run . . .	¾ in galvanised wrought-iron piping with all necessary tees, holdfasts, &c	-/7	0 10 6
259 0	,, ...	1 in. ,, ,, ,, .	-/9	9 14 3
75 0	,,	1¼ in. ,, ,, ,, ..	1/-	3 15 0
177 0	,, ...	1½ in ,, ,, ,, .	1/3	11 1 3
104 0	,, . . .	2 in. ,, ,, ,, ...	1/6	7 16 0
33 0	,, ...	2½ in ,, ,, ,, .	2/2	3 11 6
85 0	,, ..	¾ in. lead service pipe, including all bends, tacks, &c, complete	-/7	2 9 7
25 0	,, ...	1 in. ,, ,, ,, ...	-/8	0 16 8
13 0	,, ...	1¼ in. ,, ,, ,, .	-/9	0 9 9
11 0	,, ...	2 in. ,, ,, ,, ...	1/-	0 11 0
10 0	,, . .	3 in ,, ,, , ...	1/6	0 15 0
		Waste's toning room.		
	No., 40 ...	½ in lead branches 12 in long to flushing cisterns and joints . ..	1/3	2 10 0
	No, 17 .	¾ in. lead branches from supply to lavatory basins and joints	3/-	2 11 0
	No., 2 .	1 in lead branches 12 in long to flushing cisterns and joints	3/-	0 6 0
	No, 4 .	Connections of 2½ in. galvanised pipe to cisterns and engines, with all bolts and packing, complete	3/-	1 0 0
	No., 4	2 in lead bent wastes 3 ft. 6 in. long, with tafted joints or collars	7/6	1 10 0
	No, 1	¾ in approved stop cock . . .	4/6	0 4 6
	No., 2	1 in. ,, ...	7/6	0 15 0
	No., 1 ..	1½ in. ,, ...	15/-	0 15 0
	No, 1 .	2 in. ,, ...	20/-	1 0 0
	No, 9 .	½ in. brass H P. screw-down bib cocks, screwed for hose connections	5/-	2 5 0
	No, 18	½ in. brass H P screw-down lavatory valves, with tinned joints and back nuts, cross bar handles, flanges, and sockets, complete	8/-	7 4 0
	No., 1 .	Allow for all connections of new to old services	10/-	0 10 0
	No, 1 ...	Allow for taking down, cleaning, altering, and extending water supply to Government Printer's w c's and paint pipes.		

					£ s. d.
	No., 1...	Allow for temporary water supply from new w.c.'s block to lavatory and urinal, &c., in stamp-room	.....		1 10 0
	No., 1...	Allow for cutting and disconnecting all water surface pipes on roofs over jobbing-room where disturbed	.....		1 10 0
ft. in.		*Water Spray.*			
59 0	Run	1½ in. perforated copper piping, with all galvanised stays, clips, and screws	2/3		6 12 9
	No., 2...	1½ in. brass cleaning cocks	15/-		1 10 0
19 0	Run	 Galvanised iron bonnet over ridge, about 15 in. x 15 in., including all battens and bracketing, &c., complete...	1/6		1 8 6
		Sundries.			
32 0	„	6 in. x 6 in. galvanised iron vent flue, with soldered joints, fixed with G.I. clips and screws to plugs in wall	1/9		2 16 0
	No., 1...	 Galvanised iron taper piece from 6 in. x 6 in. at bottom to 6 in. diameter at top; total height, 5 ft. 8 in., with galvanised iron stay bolted around pipe and screwed to window head	10/6		0 10 6
62 0	Run	6 in. x 6 in. No. 24-gauge copper furnace flue, with capped, soldered, and riveted joints	4/-		12 8 0
	No., 4..	Extra for bends	7/6		1 10 0
	No., 2...	12 in. x 12 copper flanges, soldered and riveted to flue pipe	15/-		1 10 0
	No., 1...	 Copper junction to last flue pipe, with connection at bottom No. 2 6 in. x 6 in. flues, soldered and riveted; 2 ft. 6 in. high over all.....	30/-		1 10 0
	No., 3...	Wrought-iron hangers, 1 in. x ¼ in. each 3 ft. 6 in. long, screwed to ceiling	3/-		0 9 0
66 0	Run	9 in. diameter galvanised iron vent tube in roofs	2/-		6 12 0
	No., 6...	Extra for trumpet mouths, 16 in. diameter, with flanges and all bearers in ceiling joists, complete	8/6		2 11 0
	No., 1...	 Galvanised iron cowl to 4 in. diameter vent pipe	4/6		0 4 6
	No, 5...	„ to 9 in. „	25/-		6 5 0
	No., 7...	Galvanised iron flanged inlet tubes, 14 in. x 4 in. x 10 in.	5/-		1 15 0
	No., 31...	„ „ vent faces, 13 in. x 13 in. (lanterns)...	6/-		9 6 0
	No., 8...	 Galvanised iron inlet hoppers, 16 in. x 17 in. x 8 in. over all	8/-		3 4 0
	No., 6...	Galvanised iron inlet tubes 9 in. x 3 in., and 5 ft. 6 in. high over all.....	6/-		1 16 0
	No., 15...	 4 in. diameter copper vent outlets, fitted with flanges at bottom and galvanised iron cowls at top	10/-		7 10 0
	No., 1...	Galvanised iron bull's-eye vent, 20 in. diameter, through 9-in. stud wall, with rolled edge each side	20/-		1 0 0
	No., 1...	Galvanised iron vent, all as last, filled in with galvanised iron louvres	.....		0 17 6
	No., 487...	Zinc clips, galvanised screws, and lead washers; skylight bars	-/3		6 1 9
	No., 2...	Refix only 4 ft. 6 in. lengths of downpipes; solder connections and supply new ears	2/-		0 4 0
	No., 1...	Allow for altering and making good wastes from 3rd floor of northern building, and refix traps, complete.			
	No., 1...	Allow for carefully taking down range of lavatory basins with all wastes, traps, supply pipes, lavatory top and enclosure, complete. Stamp room.			
ft. in.		*Gas Service.*			
37 0	Run.	⅜ in. brass gas tube, and all joints, &c.	1/-		1 17 0
11 0	„	½ in. black iron pipe, inclusive of all necessary tees, elbows, junctions, hold-fasts, &c.	-/3		0 2 9
125 0	„	¾ in. „ „ „ ...	-/5		2 12 1
54 0	„	1 in. „ „ „ ...	-/7		1 11 6
4 0	„	1¼ in. „ „ „ ...	-/8		0 2 8

					£	s.	d.
	No., 4 ..	Bronze gas brackets and cedar roses		15/-	3	0	0
	No., 1 ...	Stop cock, with movable key and brass flap in floor		5/-	0	5	0
	No., 1 ...	Allow for carefully disconnecting gas service, and taking down gas pipes in jobbing room to No. 5—12 light gas rings and reflectors					
	No , 2 ...	Allow for carefully taking down, altering, adapting, and re-erecting gas main in Bent-street wing to rooms, 83 ft. long		.....	6	0	0
	No., 1 ..	Allow for carefully taking down and disconnecting gas service pipes and 12 light rings and reflectors in No. 2 Fount Room, for insertion of girders, and afterwards re-erecting and supplying all deficiencies with new material		.....	1	5	0
	No., 1 ..	Allow for temporary gas service to blast furnace, basement, with new pipes and connections, complete		.....	1	0	0
	No., 1 .	Allow for temporary gas service to antimony furnace and pan, making flues, and connecting same to forge flues		... .	1	0	0
	No., 1 ..	Allow for temporary gas service in jobbing room to No. 5—12 light rings and reflectors, the pipes hung up to ceiling		.....	2	0	0
	No , 1 ..	Allow for extending gas service from staircase to leather store and photographer's store, on ground floor, supplying and fixing wall bracket and pendant, fitted with opal globes, including all cutting and making good, complete		.....	3	10	0
	No , 1...	Allow for disconnecting and altering gas service in Reader's room, first floor, by forme lift, and making connection into strong room		.....	1	0	0
	No., 1...	Allow for temporary gas service to engraver's room from Government Printer's w.c's.		.....	1	0	0
	No., 1 ..	Allow for cutting and disconnecting gas supply by Government Printer's w.c., and inserting new connection from No. 2 Fount Room, and refixing complete			1	0	0
	No , 1 .	Allowing for supplying and fixing 16 feet super. best asbestos mill-board, under gas heaters		... ..	0	18	0
		Carried to Summary		.....	1,111	13	4
Yds. ft.		*Plasterer.*					
750 0	Supl.	Cement plain face, ¾ in. thick, with chamfered salient angles, jointed to imitate stonework		1/-	37	10	0
162	,, ...	,, ,, ,, circular		2/- p.yd.	1	16	0
17	,, ...	,, ,, ,, weathering		1/-	0	2	0
255 0	,, ...	Cement plain face, ¾ in thick, with chamfered salient angles, jointed to imitate stonework, in patching and making good		1/- p.yd.	12	15	0
37	,, ...	,, ,, ,, circular		2/- p.yd.	0	8	0
38	Run.	Making good cementing over old pipe chase		.....	0	5	0
	No., 8 .	Cement moulded profiled trusses, 10 in. x 20 in. on face, 4 in projection		12/-	4	16	0
32 0	Supl.	Hack off old plaster ceiling		-/4	0	10	8
159 0	,, ...	Hack off old plastered walls, and prepare for cementing		-/3	1	19	3
		Carried to Summary		.....	60	1	11
		Painter and Glazier.					
3,963 0	Supl.	Twice limewhite on walls, &c.		-/1½	24	15	7
296 0	,, ...	3 coats asbestos paint on small corrugated iron, measured as though flat.		1/6	22	4	0
873 0	,, ...	3 coats duresco on wood, &c.					
1,104 0	,, ...	,, on small corrugated iron, measured as though flat		-/6	49	8	6
314	Run ...	, on piping.					
2,454 0	Supl.	Clean down, prepare, stop, and paint three coats oil colour on wood, &c		-/9	92	0	6
1,237	Run	,, ,, on architraves = 138 yds.		1/3	8	12	6
	No., 26 .	,, ,, on doors, both sides		5/-	6	10	0
	No., 31...	,, ,, on closet doors, both sides		5/-	7	15	0
	No., 6 .	,, ,, on lattice doors, both sides		5/-	1	10	0
	No., 58	,, ,, on pairs of sashes and frames, both sides		4/-	11	12	0
	No , 3	,, ,, with bars		4/-	0	12	0
	No., 48 .	,, ,, on fanlights, both sides		2/6	6	0	0
	No , 26 .	,, ,, with bars		2/6	3	5	0
	No., 12 .	,, ,, on roof sashes with bars, both sides		3/-	1	16	0
	No , 100 .	,, ,, on sashes with bars, both sides.					
	No , 93 .	,, ,, on lantern sashes, both sides		2/6	11	12	6
	No , 15...	,, ,, on photo gallery sashes, both sides		2/6	1	17	6
	No , 36...	,, ,, on consoles		2/6	4	10	0
	No , 18...	,, ,, on trusses and consoles		2/6	2	5	0
486 0	Supl. ...	Clean down, prepare, and paint three coats oil colour on small corrugated iron, measured as though flat		-/9	18	4	6
2 0	,, ...	,, ,, on corrugated iron roofing, measured as though flat		-/9	0	1	6
147 0	,, ...	,, ,, on Traegerwellblech, measured as though flat		-/9	5	10	3
1,327	Run.	,, ,, on eaves gutter, down-pipe, &c.		-/1½	8	5	10½
1,175	,, ...	,, ,, on iron bar		-/½	2	8	11½
	No., 48 .	,, ,, on iron columns		3/- each	7	4	0
	No , 10 .	,, ,, on large iron lift brackets or stays		3/- each.	1	10	0
	No., 8..	,, ,, on vent inlets, 16 in. x 17 in. x 8 in		-/6	0	4	0
	No , 7..	,, ,, on inlet tubes, 14 in. x 4 in. x 10 in.		-/6	0	3	6
	No., 37 .	,, ,, on flushing cisterns		-/6	0	18	6
	No , 4	,, ,, on cowls		2/-	0	8	0
	No., 1	,, ,, on bull's-eye vent		1/6	0	11	6
	No , 1...	,, ,, on louvred bull's eye vent		2/-	0	2	6
	No., 31	,, ,, on 13 in x 13 in inlet vents		-/4	0	10	4
25 0	Supl. . .	Clean down, prepare, and paint two coats of oil colour on old wood		-/8	0	16	8
	No , 1 .	,, ,, on old door, both sides		3/6	0	3	6
	No , 1..	,, ,, on iron cowl		1/-	0	1	0
713 0	Supl.	,, ,, on iron		-/6	17	16	6
3 0	,, ..	,, ,, on corrugated iron roofing, measured as though flat		-/6	0	1	6

Yds.	ft.				£	s	d.
47	0	Supl. .	Clean down, prepare, and paint one coat of oil colour on old wood	-/4	22	12	8
1,311	0	,,	,, ,, ,, oxide paint on iron				
	10	Run.	,, ,, ,, ,, on iron bar	-/½	0	0	5
147	0	Supl	Clean down, prepare, stop size, and twice varnish on wood .	-/8	4	18	0
		No, 3	,, ,, ,, ,, on roses ...	-/3	0	0	9
		No, 53	,, ,, ,, ,, on balusters	-/3	0	13	3
		No, 6	,, ,, ,, ,, on newels .	2/- each	0	12	0
66	0	Supl. ..	Two coats vinegar and black lead on zinc work	-/7	1	18	6
570		Run. ..	,, ,, on eaves gutter and down pipe	-/1½	3	11	3
554		,, ..	,, ,, on 8 in x 4 in eaves gutter ...	-/2	4	12	4
151		Supl ..	Stippling glass to obscure	-/1	0	12	7
			Glazier.				
385		Sup. .. .	21 oz. sheet glass	-/4	6	8	4
1,853		,, ...	26 oz. ,, ...	-/5	38	12	1
378		,, . . .	32 oz. ,, ...	-/6	9	9	0
64		,, .	British polished plate glass	2 6	8	1	0
1,458		,, ...	,, ,, ,, ground	2/2	157	19	0
121		,, ...	$\frac{5}{16}$ in. rolled ribbed plate glass in 7 ft. 9 in. lengths	1/-	6	1	0
362		,,	$\frac{1}{2}$ in. rough plate glass in 8 ft lengths	2/-	36	4	0
		No, 166	Copper wire suspension pieces, 12 in long	-/2	1	7	8
		No., 11 ..	Hacking out and removing old broken glass to panes of skylight 1 ft. 5 in. x 7 ft 9 in, in situ	2/- each	1	2	0
			Carried to Summary	.....	626	3	6

SUMMARY.

£	s.	d.		£	s.	d.
796	7	6	General Bill	301	17	6
112	1	9	Excavator, labourer, and drainer	66	6	0
1,252	13	3	Mason and slater	1,068	16	9½
1,388	11	10	Bricklayer	903	4	10
3,360	8	5	Carpenter and joiner...	2,085	9	1½
69	8	2	Ironmonger	74	11	7
1,766	15	11	Smith and founder	1,720	16	6
1,240	18	9	Plumber	1,111	13	4
189	9	0	Plasterer	60	1	11
649	18	0	Painter and glazier	626	3	6
10,826	12	7		8,019	1	1
			Other Vouchers	595	0	0
				8,614	1	1

Credit—

	£	s	d
Value of old materials			
Authority for closets.....			
,, ,, alteration design main angle			
,, ,, roofing felt			

Total . ...£ ....

MEMO.—For comparative purposes, all "Provisional" amounts contained in the original Bills of Quantities should be added to the above total This Bill contains no such amounts.

G.

[Appendix by the Committee.]

MEASUREMENT of extra work in Alterations and Additions executed by day-labour at the Government Printing Office, Phillip and Bent-streets, Sydney, for the Department of Public Works, Government Architect's Branch (in addition to works set forth in Schedule dated August, 1897).

Prepared for the Department of Public Works by Alfred W W. Pate, Quantity Surveyor, Queensland Chambers, Bridge street, Sydney, November, 1897.

		Preliminary and Sundries.		£	s.	d.
		Allow for carrying on the additional works without interference with the business of the office	.....	50	0	0
		Allow for all risk of damage to Government and adjoining property or accidents to individuals, in carrying out additional works ...				
		Allow for maintaining additional works for twelve months after completion	. ...	10	0	0
		Allow for removing old material, in consequence of additional works				
		Allow for additional hoardings, in accordance with Municipal regulations	. ..	10	0	0
		Allow for giving all notices, paying all fees, etc , in respect of additional works, complying with Municipal and other regulations	...	1	2	6
		Allow for water for the works, with temporary supply, and pay all rates, &c.	... .	3	0	0
		Allow for additional services of watchman.....	... .	108	0	0

					£ s. d.
			Allow for removing all rubbish occasioned by additional works cleaning additional windows, and scrubbing additional floors		15 0 0
			Allow for the use of all scaffolding, plant, etc., for the additional works, comprising scaffolding, etc, for additions to northern building, with special precautions in use of crane for passage of heavy tram and other traffic, special scaffolding for water tower for first alteration of same, taken down and afterwards re erected for second alteration; special scaffolding for rebuilding back wall over No. 4 defective arches, and scaffolding for well-holes, stairs, &c.		171 0 0
			Allow for protecting new roof of northern building while lifting materials for water tower addition, and for shoring up small lead flat to carry same		2 10 0
			Allow for temporary scaffolding and tarpaulins in every apartment where work included in this Schedule was performed, for the protection of employees and machinery		48 10 0
			Allow for making good footpath after removal of hoarding		1 10 0
			Allow for carefully taking down roof, with principals, dormers, stud partitions, with all timbers, slating, iron, and other works connected, disconnect down-pipes, strip flushings, &c, take up flooring in roof, &c, &c., over part of northern building 58 ft 3 in x 30 ft after completion of new roof		35 0 0
			Allow for taking down roof, &c., all as last described over part of northern building 58 ft. 2 in. x 21 ft.		24 8 0
			Allow for carefully taking down photo. gallery, lead flats, &c., over 53 ft. x 41 ft., and lead flat over 9 ft 7 in. x 7 ft, including disconnecting and taking down all gas and water pipes, taking up lead floors, removing all fittings, &c, &c, complete		45 0 0
			Allow for carefully taking down tank over photo. gallery with all bearers, disconnecting all pipes and removing same, including all staging and tackle complete		5 0 0
Feet.			Allow for taking out, lowering, and removing 4 12 in x 6 in wrought-iron girders, each about 17 ft. 6 in. in length, from under main landings of staircase in north building on first, second, third, and fourth floors, including unscrewing bolts and all staging and tackle complete		8 0 0
64	Run.		Carefully take down and remove iron cresting on top of old water tower walls	1/3	4 0 0
	No, 1		Carefully take up and remove old batten floor 16 ft. x 8 ft 6 in. and joisting complete at top of old water tower		1 10 0
	No., 1		Carefully take down and remove lead-lined sink and bearers in clerical division, disconnect and remove all pipes, and make good complete		2 0 0
	No., 1		Carefully take down range of lavatory basins on third floor of northern building, disconnect and remove all pipes, and make good, complete		3 10 0
	No., 1		Carefully cut back W. end of lantern roof over jobbing-room 9 ft 6 in x 6 ft, complete		10 0 0
			Allow the cost of alterations to design of main corner		600 0 0
			Allow for supervision of works		624 0 0
			Allow for clerical assistance		300 0 0
			Allow for initial cost of plant		454 0 0
			Drains.		
			Allow for opening up and searching for cause of flooding in basement, taking out 1 defective 6 inch drain-pipe and reinstating with new, capping up 4 in. drain-pipe overflow from underground tank, and cutting off water supply		7 10 0
			Cement floor to machine-room.		
			Allow for all work under this heading being done in small quantities, in confined spaces, about machinery in motion.		
Sqs. ft.			Allow for removing 2 printing machines, and wooden furniture and fittings for this work, and afterwards replacing		10 0 0
7 41	Supl.		Taking up and removing old wooden flooring and timbers	30/-	11 2 4
Yds.					
27	Cube		Excavation and basketing out	3/-	4 1 0
27	„		Hard filling under floors and solidly ramming	5/6	7 8 6
81	Supl.		Cement concrete, 6 in. thick, under floor	13/-	52 13 0
80	„		Cement paving, 1 in. thick	4/-	16 0 0
Feet.					
24	Cube		Freestone and all labour, clean chiselled, machine foundations	4/-	4 16 0
29	Run.		12 in. x 7½ in. freestone and all labour, clean chiselled steps	3/-	4 7 0
			Carried to Summary		2,654 18 4
			Mason.		
			Stone from an approved quarry matching stonework of old building		
			Slate, best Welsh.		
			Stone pointed with neat putty joints.		
25	Cube		Freestone and all labour in chiselled window sills	5/-	6 5 0
10	Run.		12 in x 6½ in. freestone, and all labour, chiselled, weathered, and throated coping	2/6	1 5 0
73	„		17 in. x 6½ in. „ „ „	3/6	12 5 6
4	„		22 in. x 6½ in. „ „ „	4/6	0 18 0
			2 freestone and all labour, apex stones to coping 1 ft. 6 in. x 1 ft. 5 in. x 1 ft	86	0 17 0
217	Supl.		4 in. rough stone coring, roughly profiled for cementing	1/-	10 17 0
			Rubbed work.		
28	Cube		Freestone and all labour in rubbed window-sills	5/-	12 5 0
21	„		„ „ moulded „		

					£ s. d.
Feet.					
135	Cube	Freestone and all labour in rubbed pilasters, fourth floor, north building			
242	„ ...	Freestone and all labour in rubbed pilasters, all as last, with checked face			
122	„ .. .	Freestone and all labour in walling, fourth floor, north building			
88	„ .	„ „ in window dressings (large semi windows fourth floor, north building) .. .			
137	„	„ „ all as last to small windows, fourth floor north building	5/-		511 15 0
75	„ . . .	„ „ in moulded string, fourth floor, sill level .			
705	„ ...	„ „ in top cornice, north building			
90	„	„ „ blocking to last			
14	„ .	„ „ terminals			
153	„ ..	„ „ in scrolls, bases, and pilasters to dormers, north building			
91	„ . .	„ „ panel stones to dormers, boasted for carving			
195	„ ..	„ „ in moulded pediments to dormers ...			
	No., 2	Labour only, rubbed checked moulded panels, 5 ft x 3 ft. 6 in. (panel moulding 4 in girt)	35/-		3 10 0
128	Run. ...	Groove in stone for flushing and pointing	-/3		1 12 0
		Jobbing Work			
38	Cube ...	Freestone dressings to chimney stack, taken down, redressed, re-erected, and set complete	1/6		2 17 0
164	„ ..	Freestone cornice, redressed, re erected, and set—top of east wall, north building	1/6		12 6 0
44	Run	12 in. x 6½ in freestone coping redressed, re erected, and set ...	1/-		3 13 0
29	„	17 in x 6½ in „ „ ...			
28	Supl	Checking back of pediment in situ	-/9		1 1 0
40	Run.	Carefully take down old stone balustrade and prepare seating for new work	2/6		5 0 0
	No., 1..	Carefully take down blocking parapet and scroll to ramp of north wall	..		1 0 0
		Carried to Summary	.		587 6 6
Rods ft.		*Bricklayer.*			
6 160	... .	Reduced brickwork in cement mortar in walling, joints prepared for cementing or neatly struck for lime-whiting	£14/10/-		95 10 7
199	..... .	Reduced brickwork in cement mortar in patching and making good small pieces	1/6		14 18 6
1 253	..	Reduced brickwork in cement mortar in raising walls of water tower, prepared for cementing	£16/16/		32 8 6
Yds.					
14	Supl	Allow for extra cost of facing with double pressed bricks .	4/9		3 6 6
14	„ ...	Washing down with spirits of salts and tuck-pointing in lime putty	1/9		1 4 6
27	„ .	„ „ to old brickwork, including raking out old joints	1/9		2 7 3
	No , 4 .	Terra cotta chimney pots set and flaunched in cement	6/-		1 4 0
	No , 16 .	9 in. x 3 in. galvanised iron air-bricks	-/6		0 8 0
Feet.		*Jobbing Work, &c*			
236	Supl.	Draw-tooth and bond old brick walls with new	-/6		5 18 0
59	Run ...	Carefully take down top courses of old 14 in. wall and prepare top surface for new walls of water tower.	-/4		0 19 8
205	„ . ..	Carefully take down stone coping and top courses of old 14 in. walls and prepare top surface for new walls	-/4		3 8 4
6	„ . .	Cut chase in old wall for pipe	-/10		0 5 0
	No , 1	Carefully take down part of old 9 in. chimney breast, say 6 ft. x 2ft	... ..		0 2 6
	No., 4	Carefully take out arches to window and gateway openings and break out defective 14 in. brick walling over, about 5 ft. 8 in. x 7 ft. 4 in. average	.....		0 15 0
	No , 1	Break out in 14 in. wall for end of girder and make good brickwork and cementing	5/-		1 5 0
	No., 4 .	„ „ for ends of timbers and make good brickwork			
	No , 21...	Holes in brickwork for bolts and making good brickwork and cementing	1/-		1 1 0
	No., 6 .	Perforations for pipes in walls, average 23 in. thick, and making good brickwork and cementing	5/-		1 10 0
	No , 2	Enlarging holes through 14 in. walls for pipes and making good brickwork and cementing	5/-		0 10 0
	No., 3 ..	Build-in stereotypers' furnaces complete, 2 ft 8 in. x 2 ft. 6 in. x 2 ft. 7 in high, average, complete	.....		30 0 0
	No., 1 ..	Brick-up hole for pipe and make good cementing—14 in. wall	... ..		0 2 6
Feet.		*Ladies' Lavatory*			
18	Supl.	1¼ in. slate rubbed lavatory top, twice oiled .	2/3		2 0 6
12	Run.	Labour to rounded edge	-/2		0 2 0
	No , 2	Labour to rounded angles	-/6		0 1 0
	No , 4	Perforations for basins, dished . ..	5/-		1 0 0
	No , 4	Perforations for taps	-/6		0 2 0
Sqs ft.		*Roofing.*			
6 72	Supl ..	Countess slating, 20 in x 10 in from stock, on and including 3 in x 1 in new battens (jobbing room roof) ...	12/-		4 0 8
15 4	„ ...	Stripping slating from two roofs over jobbing room for new lantern, &c.	3/6		2 12 8
		Carried to Summary	. .....		207 3 8

squares	feet				£	s.	d.
			Carpenter and Joiner—Flooring.				
	240	Supl.	1 in. hardwood in 6 in. x 4 in joists and trimmers	13/-	1	11	2
	303	,, ...	1 in. Oregon in 6 in x 3 in. joists and 6 in. x 4 in plate	15/-	2	5	5
48	80	,, ...	1¼ in tallow-wood, tongued and grooved flooring, in 4 in widths ...	20/3	49	8	2
1	88	,, ...	1 in kauri, tongued and grooved flooring, in 6 in widths	24/4	8	0	7
4	72	,, ...	,, ,, 4 in. ,, ...				
	47	Run. ..	Labour to rounded edge on flooring	-/1	0	3	11
	192	,, . .	Fillet for lead	-/2	1	12	0
	47	,, . . .	1 in. x 8 in redwood beaded fascia	-/4	0	15	8
	47	,, . .	1¼ in. pine cavetto moulding.	-/1	0	3	11
		No., 9 .	Cesspools for lead floors	2/6	1	2	6
4	72	Supl.	Cut out and take up old flooring ... . square	5/-	1	3	7
			Roof over Northern Building.				
	748	,, ...	1 in Oregon, in 6 in. x 4 in. gutter plates, &c.	15/-			
	52	,, ...	,, 6 in x 1 in ridges...	15/-	12	15	4
	902	,, ...	,, 4 in. x 3 in. studs, &c	15/-			
	1,964	,, ...	,, 6 in x 4 in. wrought all round and stop chamfered, purlin, &c	20/-	19	12	10
	863	,, ...	1 in. Oregon in. 4 in. x 3 in wrought all round and stop chamfered rafter	20/-	8	12	7
	143	Run. ...	Rough cut ribs out of 12 in x 2 in Oregon	1/-	7	3	0
	48	,, ...	8 in. x 4 in. Oregon, wrought rebated and beaded mullion . . .	1/-	2	8	0
	152	,, ...	8 in. x 4 in. Oregon wrought, double rebated, and twice-beaded mullion	1/2	8	17	4
	117	,, ...	8 in. x 4 in. Oregon, wrought, splayed, rebated, and beaded head	1/1	6	6	9
	117	,, .	6 in x 4 in ,, ,, ,, ,, sill ...	-/10	4	17	6
	14	,, .	6 in x 2 in. ,, ,, and weathered sill	-/9	0	10	6
	16	,,	4 in. x 3 in ,, ,, ,, beaded frame	-/6	0	8	0
	2	,, ...	4 in x 3 in. ,, ,, ,, twice beaded mullion	1/-	0	2	0
	21	,, ...	6 in x ¼ in. pine wrought louvres	-/2	0	3	6
	61	,, ...	6 in. x 1 in ,, ,, and beaded fascia	-/3	0	15	3
	112	,, ...	9 in. x 1 in redwood beaded fascia	-/4½	2	2	0
	86	,, ...	9 in. x 1 in ,, ,, blocked out for ventilation	-/8	2	17	4
	32	,, ...	9 in. x 1 in. ,, soffit board perforated for ventilation	-/6	0	16	0
	16	,, ...	5 in. x 1 in ,, beaded fascia circular	-/6	0	8	0
	16	,, ...	4 in. x ¾ in ,, ,, capping to last, circular, screwed with cavetto under	-/8	0	10	8
	71	,, .. .	2 in cedar cavetto moulding	-/6	1	15	6
	195	,, ...	1½ in. roll for zinc	-/2	1	12	6
	93	,, ..	2 in. rolls for lead—flat and gutters	-/2½	0	19	5
	307	,, ...	3 in roll for zinc	-/3	3	16	9
		No , 22	2 in. sugar pine moulded lantern sashes 4 ft 11 in. x 7 ft. 6 in divided with moulded sash bars into 3 lights	46/3	50	17	6
			Lanterns and Skylight over Jobbing Room.				
	32	Supl.	1 in Oregon in 4 in. x 3 in. rafters	15/-	0	8	1
	22	,, ...	1 in. ,, in 6 in. x 3 in. hips				
	289	,, ...	1 in. ,, in 4 in x 3 in. wrought and stop-chamfered rafters	20/-	2	17	10
	51	,,	1 in ,, in 6 in. x 3 in. wrought, stop chamfered, and beaded rafters	-/3	0	12	9
	70	Run.	6 in. x 4 in. Oregon splayed, wrought, rebated, and beaded sill .. .	-/10	2	18	4
	70	,, ...	4 in x 4 in ,, wrought, rebated, and beaded head	-/9	2	12	6
	13	,,	4 in. x 4 in ,, double rebated and four times beaded mullion .	1/-	0	13	0
	46	,, ...	4 in x 3 in ,, ,, ,, .	1/-	2	6	0
	72	,, . .	4 in. x 4 in. ,, wrought, rebated skylight sill	-/8	2	8	0
	59	,, ...	6 in. x 3 in. ,, ,, head	-/8	1	19	4
	127	,, ...	4 in x 3 in. ,, wrought, double rebated, and moulded sash bars	-/9½	5	0	7
	11	,, .	6 in x 3 in. ,, ,, ,, hip sash bars.....	-/11	0	10	1
	111	,, ...	6 in x 1 in redwood wrought and beaded fascia	-/3	1	7	9
	69	,, ...	2 in. redwood scotia	-/2	0	11	6
	17	,, ...	2 in. x 2 in redwood wrought fillet	-/2	0	2	10
	72	,, ...	2 in. x ¾ in ,, ,, chamfered fillet	-/1½	0	9	0
	26	,,	2 in. hip roll	-/2½	0	5	5
		No , 16 ...	2 in sugar pine moulded sashes, 4 ft 1 in x 2 ft 8 in , divided into 4 lights with 1 in. moulded sash bars	13/9	11	0	0
		No., 2 ...	2 in sugar pine triangular moulded spandril sashes, 7 ft. 9 in. x 3 ft. 8 in extreme, divided into 5 lights with moulded sash-bars	21/6	2	3	0
			Roof Sheathing, &c.				
39	74	Supl. ...	1¼ in kauri wrought tongued, grooved, and beaded roof lining in 6 in. widths	25/-			
22	95	,,	1 in. kauri wrought tongued, grooved, and V-jointed roof lining in 4 in. widths	25/-	78	7	3
	16	,, .	¾ in. wrought tongued, grooved, and beaded boarding in small quantities to dormer vents	-/4½	0	6	0
2	68	,,	1 in rough boarding for zinc	16/	2	2	11
2	20	,, . .	1 in. rough roof boarding, circular	30/-	3	8	8
	494	,, ...	1 in. gutter boarding and bearers	-/6	12	7	0
		No., 5	Extra for cesspools	2/6	0	12	6
	36	Supl ...	¾ in kauri wrought tongued, grooved, and V-jointed boarding in 6 in widths, to 2 lantern spandrils	21/6	6	12	3
5	79	,, ...	¾ in kauri tongued, grooved, and V-jointed roof lining in 4 in widths to lantern				
9	32	,,	Cut out and take up old roof lining to lantern over jobbing room .	5/-	2	6	7
			Partitions, Linings, &c.				
	1,296	,, ...	1 in. Oregon, framed in stud partitions	16/-	12	3	10
	228	,, ...	1 in ,, ,, studding, forming lower part of half glass partition				
	20	,,	¾ in kauri wrought tongued, grooved, and V-jointed boarding, 4 in widths . ... square	21/6	0	4	4

Squares	feet				£ s. d.
1	9	Supl.	¾in. kauri wrought, tongued, grooved, and V-jointed boarding, but wrought both sides, 4 in. widths	26/6	1 8 11
3	51	„	¾ in. „ „ „ beaded boarding, in 6 in. widths	21/6	3 15 6
118	0	„	No. 26-gauge small corrugation galvanised iron lining, lapped and screwed on, and including battens, to ceilings and partitions, measured net...	26/6	156 7 0
	75	„	No. 26 gauge ordinary corrugated iron ceilings and battens, measured net	26/6	0 19 11
	249	Run	1 in. redwood scotia moulding	-/1	1 0 9
	19	„	1½ in. x ¾ in. redwood beaded fillet	-/1	0 1 7
	1,643	„	2 in. x 2 in. „ cornice moulding	-/2	13 13 10
	47	„	3 in. x 2 in. „ „	-/3	0 11 9
	294	„	6 in. x ¾ in. „ flat ceiling moulding	-/3	3 13 6
	100	„	4 in. x 3 in. Oregon wrought, rebated, and beaded frame	-/6	2 10 0
	12	„	4 in. x 4 in. „ „ „	-/7	0 7 0
	13	„	4 in. x 3 in. „ „ „ transom, with moulding painted on	-/8	0 8 8
	24	„	4 in. x 3 in. Oregon wrought weathered and beaded capping	-/6	1 1 0
	18	„	4 in x 3 in. „ „ „ sill		
	12	„	8 in. x 3 in. „ „ „ „	-/10	0 10 0
	31	„	8 in x 2 in. Oregon wrought sill with beaded slips planted on both sides	-/9	1 3 3
	4	„	8 in. x 2 in Oregon wrought capping with beaded slips planted on both sides	1/-	0 4 0
	45	„	4 in. x 4 in. Oregon wrought, double rebated, and four times beaded mullions	1/-	2 5 0
		No., 3...	2 in sugar pine moulded sashes, 3 ft. 9 in. x 4 ft., divided into 4 lights with moulded sash bars	18/9	2 16 3
		No., 3..	Ditto ditto, 3 ft. 8 in. x 6 ft. 8 in., as last, but in 6 lights	30/6	4 11 6
		No., 4...	Ditto ditto, 3 ft. 8 in x 6 ft. 11 in , as last ; 6 lights	31/0	6 7 0
		No , 1 .	Ditto ditto, 3 ft. 4 in x 4 ft 8 in , in 4 lights	19 6	0 19 6
			Old partitions adapted and re-erected		
	1,672	Sup.	Carefully take down cedar half glass partitions in clerical division, including doors, and re erecting in new positions where suitable, doing sundry repairs, piecing up old sashes, &c , complete. (1,492 feet sup. refixed)	1/-	83 12 0
	211	„ ...	Carefully taking down cedar half glass partitions to readers' box first floor, north building, and re-erecting in new position in clerical division	-/7½	6 11 11
	324	„ ...	Carefully taking down pine half glass partition from old leather store, adapting and re erecting in new position	-/6	8 2 0
		No., 1...	Adapt and re erect in new position old cedar half glass partition, 8 ft. 8 in. x 7 ft. 6 in., including once varnishing complete (since removed)	.....	3 10 0
	918	Sup.	Carefully taking down half glass partitions in Order and Computing rooms, and removing ..... feet	-/3	11 9 6
	468	„	Carefully taking down boarded partitions on third floor of northern building, and in clerical division, and removing	-/3	5 17 0
		No , 2...	Take out old doors in partitions, and rehang same in new positions	5/-	0 10 0
		No., 1...	Cut away boarded partition to form doorway, and fix old door in same with old architrave both sides	.....	0 15 0
		No., 1...	Opening 6 ft. x 12 ft , filled in with old framing, part hung as door, with old ironmongery, complete	.....	5 8 0
			New work in connection with old partitions.		
	135	Sup.	2 in. cedar moulded, and bead butt framing	2/3	15 3 9
	11	„	2 in. cedar framing, square framed both sides	1/9	0 19 3
	10	„	1¾ in. cedar mouleed and bead butt framing	1/9	0 17 6
	63	„	⅝ in. kauri tongued, grooved, and beaded lining in 6 in. widths, wrought both sides	21/6	0 13 7
	4	„	⅝ in. cedar boarding	-/8	0 2 8
	82	Run.	4 in. x 3 in. cedar double rebated and beaded framing.....	1/2	4 15 8
	22	„	4 in. x 1½ in. „ „ „	1/-	1 2 0
	23	„	4 in. x 3 in cedar moulded cap.....	1/6	1 14 6
	1	„	3 in. x 2 in. cedar moulding	-/6	0. 0 6
	26	„	1¾ in. x ½ in. cedar beaded fillet	-/1	0 2 2
	46	„ ...	3 in. x 2 in Oregon wrought rebated and beaded framing	-/7	1 6 10
	18	„	8 in. x 1 in. redwood double-faced chamfered skirting	-/5	0 7 6
		No., 1 ...	New cedar half-glass partition, 4 ft. 5 in. x 7 ft. 6 in., part hung as door, including glazing, ironmongery, and twice varnishing both sides complete (since removed)	.....	12 8 6
		No., 1 .	2 in. cedar cut bracket standard, 1 ft. 2 in x 4 ft. 11 in	8/6	0 8 6
		No., 2 ...	2 in. cedar moulded and beaded sashes, 1 ft. 2 in. x 2 ft. 10 in.	4/2	0 8 4
		No , 2	2 in. „ „ „ 2 ft. 4 in. x 2 ft. 10 in.	8/3	0 16 6
		No., 2 ...	2 in. „ „ „ 2 ft. 9 in. x 2 ft. 10 in.	9/10	0 19 8
		No., 1 .	2 in. „ „ „ 2 ft. 10 in. x 1 ft. 8 in.	6/-	0 6 0
		No., 1 ..	2 in. „ „ „ 2 ft. 10 in. x 4 ft 1 in. in 4 lights with moulded sash bars	15/6	0 15 6
		No., 10 ...	2 in. „ „ „ 4 ft. 4 in x 2 ft. 10 in., in 2 lights with moulded sash bars	16/6	8 5 0
		No., 1 ...	2 in. „ „ „ 4 ft. 5 in x 8 ft. 6 in in 24 lights with moulded sash bars	50/-	2 10 0
		No , 1 ...	1¾ in. sugar pine „ „ 5 ft 8 in. x 8 ft. 1 in. in 12 lights with moulded sash bars	54/-	2 14 0
			Add 50 % on all new work to old partitions	...	28 9 0
			Well-holes.		
	48	Sup.	1 in. Oregon framed in studding	-/2	0 8 0
1	39	„	¾ in kauri tongued, grooved, and beaded boarding, in 6 in. widths	21/6	1 9 11
13	27	„	1¼ in. kauri wrought and V-jointed both sides tongued and grooved boarding, in 6 in. widths	30/-	19 18 1

ft.	in.				£ s. d.
83	0	Run. ..	1¼ in kauri angle bead	-/1½	0 10 5
266	0	„ .	4 in x 1 in. kauri double-beaded fillet	-/5	5 10 10
261	0	„ .	3 in x 3½ in redwood weathered and rounded capping	-/5	5 8 9
522	0	„	Redwood ovolo bed-mould	-/1	2 3 6
22	0	„ ..	7 in x 1½ in. redwood capping, rounded both edges	-/6	0 11 0
44	0	„ ...	1 in redwood scotia	-/1½	0 5 6
19	0	„	10 in. x ¾ in. redwood beaded fascia	-/4	0 6 4
		No., 1 ..	4 in x 3 in. Oregon chamfered frame, 4 ft 8 in. x 4 ft 8 in, fitted with galvanised iron wire netting, ¾-in. mesh		0 15 0
		No., 1	Cut away flooring, joists, and ceiling lining for well hole, 4 ft. 8 in x 4 ft. 8 in., and trim joists, and make good flooring and ceiling .. .		3 0 0
		No., 3 .	„ „ „ „ all as last, for well holes 20 ft. 4 in. x 11 ft. 6 in.	£10	30 0 0
		No., 1 ..	„ „ „ „ joisting and ceiling lining only, 20 ft. 4 in. x 11 ft 6 in.	£10	10 0 0
			Door Frames and Linings		
48	0	Supl. ..	1½ in. cedar double rebated jamb linings	-/8	1 12 0
5	0	„ .. .	¾ in. kauri boarding under side-lights	-/3	0 1 3
4	0	Run. .	4 in. x 3 in. cedar beaded transom	-/9	0 3 0
26	0	„ ..	5 in. x 4 in. Oregon wrought, rebated, and beaded frame	-/10	1 1 8
15	0	„	5 in. x 4 in. Oregon, wrought double rebated, and beaded mullion }		
6	0	„ .	5 in. x 4 in „ „ sill ... . }	1/-	1 7 0
6	0	„	5 in x 4 in. „ „ transom ... }		
			Doors.		
		No, 5 .	1¾ in cedar 4 panel doors, 3 ft. x 7 ft., moulded both sides from stock	20/-	5 0 0
		No, 1 ..	2 in sugar pine 3 panel door, 3 ft. x 7 ft, upper panel in 4 lights with 1-in moulded sash bars, moulded both sides	36/-	1 16 0
		No, 4 ..	1¾ in. sugar pine framed and ledged doors, 2 ft 9 in x 6 ft. 6 in.	21/-	4 4 0
		No, 1	1⅜ in. sugar pine moulded fanlight, 3 ft x 1 ft. 10 in.	6/6	0 6 6
		No, 1	2 in. „ „ 5 ft 3 in. x 2 ft. 5 in, in 6 lights, with moulded bars	16/-	0 16 0
		No, 2 ..	2 in. sugar pine moulded side lights, 11 in. x 3 ft 2 in.	3/6	0 7 0
			Windows.		
		No., 3 ..	Openings, each containing No. 2 pairs 2-in moulded sugar pine sashes, hung with best brass faced axle pulleys, patent lines, and iron weights in redwood box frames and rebated and weathered hardwood sills, with cased mullion to match, each 51 ft. 4 in superficial	85/6	12 16 6
		No, 5	Refix old pairs sashes and frames from stock...	30/-	7 10 0
		No, 4	2 in cedar moulded sashes, 4 ft. x 3 ft. 5 in. . . .	17/-	3 8 0
		No, 2 ..	2 in. „ „ 3 ft. 6 in. x 2 ft. 6 in	11/-	1 2 0
		No, 4 .	2 in. „ „ with circular side, 2 ft. x 2 ft 6 in.	8/9	1 15 0
		No, 4	2 in. „ „ „ 1 ft 4 in x 1 ft. 2 in	7/6	1 10 0
		No, 2	2 in cedar segmental headed moulded sash, 3 ft 6 in. x 1 ft. 9 in., with moulded bars (in 3 lights)	8/8	0 17 4
		No, 4	2 in cedar semiheaded moulded sash, 4 ft x 2 ft. 4 in, and bars (in 8 lights)	14/-	2 16 0
		No., 8	Allow for setting box frames in cement	1/-	0 8 0
		No, 6	„ „ „ green baize and white lead . .	2/6	0 15 0
40	0	Run. . .	5 in. x 4 in cedar, rebated and double-moulded frame	1/-	2 0 0
59	0	„ ...	5 in. x 4 in. „ „ „ circular	4/6	13 5 6
14	0	„ . ..	6 in x 5 in. cedar, sunk, weathered, double rebated, and double-moulded transom	1/10	1 5 8
18	0	„ ...	10 in. x 8 in cedar built moulded transome with raised panel	3/10	3 9 0
16	0	„ . .	5 in. x 4 in. cedar, double rebated, double throated, and 4 times moulded mullion	1/9	1 8 0
35	0	„	5 in. x 4 in. hardwood, sunk, weathered, grooved, and throated sill, double rebated	1/-	1 15 0
			Architraves, &c.		
220	0	„ ...	3 in. redwood moulded architrave	-/1½	1 7 6
22	0	„ ...	1½ in. x 7 in redwood rounded window board	-/4½	0 8 3
183	0	„	1 in. guard mould around frames	-/1	0 15 3
58	0	„	1 in. „ circular	-/2	0 9 8
			Staircase, Northern Building.		
			Allow for seasoning timber by patent kiln-drying process	... .	Included in timber.
		No., 1	Tallow-wood staircase, containing 11 steps 5 ft. long, 8, 4 ft. 9 in long, and 6, 4 ft 8 in long, in three flights, with one quarter space landing 4 ft 10 in. x 5 ft. 3 in, and 1 ditto 4 ft 9 in x 4 ft. 8 in ; 1½ in. treads, with rounded nosings and scotias, 1¼ in risers; 2 in. ovolo moulded wall string, 17 in x 2 in. outer strings, with 4 in x 3 in cap mould, and bold moulding and scotia at bottom (2 outer strings to lowest flight); 2 rounded ends to bottom step; wall string carried round two sides of upper landing and one side of lower, as skirting, with sweeps and ramps, nosing and cavetto on one side of lower landing, and 15 in x 2 in moulded apron lining, 1¼ in. x 4 in. tallow wood flooring, 6 in x 4 in joists, 6 ft x 5 in. trimmers and ceiling joists; 36 ft run 4 in x 3 in, tallow-wood moulded handrail; 46, 2 in. x 2 in square cut moulded balusters 2 ft high, and 9 ditto 2 ft 9 in high, 2, 6 in. x 6 in. square-cut newels, with moulded caps, 5 ft 1 in. high, 1 ditto, 10 ft. 3 in high, carried below stairs to floor and moulded between, 3 ditto, 7 ft, 1 in. high, with moulded caps and pendants, 4 6 in. x 4 in. carriages; the whole blocked, bracketed, &c, complete	. . .	110 17 0

					£ s. d.
		No., 1 ..	Tallow-wood staircase, all as described on pp. 23 and 24, but with 5 newels, 7 ft 1 in. high; and 1, 12 ft. 4 in. high, all with pendants	.....	110 17 0
		No, 1 ..	Tallow wood staircase, all as described on pp. 23 and 24, but with 8 steps, 5 ft 1 in long, 15, 5 ft. long, and 2, 4 ft 7 in long, 1 quarter space landing, 5 ft 2 in x 5 ft 3 in.; and 1 ditto, 5 ft 1 in x 5 ft 2 in, 6 newels as last item, wall string, breaking around pier, and 35 ft run handrail	. .	110 17 0
		No, 1 .	Tallow-wood staircase, all precisely as last item, but with 8 steps, 5 ft 1 in. long, and 17 steps, 5 ft long, no break in wall string	... .	110 17 0
sq.	ft. in.				
	164 0	Supl. ...	Lattice work of 2 in x 2 in. tallow-wood, halved together, forming squares 4½ in x 4½ in., in spandrils, &c ...	5/-	41 0 0
6	43 0	„	⅝-in. tallow-wood, tongued, grooved, and V jointed lining to soffits, in 4 in widths		
	4 0	„	⅝-in. „ „ „ spandril lining		
	105 0	Run	12 in. x 2 in tallow-wood, moulded apron lining, with scotia planted on		
	8 0	„	12 in. x 2 in tallow-wood, ovolo-moulded skirting		
	91 0	„	4 in. tallow-wood nosing and scotia		
	8 0	„	3½ in. x ½ in tallow-wood chamfered skirting		
	9 0	„	9 in. x 1½ in. „ rounded coverboard ..		
	125 0	„	4 in x 3 in. „ ovolo cornice moulding and mitres	... ..	Included.
	20 0	„ ..	2 in x 2 in. „ moulding		
	57 0	„	4 in x 3 in. „ moulded handrail to landings		
		No., 6	Extra only to sweeps and ramps		
		No, 5	6 in. x 6 in tallow-wood newels, as before described, with pendants 6 ft. 1 in. high over all		
		No., 14	2 in. x 1 in. tallow wood moulded fillets around pendants		
		No, 104 .	2 in. x 2 in balusters as before described, 2 ft 9 in high		
		No, 3 .	2 in. x 2 in „ „ 3 ft. 1 in high		
		No, 3..	2 in. x 2 in. „ „ 3 ft 8 in. high		
			Allow extra for work to these staircases being executed, one staircase at a time, and timber for basement stairs	.	15 0 0
		No., 4...	Carefully take down old staircases, with half-space landings, and iron-lined, enclosing stud partitions, with doors, &c, and remove same, complete. (Ground to fourth floor, North building)	6/5/-	25 0 0
		No, 4 ...	Cut away joists, flooring, and ceiling lining, to enlarge well-holes for stairs, from 12 ft. x 7 ft. 6 in. to 16 ft. x 13 ft. (average); trim joists with 9 in. x 4 in. trimmers, and make good floors and ceilings	£10	40 0 0
			Staircase from yard to 3rd floor.		
		No., 1 ...	Kauri pine staircase, containing 14 steps, 3 ft. 5 in. long, and 4 winders in three flights, with 1 quarter-space landing, 3 ft. 5 in x 3 ft 5 in, 1½ in. treads, with rounded nosings and scotias, 1 in. risers, 1¾ in. plain wall string, 15 in x 2 in. plain close outer string, bottom step rounded, wall string carried along one side of landing, with sweeps and ramps; include joisting and flooring to landing, 12 ft. run. 4 in. x 3 in. kauri rounded and reeded handrail, 22 1½ in. square-bar balusters, 4, 4 in. x 4 in. square newels with cut tops (3 with pendants), 3, 4 in x 3 in. carriages, the whole blocked, bracketed, &c., complete	.....	20 5 0
		No, 1 ..	Kauri staircase generally as above described, with 22 steps, 3 ft. 5 in. long, and 2 winders in four flights with 2 quarter-space landings, with wall string along two sides of lower and one side of upper landing; 18 ft run handrail, 34 balusters, and 5 newels (3 with pendants) complete	...	27 0 0
		No., 1 ...	Kauri staircase generally as by described on page 27, with 23 steps 3 ft. 5 in. long, and 2 winders in four flights; 2 quarter-space landings, with wall-string along two sides of lower and one side of upper landing; 20 ft. run of handrail, 36 balusters, and 5 newels (3 with pendants) complete	. ....	28 2 6
1	26 0	Sup ...	¾ in baltic beaded, tongued, and grooved lining in 6 in. widths, from stock to spandrils, including new wrought bearers and fillets ..		
	36 0	„ . .	¾ in kauri wrought and V-jointed both sides, tongued and grooved lining in 4 in. widths to spandrils		
2	45 0	„	¾-in kauri, wrought, tongued, grooved, and V jointed soffit lining in 4 in. widths		
	4 0	Run .	8 in. x 1 in kauri beaded apron lining		
	39 0	„	10 in x 1 in „		
		No, 1	Extra for small rounded end		
	31 0	Run	4½ in kauri nosing and scotia		Included.
	18 0	„	8 in „ „		
		..... .	No 1 extra to rounded end		
	20 0	Run ..	Redwood scotia		
	137 0	„	2 in cedar ceiling moulding		
		....	No. 1 extra to small turned ceiling moulding (diameter 9 in.) .		
	13 0	Run	Ovolo bed mould		
	36 0	„	4 in x 3 in kauri rounded and reeded handrail to landings		
		No., 5 .	4 in x in. kauri newels, as before described		
		No, 80	1½ in. square bar kauri balusters, 2 ft 6 in high		
		No., 2 .	Cut away flooring and joists and trim for staircase well-holes 12 ft. x 8 ft 3 in., and make good	70/-	7 0 0
			Sundries		
	313 0	Supl	1 in. Oregon in timbers to carry shafting in stamp-room, 6 in. x 4 in and 10 in. x 4 in. wrought	Square 40/-	8 2 10
	94 0	„	1 in. hardwood from stock in timbers to carry shafting in Stamp-room, 10 in x 4 in. wrought		
	96 0	„	Decking of 2 in. x 1 in. hardwood battens, 1 in apart, on and including 3 in. x 1 in bearers	-/4½	1 16 0
	465 0	„	1 in wrought both sides shelving and bearers	-/6	11 12 6
	38 0	Run	Beaded pipe casing	1/-	1 18 0

ft.	in.				£	s.	d.
9	0	Run ...	12 in. x 3 in hardwood chamfered head to gate frame	....	3	0	0
12	0	„	5 in. x 3 in Oregon wrought and moulded bearer to lavatory top...	1/-	0	12	0
23	0	„ . ..	3 in x 2 in. Oregon rough bearer to lavatory top	-/2	0	3	10
11	0	„ ..	5 in redwood moulded skirting ...	-/4	0	3	8
49	0	„ . .	3 in. x ½ in. redwood chamfered skirting ..	-/2	0	8	2
		No , 1 ..	Camera stand, about 20 ft long , allow for afterwards taking down and removing same	....	5	0	0
		No , 1	1½ in kauri dovetailed trough, 4 ft x 2 ft. 6 in. x 3 ft. in clear, blocked up	30/-	1	10	0
		No , 1 ..	1½ in. kauri dovetailed sink, 3 ft. x 2 ft. x 10 in. in clear, and framed bearers	13/6	0	13	6
		No , 5 .	1¼ in kauri dovetailed sinks, 4 ft. x 3 ft. x 9 in. deep in clear, with 4 in. x 3 in. wrought framed bearers, and small platform inside. .	25/9	6	8	9
		No., 2 .	1¼ in kauri dovetailed sinks (all as last), 3 ft. 9 in. x 2 ft. 3 in x 9 in. (all as last)...	25/-	2	10	0
		No , 1 ...	1¼ in. „ „ (all as last), 3 ft 7 in. x 2 ft 9 in x 11 in. (all as last) ..	30/-	1	10	0
		No , 1 .	1¼ in. „ „ (all as last), 3 ft 9 in. x 2 ft. 3 in x 9 in. (all as last) ...	25/-	1	5	0
		No , 1 ..	1½ in. kauri pine table, 5 ft. 6 in. x 3 ft. 3 in. 2 ft 7 in. high, with No. 2 drawers	.....	1	15	0
		No , 1 .	1½ in. kauri pine-table 18 ft. 9 in. x 3 ft. x 2 ft. 9 in. high, with framed bearers, and 4 in. x 3 in. legs	.....	5	5	0
		No., 1	1½ in. kauri pine table, 16 ft. 3 in. x 3 ft. x 2 ft 9½ in. high, with framed bearers and 4 in. x 3 in. legs . . .	.....	4	18	0
		No , 1 ..	1½ in. kauri pine table 16 ft. 10 in. x 3 ft. x 2 ft. 9 in. all as last	.....	5	0	0
		No., 1 ...	1½ in „ 15 ft. 6 in. x 3 ft. x 2 ft. 9 in. „	.....	4	13	0
		No , 1 ..	1½ in. „ 13 ft. 2 in. x 3 ft. x 2 ft. 9 in. „	.....	3	19	0
		No , 1 .	1½ in. „ 13 ft. x 3 ft. x 2 ft. 9 in. „	.....	3	18	0
		No , 1 .	1½ in. „ 11 ft. 1 in. x 3 ft. x 2 ft. 9 in. „	.....	3	7	6
		No , 1	1½ in. „ 10 ft 10 in. x 2 ft. 11 in. x 2 ft. 9 in „	.....	3	4	0
		No , 1	1½ in. „ 7 ft. 4 in. x 3 ft. x 2 ft. 9 in. „	... ..	2	4	0
		No., 1 ..	1½ in „ 7 ft. 1 in x 3 ft. x 2 ft. 9 in. „	.....	2	2	0
		No., 1	1½ in „ 7 ft x 5 ft. x 2 ft. 9 in. „	....	3	10	0
		No , 1 ...	1½ in. „ 6 ft. x 3 ft. x 2 ft. 9 in. „	....	1	16	0
		No , 1 ..	1½ in. „ 5 ft. 9 in. x 3 ft. 6 in x 2 ft. 9 in. „	... ..	2	0	0
		No., 2	1½ in „ 5 ft. 8 in x 3 ft x 2 ft. 9 in. „	34/-	3	8	0
		No., 1 ..	1½ in. „ 4 ft. 6 in. x 3 ft. x 2 ft. 9 in. „	.. ...	1	7	0
		No , 1	1½ in „ 3 ft. 8 in x 3 ft. 3 in. x 2 ft. 9 in. „	.....	1	4	0
		No , 1	1½ in „ 2 ft. 4 in x 2 ft. x 2 ft 9 in. „	.....	1	0	0
		No , 1 ..	1½ in „ 1 ft. 1 in x 3 ft 1 in x 2 ft 9 in. „				
		No., 1 .	Set framed bearers for washing drum in toning room ..	. ..	0	15	0
		No , 1 ..	1 in kauri cutters' locker 4 ft. 1 in. x 1 ft. 7 in. x 1 ft. 11 in., with lid ..	31/6	1	11	6
		No , 1 ..	1 in. kauri cutters' locker 2 ft 7 in. x 1 ft 5 in. x 1 ft. 11 in. ...	17/6	0	17	6
		No , 2	1 in cut brackets 10 in. x 12 in ...	2/6	0	5	0
		No , 1 ..	1½ in sugar pine kauri mounting drum 12 ft. 1 in. long x 4 ft diameter, with 4 ft. x 4 in centre, shaft, No. 4 4 in x 3 in longitudinal timbers, No. 8 4 in. x 3 in. struts to same, No 5 circular ribs out of 9 in. x 2 in. stuff, with 4 in. x 3 in. strutting, 1½ in. kauri ends ...	... ..	11	10	0
		No., 2	Oregon standards to mounting drum 4 ft high, 6 in. x 4 in. upright, 6 in. x 4 in sill, and 4 in. x 3 in. struts—22 ft. sup. 1 in. Oregon in each	. ...	(Included)		
		No., 6 .	Planks for walking over iron and glass roofs	7/6	2	5	0
			Centres, &c.				
93	0	Supl ...	1 in. hardwood in lintel	15/-	0	13	11
		No., 2 ..	Semi-centres to 8 ft 6 in. opening 18 in. soffit	25/-	2	10	0
		No , 4 ..	„ 4 ft. 6 in „ 18 in. „				
		No , 12 ..	„ 2 ft. 6 in „ 14 in. „				
		No , 7 ..	Segmental centres 5 ft 9 in. „ 9 in. „	7/6	13	2	6
		No , 7 .	„ 3 ft 6 in „ 9 in. „				
		No , 5	„ 3 ft „ 5 in. „				
			Jobbing Work, &c.				
11	0	Run. .	Cutting away eaves of old lift roof, and trimming roof timbers to suit new main roof	. ..	7	0	0
		No , 1 ..	Take to pieces revolving camera stand, remove from 4th floor, north building, and re-erect in new photo gallery. Include for taking up old rails, and screwing to new gallery floor	....	3	10	0
		No , 7 ...	Cut away floors for cesspools	3/6	1	4	6
			Allow for removing photographers' furniture from 4th floor, north building, to new photo rooms, taking down and refixing shelving, &c	.....	8	11	0
			Allow for removing and refitting furniture and fittings, cupboard, and counters from old to new leather store	.....	2	0	0
			Allow for removing 8 tables and 3 presses from o'd to new Sewing-room	.....	1	0	0
			Allow for removing and refixing pigeon-holes in clerical division ...	. . .	3	10	0
			Allow for material and overtime, shifting machinery and furniture of Press-room, patching flooring and replacing fittings, &c.	.....	Nil.		
			Allow for carpenter's assistance to Government Printer's engineer in fixing timbers for shafting	... .	1	10	0
		No., 1 ..	Adapt and fix old counter from stock	.	1	5	0
		No., 1	Alter, cut, and refix old cedar counter, part circular, on plan 10 ft 1 in. girth, making good with new bearers, &c .. .	....	3	15	0
		No., 1 ..	1¾-in. cedar flap to last counter, 2 ft. 9 in x 2 ft 3 in., framed and screwed, moulded two edges to match counter, with 3 in. x 2 in. cedar moulded cut rail plugged to wall	.....	1	5	0

					£ s d.
	No, 2	1½ in cedar 4 panel moulded and square framed cupboard, doors 2 ft 5 in. x 6 ft 10 in, hung to slide, with runners and beads—include for piecing up cupboard to receive same	40/		4 0 0
	No, 1	Take out door and frame and remove ..	5/		0 5 0
square ft in					
35 53 0	Supl ...	Strip off paper and prepare wood ceilings, &c, to receive duresco with any necessary patching ..	Square 3/		5 6 7
	No, 4	Carefully shoring and supporting stone window sills, sashes, and frames .	20/		4 0 0
	No, 4	Carefully shoring and timbering floors, &c, over window and gate openings from floor below	20/-		4 0 0
	No, 11	Carefully shoring and timbering floors, &c, while forming wellholes for stairs, &c	30/		16 10 0
		Allow a moiety of the cost of lining composing room roofs with felt			30 0 0
		Carried to Summary		£	1,813 16 11
		Ironmonger			
	No, 18	Pairs 2½ in. iron butts		/4	0 6 0
	No, 16	„ 4 in „		-/6	0 8 0
	No, 1	„ 3½ in brass butts		1/3	0 1 3
	No, 5	6 in rim locks and furniture		3/-	0 15 0
	No, 4	5 in brass barrel bolts		1/	0 4 0
	No, 4	2½ in brass door knobs		1/	0 4 0
	No, 6	Sets Preston fanlight openers		13/-	3 18 0
	No, 2	Brass thumb catches		1/	0 2 0
	No, 1	Brass spring catch and striking plate to counter flap		2/6	0 2 6
	No, 2	Wood drawer knobs		/6	0 1 0
	No, 2	Drawer locks		3/6	0 7 0
	No, 8	Sets fanlight openers and shafting, &c, &c, complete to Jobbing room—Mounteney & Co's vouchers .		5/17/6	47 0 0
	No, 3	Chubb's locks for iron safes		51/	7 13 0
		Carried to Summary		£	61 1 9
cwt qr lb		*Smith and Founder*			
1 0 6		Wrought iron in tie rods and plates, drilled		/4	1 19 4
1 0 10		„ in templates under girders ...		/4½	2 5 9
1 1 8		„ in straps and bolts		30/	1 19 8
1 3 6		„ in girder connections drilled for bolts		42/	3 15 9
0 0 25		„ in extension of ladder to water tower, including taking down and re erecting ..		..	2 0 0
1 3 23	..	Wrought iron in platform to water tower			5 15 0
4 1 23		„ in brackets and bolts to furnace hood		/4½ lb	9 7 2
1 1 0		„ in suspension rods to platform in Numbering room		/4 lb	2 6 8
1 2 6		„ in circular rails for camera stand (including afterwards taking up and removing same), drilled and screwed every 12 in, and centre pin and rings			3 18 0
	No, 2	Wrought iron roof principals with cast-iron bracket struts, each weighing 5 cwt 3 qr 7 lb, including shoes, bolts, and cleat complete, to match old			18 11 4
	No, 6	Straighten roof principals from stock, hoist and refix, complete		.	1 10 0
	No, 4	8 in wrought iron round brackets to lavatory top		2/6	0 10 0
	No, 56	Wrought iron caps and bases to stanchions		5/9	16 2 0
	No, 28	Fixing only „ ...		. 5/-	7 0 0
	No, 1	Wrought iron tank, 17 ft x 9 ft x 9 ft 6 in, with man hole and step ladder through same zinc cornice around top, 121 ft rim of 1 in iron in scroll, 1 centre finial and cap complete, and hoisting to top of water tower, and painting with patent asphalting paint			144 15 0
		Allow for cramps in stonework		...	2 10 0
69 3 18		Steel in rolled joists, 12 in x 5 in and 4 in x 3 in, and hoisting		12/	41 18 11
12 2 13		Steel in 5 rails as joists and hoisting to water tower .		8/-	5 1 0
30 1 22		Cast iron in 9 columns, drilled for bolts and hoisting		11/6	17 10 3
ft in					
294 0	Run	2 in x ¼ in cast iron chequered nosings screwed to stair treads		/8	9 16 0
	No, 117	Drilling holes in girders *in situ* ...		/6	2 18 6
		Paste room, 4 brackets and railing .			4 8 0
		Type casting machine		109/ /	109 15 8
	{	Haddon & Co } Carried to Summary		£	415 13 0
	{	Hopkinson }			
cwt. qr lb		*Plumber*			
104 0 18		Milled lead and labour in roofs, &c, include copper nailing, galvanised iron clips, &c .		18/-	93 14 11
36 0 20		Milled lead in floor coverings and cesspools		18/	32 11 3
17 0 21		„ in sinks and troughs, include copper nailing and soldering		30/	25 15 8
6 1 12		Cast lead in templates to columns .		18/	5 14 5
square ft in					
698 0	Supl	No 10 gauge zinc, with melted joists, screwed, include for clips and solder		/10	29 1 8
42 50 0	„	No 26 gauge corrugated galvanised iron roofing, properly lapped and secured on, and including 3 in x 1 in battens, measured net		25/-	53 2 6
2 34 0	„	No 26 gauge corrugated galvanised iron roofing as last bent to curve		27/	3 3 2
18 27 0	„	Corrugated galvanised iron roofing from stock, on, and including new 3 in x 1 in battens, measured net		6/6	5 18 9
114 0	Run	Rolled edge to iron roofing .		/1	0 9 6
238 0	,	Galvanised iron ridging 16 in wide		/7	6 18 10
70 0	„	3 in galvanised iron O G moulded eaves gutter, including all angles, outlets stopped ends, &c		/6	1 15 0
61 0	„	4 in galvanised iron O G moulded eaves gutter, including all angles outlets, stopped ends, &c .. .		/8	2 0 8

ft.	in.				£	s.	d.
10	0	Run	.....	2 in. galvanised iron downpipe, including all bends, shoes, ears, spikes, &c. ..... -/5	0	4	2
17	0	„	.....	2½ in. galvanised iron downpipe, including all bends, shoes, ears, spikes, &c. ..... -/6	0	8	6
156	0	„	.....	4 in. galvanised iron downpipe, including all bends, shoes, ears, spikes, &c. ..... -/10	6	10	0
42	0	„	.....	4 in. diameter lead down pipe, including all ears and spikes, and collars 2/-	4	4	0
		No.,	2...	4 in. lead swan-necks from cesspools 7/-	0	14	0
		No.,	5...	Octagonal galvanised iron downpipe heads 6/-	1	10	0
		No.,	5...	Domical galvanised wire gratings 1/6	0	7	6
		No.,	7...	Connections, old, to new down pipes ..... -/6	0	3	6
				W.C's., Lavatories, &c.			
42	0	Run	.....	1¼ in. lead fall pipe ..... -/9	1	11	6
32	0	„	.....	1½ in. lead waste and vent pipe, including bends, joints, &c. ..... -/10	1	6	8
156	0	„	.....	2 in. lead „ „ „ 1/-	7	16	0
27	0	„	.....	2½ in. lead „ „ „ 1/3	1	13	9
39	0	„	.....	4 in. lead soil pipe 2/-	3	18	0
		No.,	6...	Extra for bends 2/6	0	15	0
		No.,	3...	Extra for junctions 5/-	0	15	0
		No.,	3...	Extra for connections to old soil pipes 7/6	1	2	6
4	0	Run	.....	2 in. galvanised wrought-iron waste pipe 1/6	0	6	0
		No.,	2...	Tylor's "Compound" w.c's., seats, and lead traps ..... } £5	30	0	0
		No.,	4...	Tylor's "Tower" „ „ ..... }			
		No.,	4...	16 in. diameter, Tylor's lavatory basins with flushing rims, brass washers, and vulcanite plugs 23/-	4	12	0
		No.,	2...	20-gallon galvanised iron flushing cisterns, and 3 in. x 2 in. hard-wood bearer complete 24/4	2	8	8
		No.,	2...	2-gallon automatic flushing cisterns and brackets 45/-	4	10	0
		No.,	4...	Tylor's tower flushing cisterns and brackets. Include for back boards to brackets plugged to wall	Included.		
		No.,	6...	Connections, soil pipe to w.c's 10/-	3	0	0
		No.,	28...	Connections, wastes to fittings, &c. 5/-	7	0	0
		No.,	4...	2 in. lead syphon traps with brass screws and joints 7/-	1	8	0
		No.,	1...	4 in. lead diminishing socket and joints 7/6	0	7	6
		No.,	2...	2 in. brass washers and gratings 1/6	0	3	0
		No.,	10...	2 in. brass washers, plugs, and chains 5/-	2	10	0
		No.,	9...	Lead dome gratings 2/6	1	2	6
		No.,	1...	2 in. brass stop cock on waste pipe 20/-	1	0	0
		No.,	1...	Cast-iron sink, 24 in. x 14 in. x 8 in., with brass plug, washer, and chain 27/10	1	7	10
				Water Supply.			
				Allow for opening up the main and laying on water	5	0	0
32	0	Run	.....	¾ in. galvanised wrought-iron piping with all necessary T's., &c., &c. -/6	0	16	0
82	0	„	.....	1 in. „ „ „ ... -/9	3	1	6
190	0	„	.....	1¼ in. „ „ „ ... 1/-	9	10	0
9	0	„	.....	1½ in. „ „ with T's., &c., &c. 1/3	0	11	3
146	0	„	.....	2½ in. „ „ 2/6	18	5	0
5	0	„	.....	2½ in. „ „ and excavation 2 ft. deep 2/9	0	13	9
38	0	„	.....	¾ in. lead water piping, including all bends, &c., complete ..... -/6	0	19	0
4	0	„	.....	1 in. „ „ „ ..... -/8	0	2	8
		No.,	1...	2½ in. ball cock 70/-	3	10	0
		No.,	1...	1½ in. „ 32/6	1	12	6
		No.,	1...	2½ in. stop-cock and footpath box 57/-	2	17	0
		No.,	1...	1¼ in. „ 10/-	0	10	0
		No.,	1...	1 in. „ 7/6	0	7	6
		No.,	4...	¾ in. h.p. bib-taps 3/9	0	15	0
		No.	2...	¾ in. „ screwed for holes 7/6	0	15	0
		No.	8...	12 in. lengths of ¾ in. galvanised iron pipes with ¾ in. h.p. bib cock, with hose union, rubber hose, and rose nozzles (hose, say, 12 in. long) 15/-	6	0	0
		No.,	1...	¾ in. bend, with ¾ in. h.p. tap for hose union and 4 ft. length of rubber hose, with plated spray nozzle and connections 20/-	1	0	0
		No.,	1...	Short ¾ in. hose and rose nozzle 10/-	0	10	0
		No.,	4...	¾ in. brass h.p. screw-down lavatory valves, with cross-bar handles, and tinned joints, back nuts, flanges, and sockets complete. (Included with basins).			
		No.,	3...	Connections, new, to old water pipe 1/-	0	3	0
211	0	Run	.....	1¼ in. galvanised iron water pipe, with bends, &c., and include for afterwards taking down and removing 1/-	10	11	0
		No.,	6...	¾ in. h.p. bib-taps, and include for afterwards taking down and removing 3/9	1	2	6
				Allow for laying on a temporary water supply to portable room at end of photo. gallery, with 1 tap, and lead connections to fittings, and afterwards taking down and removing	2	10	0
				Allow for taking down piping to 3 flushing cisterns, 4th floor, northern building; 4, cisterns, each on 3rd, 2nd, 1st, and ground floor; 5 cisterns in basement, 3 lavatory basins, 1 stand-pipe, and 1 ball-cock; disconnecting, cleaning out pipes, cisterns, and taps; making good, refixing, and leaving perfect. (Include for, say, 20 ft. of new 1 ft. 4 in. lead pipe)	16	4	0
				Allow for taking down branch pipes to (say) 40 lavatory basins at east end of northern building, unscrewing taps, cleaning out and refixing, complete. (Some of these basins since removed)	15	0	0
				Sundries.			
23	0	Run.	.....	4 in. diameter of galvanised iron vent tube, including fixing with galvanised iron straps and wire ..... -/10	0	19	2
		No.	2...	Extra only to L's ..... } -/6	0	2	0
		No.	2...	Extra to junctions ..... }			

ft.	in.				£	s.	d.
21	0	Run.	1¼ in. galvanised iron gas pipe, from stock, to support vent tubes, including bends and 1 flange, screwed to floor	1/9	1	16	9
					0	0	6
23	0	„	1 in. gas-pipe, from stock, to support vent tubes, including bends, and 1 flange, as last item	1/6	1	14	6
					0	0	6
4	0	„	4 in. x 2½ in. copper vent tube	3/-	0	12	0
		No., 1	Extra to L	1/-	0	1	0
1	0	Run.	4 in. drain iron flue, blacked	1/6	0	1	6
13	0	„	9 in. „ „ including iron clips	2/6	1	12	6
			1 extra to elbow	2/6	0	5	0
			1 extra to bend				
		No., 2	9 in. x 3 in. galvanised iron vent tubes through stud partition	2/6	0	5	0
8	0	Run.	9 in. diameter galvanised iron vent tube (water tower)	7/-	0	16	0
		No., 1	Take off cowl, and afterwards refix at higher level	5/-	0	5	0
		No., 1	Black iron hood over furnaces, 13 ft. x 4 ft. 8 in. x 3 ft. 9 in., with 2 enclosed ends and rolled edge		9	15	0
		No., 1	4 in. cast-iron vent pipe, about 50 ft. long, with No. 1 connection to drain in lane, and 1 cowl, afterwards taking down and removing		4	3	4
54	0	Supl.	Galvanised iron and asbestos mill-board under furnaces, &c.	1/8	4	10	0
3½	0	Run.	Extension of lightning conductor to water tower	2/-	3	8	0
		No. 1	Spear terminal		1	2	6
11	0	Run.	Cutting galvanised iron lining to studding of lift roof, to fit rake of new main roof, and dressing over new iron	-/6	0	5	6
3	0	„	End of corrugated iron dressed to stone		0	2	6
			Allow for raking out, wedging, and pointing flashings		3	10	0
		No, 1	Ventilation system complete in basement		82	16	0
			Gas service.				
111	0	Run.	⅜ in. brass gas tube, and all joints, &c.	-/3	1	7	9
203	0	„	½ in. black iron pipe, including all necessary T's, L's, junctions, holdfasts, &c.	-/3	2	10	9
143	0	„	¾ in. black iron pipe, as in last	-/5	3	1	8
54	0	„	1 in. „ „	-/7	1	11	6
80	0	„	1¼ in. „ „	-/8	2	13	4
1	0	„	1 in. lead gas-pipe	-/8	0	0	8
2	0	„	¾ in. „	-/6	0	1	0
		No., 1	½ in. brass stop cock	2/6	0	2	6
		No., 4	Brass double cocks for flexible pipe	1/3	0	5	0
		No, 6	1-light pendants	7/6	2	5	0
		No, 1	1 „ and afterwards taking down and removing	10/-	0	10	0
		No., 6	Iron 2 light pendants	15/-	4	10	0
		No, 4	„ „ brass mounted	21/-	4	4	0
		No., 1	Iron 4-light pendant	25/-	1	5	0
		No., 7	Two-arm gas brackets	7/6	2	12	6
		No, 1	Small brass movable gas standard, with arm and double burner and flexible hose pipe complete	15/-	0	15	0
		No, 10	Cedar roses	-/9	0	7	6
		No, 25	Iron shades from stock, and new galleries	2/6	3	2	6
			Allow for taking up about 10 ft. run of 1¼ in. gas pipe, refixing to altered course, making good with 10 ft. run of new pipe, including bends, &c.		0	11	8
			Allow for taking up about 18 ft. run of 1 ft. 4 in. gas pipe, and refixing to altered course with 10 ft. run of new pipe		0	15	0
			Allow for fixing cocks to furnaces, &c., supplied by Government Printer		1	2	6
			Jobbing Work, &c.				
		No., 2	Carefully take down closets, seats, and risers, and remove		0	15	0
		No, 1	Take down old ball cock		0	5	0
10	0	Run.	Disconnect and take down old defective soil pipe		0	5	0
134	0	„	„ „ water pipe		1	10	0
			Allow for disconnecting water supply to 2 old flushing cisterns, taking down cisterns and full pipes, afterwards making good water supply to new cisterns		0	10	0
			Allow for redressing lead over new flushings to jobbing room lanterns		1	15	3
			Allow for redressing lead over 1 end of ridge		0	0	9
			Allow for repairing and maintaining speaking tubes to photo gallery temporarily during progress of works, providing and fixing 190 ft. run, new tubing, 2 mouth-pieces and brass couplings		2	12	0
			Allow the cost of increased latrine accommodation		450	0	0
			„ „ „ zinc dressings		2	12	9
			Carried to Summary	£	1,067	13	5
yds.	ft.		*Plasterer.*				
386	0	Supl.	Cement plain face ¾ in. thick, with chamfered salient angles, jointed to imitate stonework	1/-	19	6	0
12		„	Cement plain face ¾ in. thick, as in last, weathering	-/3	0	3	0
49		„	„ „ „ circular soffit	-/3	0	12	3
13		„	„ „ „ to sides and soffits of beams, including steel lathing and rough rendering	-/6	0	6	6
56	0	„	Cement plain face, as above described, in patching and making good	3/-	8	8	0
53		Run	Cement rounded coping to 23 in. wall	1/-	2	13	0
		No., 4	Cement flues to airbricks, through walls	-/6	0	2	0
412	0	Supl.	Hack off old plaster ceilings	-/2½	4	5	10
126	0	„	Stripping, washing-down, and patching plastered walls	1/-	6	6	0

yds.	ft.				£ s. d.
			Water Tower.		
75	0	Supl.	Cement plain face ¾ in. thick jointed to imitate stonework, and all arrises	3/-	11 5 0
	188	„	Cement weathering	-/6	4 14 0
	55	„	Cement circular soffit	-/6	1 7 6
	48	Run	Cement moulded archivolt 6 in. girth, 24 stops	-/9	1 16 0
	63	„	„ necking 10 in. girth	-/9	0 18 0
		No., 28	Mitres and stops	1/3	4 5 0
	72	Run	Cement moulded cornice, 18 in. girth, with weathering 9 in. wide	1/3 3/6	1 15 0 12 12 0
		No., 28	Mitres and stoppings	3/6	4 18 0
	38	Run	Cement moulded balustrade capping, 13 in. girth, with weathering 19 in. wide	4/-	7 12 0
		No., 28	Mitres and stoppings	4/-	5 12 0
	34	Run	Cement moulded balustrade, 8 in. girth, with weathering 8 in. wide	2/-	3 8 0
		No., 12	Stops	2/-	1 4 0
15	0	Supl.	Hack off old cementing	-/6	0 7 6
			Carried to Summary	..... £	103 16 7
			Glazier.		
	41	„	21 oz. sheet glass	-/4½	15 5 0
	920	„	26 oz. „	-/5½	21 1 8
	14	„	British polished plate-glass	2/6	1 15 0
	230	„	„ „ ground one side	2/-	23 0 0
	436	„	„ „ ground one side from stock	-/4	7 5 4
	266	„	⅜ in. rough plate-glass	1/6	19 19 0
	236	„	Stippling glass	-/1	0 19 8
	203	„	Take out old glass, part broken	-/2¼	1 18 1
		No., 152	Copper-wire suspension pieces, 12 in. long	-/1½	0 19 0
	151	Supl.	Non-actinic glass	1/-	7 11 0
			Carried to Summary	..... £	99 13 9
			Painter.		
737	0	Supl.	Twice limewhite on walls	-/2½	7 13 7
465	0	„	Twice distemper colour on walls	-/2½	4 16 11
527	0	„	3 coats duresco on wood, &c.	-/7	15 7 5
564	0	„	3 „ „ on plaster and brick	-/7	16 9 0
1,260	0	„	3 „ „ on small corrugated iron, measured as though flat	-/8	42 0 0
	42	Run	3 „ „ on piping	-/1	0 3 6
400	0	Supl.	Clean down, prepare, stop, and paint three coats oil colour on wood	-/10	16 13 4
	214	Run	„ „ „ on architrave	-/1	0 17 10
		No., 10	„ „ „ on doors, both sides	4/-	18 8 0
		No., 6	„ „ „ on pairs sashes and frames, both sides		
		No., 17	„ „ „ on sashes, both sides		
		No., 21	„ „ „ on sashes, with bars, both sides		
		No., 16	„ „ „ on lantern sashes, with bars, both sides		
		No., 22	„ „ „ on roof sashes, with bars, both sides		
120	0	Supl.	„ „ „ three coats oil colour on iron	-/10	31 5 0
630	0	„	„ „ „ on corrugated iron roofing, measured as though flat		
	424	Run	„ „ „ on eaves, gutter, down-pipe, &c.	-/4	7 1 4
	1,471	„	„ „ „ on iron bars	-/1	6 2 7
		No., 6	„ „ „ on iron columns	4/-	2 0 0
		No., 4	„ „ „ on air bricks		
134	0	Supl.	„ „ „ one coat of oil colour on old wood	-/9	5 0 6
	182	Run	„ „ „ on architrave	-/1	0 15 2
		No., 55	„ „ „ on pairs sashes and frames, one side	2/-	12 0 0
		No., 12	„ „ „ „ with bars one side		
		No., 2	„ „ „ on sashes, one side		
		No., 9	„ „ „ „ with bars one side		
		No., 34	„ „ „ on lantern sashes, with bars, one side		
		No., 8	„ „ „ on doors, one side		
109	0	Supl.	„ „ „ one coat of oxide paint on iron	-/4	1 16 4
78	0	„	Two coats vinegar and black lead on zinc	-/9	2 18 6
262	0	„	Clean down, prepare, and paint four coats oil colour on cement and sanding	1/6	19 13 0
	63	Run	„ „ „ on pipe	-/1½	0 11 6
	29	„	„ „ „ on 9 in. pipe		
1,284	0	Supl.	„ „ stop, size, and twice varnish on wood	2/-	128 8 0
		No., 2	„ „ „ „ on doors, one side	5/-	0 10 0
		No., 14	„ „ „ „ on sashes, one side	2/6	1 15 0
		No., 24	„ „ „ „ on sashes, with bars, one side	3/-	3 12 0
		No., 19	„ „ „ „ on newels	2/-	1 18 0
		No., 172	„ „ „ „ on balusters	1/-	8 12 0
249	0	Supl.	„ „ and once varnish on old wood	1/-	12 9 0
	259	Run	„ „ „ on architrave	-/1	1 1 7
	247	„	„ „ „ on shelf edge	-/1	1 0 7
		No., 28	„ „ „ on doors, one side	2/6	3 10 0
		No., 4	„ „ „ on pairs sashes and frames, one side	5/-	1 0 0
		No., 8	„ „ „ on pairs sashes and frames, with bars, one side	6/-	2 8 0
		No., 8	„ „ „ on sashes, one side	1/3	0 10 0
		No., 102	„ „ „ on sashes, with bars, one side	1/6	7 13 0
337	0	Supl.	Preparing and twice oiling on tallow-wood	-/6	8 8 6
37	0	„	„ „ on lattice, one side	1/6	2 15 6
		No., 29	„ „ on newels	2/6	3 12 6
		No., 330	„ „ on balusters	-/2	2 15 0
			Carried to Summary	.....	406 12 2

SUMMARY.

	£	s.	d.
Preliminaries and sundries	2,654	18	4
Mason	587	6	6
Bricklayer, &c.	207	3	8
Carpenter and joiner	1,813	16	11
Ironmonger	61	1	9
Smith and founder	415	13	0
Plumber	1,067	13	5
Plasterer	103	16	7
Glazier	99	13	9
Painter	406	12	2
Total	£7,417	16	1

General Statement.

	£	s.	d.	£	s.	d.
Actual expenditure (ex Parliamentary Return)	17,856	0	0			
Less credit of old material paid into Treasury	200	0	0			
				17,656	0	0
Estimate of 1st part	10,995	12	6			
Less additional amounts authorised	1,080	0	0			
	9,915	12	6			
Estimate of 2nd part, as per this bill	7,417	16	1			
				17,333	8	7
Difference				£322	11	5

Sydney: William Applegate Gullick, Government Printer.—1893.

1897.

LEGISLATIVE ASSEMBLY.

NEW SOUTH WALES.

REPORT FROM THE SELECT COMMITTEE

ON

DAY-LABOUR—RAILWAY DEVIATIONS,

TOGETHER WITH THE

PROCEEDINGS OF THE COMMITTEE,

MINUTES OF EVIDENCE,

AND

APPENDIX.

Printed under No. 26 *Report from Printing Committee,* 9 *December,* 1897.

SYDNEY: WILLIAM APPLEGATE GULLICK, GOVERNMENT PRINTER.

1897.

[1*s.* 3*d.*] 209—A

1897.

EXTRACTS FROM THE VOTES AND PROCEEDINGS OF THE LEGISLATIVE ASSEMBLY.

VOTES No. 28. WEDNESDAY, 30 JUNE, 1897.

12. DAY-LABOUR—RAILWAY DEVIATIONS:—Mr. McGowen moved, pursuant to Notice,—
(1.) That a Select Committee be appointed to inquire into and report upon day-labour as compared with the contract system in connection with "Government works."
(2.) That such Committee consist "of" Mr. Young, Mr. Lyne, Mr. O'Sullivan, Mr. Millen, Mr. Whiddon, Mr. Mackay, Mr. Waddell, Mr. Sleath, Mr. Watson, and the Mover.
Debate ensued.
Mr. Young moved, That the Question be amended by leaving out the words "Government works" paragraph (1), and inserting the words "the Railway deviations" instead thereof.
Question proposed,—That the words proposed to be left out stand part of the Question.
Debate ensued.
Question,—That the words proposed to be left out stand part of the Question,—put and negatived.
Question,—That the words proposed to be inserted in place of the words left out be so inserted,—put and passed.
Mr. Garrard moved, That the Question be further amended by leaving out all the words after the word "of" paragraph (2), and inserting the words "Mr. Cook, Mr. Bavister, Mr. Lyne, Mr. "Robert Jones, Mr. Cann, Mr. Harris, Mr. Nelson, Mr. F. Clarke, Mr. Hayes, and the Mover" instead thereof.
Question,—That the words proposed to be left out stand part of the Question,—put and negatived.
Question,—That the words proposed to be inserted in place of the words left out be so inserted,—put and passed.
Question then,—
(1.) That a Select Committee be appointed to inquire into and report upon day-labour as compared with the contract system in connection with the railway deviations.
(2.) That such Committee consist of Mr. Cook, Mr. Bavister, Mr. Lyne, Mr. Robert Jones, Mr. Cann, Mr. Harris, Mr. Nelson, Mr. F. Clarke, Mr. Hayes, and the Mover,—put and passed.

VOTES No. 80. WEDNESDAY, 8 DECEMBER, 1897.

6. DAY-LABOUR—RAILWAY DEVIATIONS:—Mr. McGowen, as Chairman, brought up the Report from, and laid upon the Table the Minutes of Proceedings of, and Evidence taken before, the Select Committee for whose consideration and Report this subject was referred on 30th June, 1897, together with Appendix.
Referred by Sessional Order to the Printing Committee.

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1897.

DAY-LABOUR—RAILWAY DEVIATIONS.

REPORT.

The Select Committee of the Legislative Assembly, appointed on 30th June, 1897,—"*to inquire into and report upon day-labour as compared with the contract system in connection with the railway deviations,*"—have agreed to the following Report:—

Your Committee, having examined the witnesses named in the list* (whose evidence will be found appended hereto), find as follows:— *See List, p. 5.

1. That the evidence taken before your Committee (without exception) proves:—

(I) That the work done by day-labour on the deviations has been performed in as efficient a manner as any other work of a similar nature by the contract system.

(II) That the cost of the work has certainly not been increased, but has in some instances been materially decreased, while the danger of litigation, an item of some considerable importance, has been entirely abolished.

(III) That, without doubt, it has been more convenient for the railway authorities and the travelling public, resulting in greater safety for the running road and celerity in the execution of the work, while retaining all matters entirely under the control of the Commissioners.

2. That the method adopted by the Railway Commissioners has conserved the public interest, and your Committee consider that the principle should be further extended.

JAS. S. McGOWEN,
Chairman.

No. 2 Committee Room,
Legislative Assembly,
8th December, 1897.

PROCEEDINGS OF THE COMMITTEE.

WEDNESDAY, 14 *JULY*, 1897.

MEMBERS PRESENT:—

Mr. Bavister,	Mr. Cann,
Mr. F. Clarke,	Mr. Harris,
Mr. Hayes,	Mr. McGowen.

Mr. McGowen called to the Chair.

Entry from Votes and Proceedings, appointing the Committee, *read* by the Clerk.

Committee deliberated.

Ordered,—That the Secretary to the Railway Commissioners be summoned to give evidence next meeting.

[Adjourned till Tuesday next at *Two* o'clock.

TUESDAY, 20 *JULY*, 1897.

MEMBERS PRESENT:—

Mr. McGowen in the Chair.

Mr. Bavister,	Mr. Nelson,
Mr. Cann,	Mr. F. Clarke,
Mr. Cook,	Mr. Harris,
Mr. Hayes,	Mr. Robert Jones.

Hugh McLachlan (*Secretary to the Railway Commissioners*) called in, sworn, and examined.

Witness *handed in* Return of Railway Curve and Grade Improvements carried out by contract and day labour respectively. [*Appendix* A.]

Witness withdrew.

[Adjourned till Thursday next at *Eleven* o'clock.]

THURSDAY, 22 *JULY*, 1897.

MEMBERS PRESENT:—

Mr. McGowen in the Chair.

Mr. Bavister,	Mr. Cann,
Mr. Harris,	Mr. Robert Jones.

James Fraser (*Chief Assistant Engineer for Existing Lines*), called in, sworn, and examined.

Witness *handed in* Return showing cost of supervision on deviations, Locksley, and Wellington to Dubbo. [*Appendix* B.]

Witness withdrew.

Re-assembling of the Committee to be arranged by the Chairman.

Adjourned.

THURSDAY, 29 *JULY*, 1897.

MEMBERS PRESENT —

Mr. McGowen in the Chair.

Mr. Bavister,	Mr. Cann,
Mr. F. Clarke,	Mr. Harris.

Hugh McLachlan recalled and further examined.

Witness withdrew.

John Bligh Suttor (*Resident Engineer to the Railway Commissioners*) called in, sworn, and examined.

Witness withdrew.

Resolved (on motion of Mr. Bavister),—That the Chairman write to the Railway Contractors' Association, asking them to submit the names of any of their members who may desire to tender evidence.

Ordered,—That the Engineer-in-Chief for Railway Construction be summoned to give evidence next meeting.

[Adjourned till Tuesday next at *Two* o'clock.]

TUESDAY, 3 *AUGUST*, 1897.

MEMBERS PRESENT:—

Mr. McGowen in the Chair.

Mr. Bavister,	Mr. Robert Jones,
Mr. Harris,	Mr. Cann.

Henry Deane (*Engineer-in-Chief for Railway Construction*) called in, sworn, and examined.
Witness withdrew.
Re-assembling of the Committee to be arranged by the Chairman.

[Adjourned.]

WEDNESDAY, 8 *DECEMBER*, 1897.

MEMBERS PRESENT:—

Mr. McGowen in the Chair.

Mr. Bavister, | Mr. Cann,
Mr. Robert Jones.

The Chairman *handed in* analysis of cost per mile of lines constructed in Victoria under the "Butty-gang" system to 31st August, 1896.
Ordered to be appended. [*Appendix* C.]
Chairman submitted Draft Report.
Same read, amended, and agreed to.
Chairman to report to the House.

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1897.

LEGISLATIVE ASSEMBLY.

NEW SOUTH WALES.

MINUTES OF EVIDENCE

TAKEN BEFORE

THE SELECT COMMITTEE

ON THE

DAY-LABOUR—RAILWAY DEVIATIONS.

TUESDAY, 20 *JULY*, 1897.

Present:—

MR. BAVISTER,	MR. F. CLARKE,
MR. HARRIS,	MR. COOK,
MR. HAYES,	MR. R. JONES,
MR. NELSON,	MR. CANN.

J. S. T. McGOWEN, ESQ., IN THE CHAIR.

Hugh McLachlan called, sworn, and examined:—

H. McLachlan. 20 July, 1897.

1. *Chairman.*] What are you? Secretary to the Railway Commissioners.
2. During your time in that position, the Railway Commissioners have carried out some deviations on the contract and some on the day-labour system? Yes.
3. Can you give us the names and the number of those various contracts? I have a statement giving practically the whole carried out since the Commissioners took office, both by contract and by day-labour; the cost is given, the name of the contractor, or if carried out by day-labour.
4. It would be as well to hand that document in? I will do so. I do not know whether it will give you a great deal of information; the amounts given are all lump sums relating to the different contracts and the different works carried out by day-labour. [*See Appendix* A.]
5. Of course these deviations by day-labour have been carried out lately? Comparatively lately—within the last two years.
6. Will you tell the Committee what led up to their being done by day-labour? There were a number of causes that led up to it. One reason was that there were a large number of men out of employment, and a desire was expressed that they should get profitable employment. The Railway Commissioners had some works which they wished to have carried out, and they assisted the Government to that extent. They said that if the men were suitable for railway work they would take a number of them on, and we selected a large number, picking the best men, and put them on the work which the Commissioners wished carried out.
7. Did any documents pass between the Railway Commissioners and the head of the Government with regard to the carrying out of those works by day-labour? I do not think so; not directly on the question of day-labour as against contract work. I do not recollect any.
8. Do you know whether the Railway Commissioners suggested the doing of this work by day-labour or was it suggested to them? I am inclined to think that they suggested it.
9. Is there any minute to that effect? Not to my knowledge. I am pretty well certain that it was discussed with the Minister for Railways.
10. It was discussed with the Minister for Railways before they decided on doing it? Yes.
11. Some little time ago a statement appeared publicly with regard to the success of one or two of these deviations, professing to come from the late Chief Commissioner, Mr. Eddy;—do you know anything of that? I think it was mentioned by Mr. Reid in the debate on the Railway Estimates, in which he said there

H. McLachlan. 20 July, 1897.

there was one work in particular, the Locksley deviation, with which the Chief Commissioner said the Commissioners were satisfied. He said he was satisfied with the carrying out of that work by day-labour, and that the Commissioners were carrying it out in other directions.

12. There is no report from your office agreeing in substance with the statement made by the Premier in connection with those estimates? We have different progress reports from the engineers from time to time, telling the Commissioners how many men were employed, and that the work was proceeding satisfactorily at what was considered a very reasonable cost; and there was a final report to show that the work had been done satisfactorily, and carried out cheaply and expeditiously. To some extent we look upon those reports as confidential documents.

13. In the statement which you have handed in, giving estimates of cost, there is a comparison between day-labour and contract in one column;—is the estimate given there the one that would be given to the Commissioners—an estimate of what it would cost if let out by contract? No, not so much that. In every case before starting the work the Commissioners go very carefully into the estimated cost and its advantages. They would get an estimate of the cost by the engineers and surveyors going over the work and taking out the probable quantities; and if the Commissioners thought that the value of the work warranted the cost they would approve of its being carried out. The estimated cost is what it was considered the work would cost, and a number of estimates are given of what it would cost to do the work by day-labour.

14. And for purposes of comparison that is a fairly reliable statement? The estimate is the estimate usually given as a guide as to the value of the work to be done.

15. You have told us that the actual cost for day-labour is thoroughly correct, and that the other estimate is the Departmental estimate? Yes.

16. In your experience of contracts for deviation works done by the Railway Commissioners under the contract system you have always had an estimate for the work before you let the contract? Naturally.

17. Could you say how far your estimate would differ from the accepted tender for the contract? I think that in most cases you would not find a very marked difference. If there was a difference the engineers know that they would be called up for examination, and would be dealt with if they gave anything erroneous. You can see from the list that there has not been a great difference. Very often little extras come in afterwards.

18. There is a marked difference between the Locksley deviation estimate, which is £47,500, and the actual cost, which was £34,396;—do you know of any reason for that? That is a very exceptional case. It would not be a guide as to the others. In the first instance, the estimates were made by the Engineer-in-Chief of the Construction Department, and that work went before the Public Works Committee. He based his estimate on what he thought it would cost if carried out by a contractor. As it had to go before the Public Works Committee I take it that he made it fairly high, so as to have no shortage. It is not to say that if a contractor did the work it would cost £47,000. We do not feel that we are responsible for that estimate.

19. Then, in the other cases the margins are fair ones? I think so—a fair average.

20. You know nothing with regard to the success or otherwise of this work done by day-labour other than what your officers reported to you? The Commissioners are very pleased with their success as far as we are concerned. We are in an exceptional position. All these works have been done in connection with running-lines, and it is always inconvenient to have contractors coming in where you are running trains day by day. We have the daily operations—forwarding materials and everything else—absolutely under our own control; so that, as a matter of safety and convenience as regards the running of the traffic, we like to carry out the work ourselves. The Commissioners have been very well satisfied with the work that has been done. Then we do not lose time. We have not to get out contract drawings and to call for tenders, and we have no litigation with contractors afterwards.

21. *Mr. Bavister.*] That has been a serious item, has it not? Sometimes. Some contractors think that they ought to get more for extras than they do.

22. *Chairman.*] Whether the work is done by contract or by day-labour the Commissioners have to employ inspectors? We have supervision on contracts. We save that, because the supervising officers are our own officers in carrying out the work by day-labour.

23. Who are the officers who had the immediate supervision of these works in your office? I should say Mr. Fraser, the Assistant Engineer-in-Chief. He was the man who had the most to do with the selection of the men, and perhaps more to do with detail work than any of the engineers, except, of course, the supervising officers on the work. Mr. Firth would also be concerned.

24. *Mr. Hayes.*] In the document you have handed in you do not give any particulars as to extra work? No.

25. As you have already mentioned, there are often extras on these contracts? Yes.

26. Whether the work is done by day-labour or not? Yes.

27. That might account for the discrepancy in the case referred to? You will not find many discrepancies. The principal one is in the Locksley deviation. Then, that is not our estimate. I do not think there is anything specially big or marked otherwise.

28. *Mr. Clarke.*] With reference to the list of contracts, were there any bridges or any other works for which extensive plant would be required? Some of them would require considerable plant.

29. And does this estimate of actual cost include the interest on the capital of that plant? No; the cost of tools in the day-labour work would be debited to it. We have not debited the salary of the Engineer-in-Chief. We debited the supervising officer, but should not debit the Commissioners who control the work.

30. It is simply wages actually paid to the men? Yes, and the officers on the job, the cost of material, and the cost of the tools.

31. Was the plant that was used by the Commissioners in carrying out these works by day-labour in the possession of the Department, or was it purchased specially? A great number of tools were purchased specially or made on the works, and they were all debited to the works.

32. *Mr. Cook.*] Were the tools exhausted? A great number of them would be; but where there were any of any value at the termination of the contract, I understand that a fair value has been allowed for them as a credit.

33. *Mr. Clarke.*] Apart from the ordinary tools, such as picks and shovels, it would be necessary to have monkeys, pile-drivers, and other things? All that we have been carrying out have been practically labour-works; there has been very little engineering work in them.

34. Most of the day-labour which has been carried out, I understand, has been in connection with deviations of that sort? Yes; these are all what you may call deviation contracts. H. McLachlan.
35. There was no new work? No.
36. *Mr. Bavister.*] There is not included in the list any of the work done just after the duplications? Not the suburban widenings. 20 July, 1897.
37. Would that be considered to come under the head of deviations? No; it was duplication work, not deviations.
38. Was not some of that work done under the day-labour system, a contractor being appointed, and he supplying the men? To a small extent.
39. Information as to that could be obtained? Yes; the engineer could give you that. It was provided for in the contract.
40. *Mr. Nelson.*] You spoke of the estimated cost;—I take it that the estimated cost is based upon the experience of the officers of the Department? Yes.
41. I suppose you have often found, where tenders were called for, that the cost is below that estimated by the Department? Yes. It is not an absolutely correct cost. It may be above or it may be below the actual cost.
42. Take one instance, that of J. F. Carsons, who carried out the work at Dargan's Creek;—the estimated cost of that work in the list you have produced is how much? £19,260.
43. And the contract was what? £23,000.
44. Is it not evident, then, that the Department made a mistake in the estimated cost? We have not yet had details, and I do not think the final settlement has been made; there may be a number of extras.
45. Suppose I were to say that Carson lost £9,000 by that contract, though he got a higher amount than was estimated by the Department, do you admit there was something wrong in the estimate of the officers of the Department? I do not think it could be to that extent. While the contract was lower, there were other tenders. They would not all have made a mistake to the amount of £9,000.
46. We will say, for instance, that I put down a bore, and estimate that I am going to shift mullock, but find that I get rock, then the Department is as liable to make mistakes as the contractors? Yes, but the contractor would get different prices; so it would not affect him so much, but it would affect the estimate.
47. In the estimates of cost you have given here, I take it that you have charged the whole of the carriage and the whole of the supervision? Yes; the whole of the supervision.
48. These are charged at the same rates as you would charge a contractor? The actual sum as paid to the officers are debited to the work. We may have supplies more convenient on the ground, and can do things which would cause the contractor extra expense.
49. I understood you to say that all these works were deviations which were practically done by pick and shovel? Most of them were labour works.
50. You have not introduced any machinery? Only waggons, but no elaborate machinery.
51. Then these works have been carried right through by manual labour? Very largely they have been labour works.
52. Presuming that the Government were about to call for tenders for a quantity of work in which it would be necessary to put on motive power, do you think that under those circumstances the Government would carry out the work as expeditiously and as cheaply as a contractor would? I should not like to speak of the Government Departments. We are in an exceptional position, and, apart from the question of cost, believe that we have done it more cheaply and more expeditiously, saving time and trouble. One great factor in the matter is that all these works have been connected with the running-lines, and it was very undesirable to allow strangers to come in where we are conducting a daily traffic; for you have to protect your line at some cost to yourselves to avoid risk to the traffic.
53. Is it not customary in contracts to place on the contract the responsibility of keeping the lines constantly running? Yes; but there is always a great deal of inconvenience.
54. You have had a great deal of experience with regard to the final settlement with contractors? Yes.
55. Have you found much trouble in regard to these final settlements? We have with some of them.
56. What is the chief trouble? The chief trouble is the extra claims made which we consider ought not to be paid, but which the contractors think ought to be paid.
57. It is not customary, then, when instructing a contractor to do work which is not specified in his contract to give the instructions in writing? You provide as far as you can in the specifications for everything, but no matter what you provide for some contracts they give trouble at the finish.
58. *Mr. Bavister.*] Does not a great deal of that arise from the different interpretations of the specifications? If they interpreted them in the way in which the engineers do there would be no claims. The engineers try to make the specifications so that their decisions should be absolute and binding, but I do not think that that has been allowed.
59. *Chairman.*] But you always have a schedule of prices with the contracts? Yes; they are let on schedule of prices—not a lump sum.

THURSDAY, 22 JULY, 1897.

Present:—

MR. BAVISTER, | MR. HARRIS,
MR. ROBERT JONES, | MR. CANN.

J. S. T. McGOWEN, ESQ., IN THE CHAIR.

James Fraser called in, sworn, and examined:—

60. *Chairman.*] What position do you occupy? I am Chief Assistant Engineer for Existing Lines of Railway. J. Fraser.
61. In the duties that you have had to perform you have had to superintend the deviations that have been carried out by the Railway Commissioners lately? Yes; I have to superintend both day-labour work and contract work. 22 July, 1897.
62. Have you had anything to do with preparing the Departmental estimates with regard to day-labour and contract work? Not in all cases. The estimates are prepared by the officers in the Department, not necessarily

J. Fraser. 22 July, 1897.

necessarily by me personally. Some of the estimates I check, and some I have prepared myself, but very few.

63. *Mr. Bavister.*] Do they all come under your notice? Yes.

64. *Chairman.*] Before carrying out the work the figures of the estimate are given to you? Yes; I have all the figures.

65. And you work according to the estimates;—you can tell whether you are working within the estimate or exceeding it as the work is progressing? Yes; we get fortnightly or monthly returns.

66. All the estimates, whether the work is done by day-labour or by contract, are based on the schedule of prices? No, hardly that, as far as day-labour is concerned, because in the case of contract work there is a schedule of prices to which the contract is worked. What they are paid is the amount set down in their schedule for each class of work; but in the case of day-labour work we do not keep an expensive staff outside to keep an accurate account of the time spent on cuttings and side-drains, so as to separate one directly from the other, and so get perfectly accurately the cost of the cuttings and side-drains, and of the other earthwork. It is a matter which is of not very great importance to us to know what is the cost of the cuttings or of the side drains.*

67. Only you know as the work progresses whether you are exceeding the Departmental estimate, or whether you are under it? We can get to know near enough. Suppose that we have a Resident Engineer on the job, he measures up the amount of the work, and he takes the ganger's time notes and takes out the cost of labour, then adds the cost of explosives and all other sundries to that, so as to get for his own information what the cost of the cutting or other work is. If he finds from fortnight to fortnight, as he makes his measurements, that the cost is increasing, he must ascertain the reason.

68. Then, as a matter of fact, you are always able to know, as the work progresses, whether you are under or over the estimate? We can tell very nearly.

69. You had the engagement of all the men employed in the deviations done by day-labour? Almost all the men were passed by me.

70. You had to approve of them before they received work on the job? Not all. There were some cases of local application, the men being put on by the resident engineer in charge.

71. And you had to purchase all the plant required? No; that is arranged through the Comptroller of Stores. We simply requisition on him for such tools, shovels, and other things as we require them, and he purchases them from the contractor.

72. As regards this return submitted by Mr. Firth of the estimated and actual cost of the deviations, did you make the tools in the cases mentioned and charge them against the work? In all cases of Departmental work the tools were charged against the work.

73. I notice from this return that in some of the cases the estimates have been exceeded;—take the case of the Lapstone deviation; the estimated cost was £50,840, but the actual cost was £52,925? I notice that there are some cases in which the actual cost was in excess of the estimates.

74. There are ten out of sixteen cases on the contract system, and only eight out of twenty-one on the day-labour system in which the actual cost exceeded the estimate;—the amount that you have put down here is that of the tender, is it not? No, the actual cost—the complete cost—not the tender.

75. That is not what I wanted to get at; take the Lapstone case;—do you know the price of the contract in that case? I could not tell you, but that could be obtained.

76. I want to know whether the extra amount of £2,100 is made up of extras? Not the whole of it. There are Departmental charges in connection with every contract which must be added to show the actual cost to the Department. There are Departmental charges for supervision—charges for certain materials. Those would not appear in the schedule amount that would be put in by the contractor.

77. Did you know that this estimate allowed any sum for supervision? Yes; we allow a certain percentage for supervision.

78. Then, if that is so, that will not account for the difference of £2,000? No, it will not account for the difference in that respect, but it would partly account for the difference between the contractor's original tender price and this amount of £52,000. The contractor's original tender price might have been £47,000—I do not know that it was; we will say that it was;—well the difference between that and £52,000 would be for the supply of certain materials that we had to deliver, and other Departmental charges, and extras claimed by the contractor and allowed.

79. *Mr. Bavister.*] If these totalled £5,000, then there would have been no difference between the estimate and the actual cost? If they totalled £3,840 that would make the difference between £47,000 and £50,840.

80. *Chairman.*] Are there any of these works carried on under the contract system, the difference in respect to which you would say is made up of extras? There are some small extras in almost every contract.

81. What is the custom of the Department in dealing with these extras? When a contract is completed, if the contractor thinks he has done more than he is entitled to do under the specifications, he makes a claim, and if his claim is regarded as reasonable—if we consider that the work that he has done has been in addition to the amount originally specified—we allow it, because we cannot ask a contractor to do something that he did not originally tender to do without making him some compensation for it.

82. Have you any rule by which you allow them? No.

83. Are you at the mercy of the contractor? No, we are not at his mercy, certainly. You cannot be at the mercy of the contractor when you have a final Court of Appeal. If he makes exorbitant charges we say we will not pay him, and he can take what further action he considers advisable.

84. *Mr. Cann.*] I suppose, for Departmental convenience, you must have some latitude with regard to the work? Most decidedly. I do not care how careful an engineer or architect is who has to arrange for contract work, there is always some little trifling thing that is likely to be overlooked, and in buildings and other works there are always a certain amount of enlargements on the original contract; for instance, you may have a cutting, and in estimating for the work you may reckon that it will stand at one quarter to one slopes, but when this cutting is opened out we may find a soft patch in it, and that must be taken out and the slopes taken to such a batter that the stuff will stand. We cannot say to the contractor, "You must do that at your own expense." Enlargements of that kind we must pay for. In foundations for culverts,

*Note *(on revision)*:—I evidently misunderstood this question. All estimates, whether for a day-labour or contract job, are based on a schedule of quantities and prices.

culverts, bridges, and these things, no one can say definitely at what depth a sound foundation can be got, unless we go into a comprehensive scheme of boring, and that would be expensive.

85. I suppose the same reason would prevail with regard to your estimate of day-labour? We should have just the same thing to contend with.

86. *Chairman.*] Do I understand from what you have said, that it is almost an impossibility to fix a schedule before the work starts, which would in all cases bind the contractor as far as extras are concerned? I would not go so far as that. A schedule anticipating certain things may be made so as to get a price, and a unit is frequently inserted. Although we may anticipate that we may not use any concrete on a job, we still put the item in so as to get a price, and a quotation which must be adhered to is obtained. It is not absolutely impossible, but it is very difficult to anticipate all the items that may creep in.

87. *Mr. Harris.*] You could not get perfect specifications? I do not think it is possible.

88. *Chairman.*] The point I want to get at is whether, under a contract system, you are absolutely at the mercy, unless it is settled by litigation, of the contractor with regard to the extras? With regard to extras, of course, we are pretty well at the contractor's mercy if we ask him to do something that is outside the contract. Then, he can make a claim. Of course we protect ourselves to a certain extent against anything of that kind by saying that the contractor shall furnish, with his monthly statement of the amount of his claim for compensation for work done, that he should also furnish a statement of any extras that he may have done during that month, with the prices that he claims, so that those items can be gone into monthly and settled at once, and no extra works of any kind will be paid for unless a written order to carry out has been given by the engineer.

89. *Mr. Cann.*] I suppose you cover charges which the contractor may make by getting quotations for a unit? We do as a rule. I mentioned concrete as an illustration. Sometimes we carry out deviation works without concrete, but as a rule we put it in the schedule.

90. *Chairman.*] In your experience, has any case of this kind occurred in which, in the monthly statement of the contractor, and the price he has charged for extras, the Commissioners have questioned any of these statements or any of the prices? It does not occur often. I can think at present of only one case, and that is a recent one, where a man made a claim for work at certain prices which we found to be too high. We had a consultation with him, and the matter was arranged; but in cases of final settlement contractors' claims are, as a rule, reduced.

91. *Mr. Bavister.*] Did such cases occur in the carrying out of the works in connection with or just after the reduplications of the metropolitan portion of the line? That is a question that I cannot answer. I was not appointed until the duplication works were almost completed.

92. As a matter of fact, you did not hold this position? No.

93. You do not know of any cases in which they have been compelled by a contractor to go to litigation? There was the Proudfoot case.

94. Was that a question of extras? They made extravagant claims which we could not admit.

95. The making of those extravagant claims by a contractor is always a danger which has to be feared under a contract system? No; I do not regard it in the light of a danger, because we can protect ourselves to a considerable extent. In the Proudfoot case the specifications were not so perfect as those which we have to-day, and there was a better chance, perhaps, for claims to creep in.

96. Under a contract, is there not always an inducement, for the sake of increased profit, for the contractor to charge unnecessary prices for it? Of course, the contractor wants to get as much as he can for himself, but I do not think you can regard it in the light of a danger.

97. Is there not an inducement, for the sake of additional profit, to make unfair charges? There is that inducement, but I cannot quite consider it in the light of a danger, because we protect ourselves with as perfect a specification as we are able to draw, and we estimate as closely as we possibly can the amount of work that has to be done. In very many cases we do not have many outside charges. The Linden deviation and the Karabar deviations were carried out practically without any claims at all.

98. *Chairman.*] Both of them were small contracts? Yes; but the same thing applies to big contracts.

99. *Mr. Bavister.*] They were each less than the official estimate? Yes.

100. Would not that account for there being no claims—that the official estimate was in excess? I think not. All the items in those cases were covered by the items in the schedule.

101. *Chairman.*] The possibility of having to resort to litigation has been considerably reduced by the improved specification? I think so; there is always a possibility of it. We must admit that.

102. Have you got any opinion that you care to express in regard to contracts carried out by day-labour? I hardly know what grounds you want me to cover.

103. *Mr. Cann.*] Has it been as efficient and as cheap as the contract system? I do not think there is very much to choose between them as far as cost and perfection of work are concerned.

104. *Chairman.*] In your experience, has day-labour been more convenient? Yes.

105. In what way? There are so many points to take into consideration in regard to some of our works. For instance, where we were altering very sharp curves on the Mountains, that work closely adjoined the main line of railway, and there is a very heavy traffic on the Western line, making it necessary that the work should be carried out with the greatest care. Those of our men who have the immediate supervision and care of the works are trained in all the regulations for safe working, and they would take greater precautions than a contractor could be forced to take. Of course, we tie him up as close as we can with our specifications. We say that he is to provide the necessary flagmen and work to our rules; but the contractor is always anxious to get as much work done as possible. When he is blasting near the line he does not like to be delayed for a quarter of an hour because there is a train coming, but we have to insist upon that, and in the case of day-labour there is less difficulty and greater security. Safety is one of the most important considerations in regard to carrying out our own particular works. We have to maintain the safety of the line and to carry out our work with the utmost care. That is one reason why I like day-labour.

106. If you made a contractor delay for quarter of an hour, would he make any charge? No; he could not make a charge for that.

107. *Mr. Harris.*] Were there any tenders called for any of this day-labour? Not for any of the works on this list.

108. *Mr. Cann.*] I suppose you have the additional advantage, when employing day-labour, that if you want

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want to alter your plans to effect improvements, you can do it without any extra cost or breach of contract? Yes; that is another advantage as far as we are concerned. We can make any departure from the original proposals without incurring the risk of any claim.

109. *Chairman.*] In your opinion, then, the work done by day-labour is as efficiently and as cheaply done, and done with greater safety and more convenience to the Department than contract work? Yes; the work that we have done, I consider, has been done as cheaply, as well, and certainly as safely.

110. And with more convenience to the Department? With more convenience to us, and with greater celerity.

111. In your opinion, it is better for the Railway Commissioners to do the work by day-labour on running lines? I think so, because the Railway Commissioners constantly employ thousands of men at daily rates, and the addition of a few hundred of men to the staff temporarily necessitates practically no additions to their plant or supervising staff.

112. *Mr. Bavister.*] If the deviations on the Western line had been done by contract, and a workman in the employ of the contractor was injured by a passing train, would there be a greater liability of the Department being forced into litigation than there would be if the work had been done under the control of the Department? No; the Department takes no risks in case of the contractor's men being injured.

113. Would there not be a tendency to try to shift the blame on to the Department, and thus cause a greater liability? We have never had such a case.

114. *Mr. Harris.*] There is no clause in the specifications that you take no risk in case of accidents? Yes; we put that liability on to the contractor. He is responsible for any accidents that may occur.

115. *Mr. Cann.*] That is, to his own workmen? Yes; or to the railway.

116. If you had a railway accident through the fault of the contractor, you would make the contractor liable? Yes.

117. Could you transfer your liability? That is a legal point. The conditions of our contract are drawn up by legal men.

118. Have you ever had any such case? No.

119. *Chairman.*] Has the cost of the supervising staff had to be increased owing to this day-labour system, compared to what it was under the contract system? No; we did put on one additional supervising engineer, but we should have had to put him on had the work been done by contract.

120. *Mr. Bavister.*] Is the Department put to greater or less cost for the supervision of works done by day-labour as compared with those done by contract? There is not a great deal of difference.

121. *Chairman.*] The Wentworth Falls deviation cost £11,235, and the Linden and Woodford deviation cost £12,918; the former is a contract work and the latter is a Departmental work;—what is the cost of supervision in those cases? It is rather less in the day-labour work, taking those two works.

122. *Mr. Cann.*] Is it a fair comparison to take two works like that? I do not think it is quite. The Wentworth Falls work was supervised by the resident engineer in charge. In the case of the Linden and Woodford deviation, the supervising engineer had several other works going on at the same time. One man supervised the whole of them.

123. *Chairman.*] Could you suggest a comparison that would be more equal? Take the Wellington to Dubbo deviation. We had a resident engineer in that case, and about three inspectors constantly on the work for a considerable period. In the case of the Locksley deviation we had a resident engineer and about the same number of foremen, and they were employed for a less time; so that the cost of the supervision in the Locksley case would be less than in the Wellington to Dubbo case, although the amount of the estimate is greater.

124. *Mr. Bavister.*] Would it be a matter of much difficulty to find out the actual cost of supervision in these cases? I do not think it would be. We could get that with probable accuracy. I could give the cost of supervision in each case.

125. *Chairman.*] Do you know of any other cases in which a fair comparison could be made? The Katoomba work, as regards supervision, is one of the cheapest jobs that we have ever done.

126. *Mr. Bavister.*] In your opinion, was Doyle's Hill deviation the cheapest for supervision of any of the day-labour works? Either Doyle's Hill or Katoomba; I would not like to say which.

127. You spoke of the tools being charged to the works; how are the large items for plant treated;—if cranes or pile-drivers were required, how would such items be charged to the cost of the works? We have them, and that is where we gain an advantage over the contractor.

128. Is any allowance made where machinery is used, or depreciation, or is it returned to stock at a reduced value? I do not think I made myself clear in answer to your previous question. Take the case of cranes. If we want a travelling crane; we borrow that from the Locomotive Branch, and we pay so much a day for the use of it. That is only in case we borrow from another branch. In all our divisions they have a large plant. They have pile engines, and when we make use of one of those engines, we do not debit anything to the job. But a contractor would have to make a debit to his job in some way or other; so that we get a certain advantage in that way. We should not debit to the work anything for the plant, unless it were obtained from another branch.

129. *Mr. Cann.*] If contractor's plant were used for the job, would not your plant be lying idle? A portion of it would be lying idle.

130. *Mr. Bavister.*] In regard to extras, I suppose that if an additional amount of work is done, there is no trouble about it, the prices being inserted in the schedule? Yes.

131. But if an item does not appear in the schedule, it is charged as an extra, and it is a matter of arrangement between the Department and the contractor? Yes; purely a matter of arrangement.

132. And it is only there that disputes are likely to arise? Yes; but efforts are made to avoid them. I might mention that we might plan a work with a timber bridge in it. We provide for that bridge; but finding that it would cost very little more to put in a brick arch, which is a permanent structure, we make an estimate and see if we can get it at a fair cost. Then we ask the contractor to do it, but we do not always give a direct order, because we may not have provided brickwork in the schedule. The contractor is asked for a price at which he will do it. If he asks something outrageous, and an agreement cannot be come to, the original contract is adhered to.

133. Has this system of asking for an estimate, before you tell the contractor to go on with extra work, been brought about in consequence of litigation and trouble taking place previously? No; it has always been the rule. I was out on construction work for some years, and we used always, if we wanted to make

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a certain altered work, to ask the contractor to give a price. That is the only way that heavy claims can be prevented. If the work were of a very urgent character, the contractor would be told to go on with it, and at the same time to give the price. Of course that price is agreed to as soon as possible, so as to prevent any exorbitant claims from being made.

134. Have you found any difficulty in your experience with regard to contractors trying to put in material at a lower standard than, in your opinion, is specified? We have had very little trouble in that respect.

135. It does occur? Not very much in recent years. I do not think much fault could be found with the material. It is specified to be of the best quality, and we see that we get it.

136. *Mr. Harris.*] You state that the work has been done as efficiently, as cheaply, and as safely as if it had been done under contract;—that is the Departmental opinion, I suppose? Quite so; we are competent to judge.

137. Then you do not know whether any of these works are being carried on as cheaply as you have done them? It is a matter of opinion, not of absolute certainty.

138. *Chairman.*] Even when calling for tenders from contractors the Department prepare the estimates? Yes.

139. *Mr. Harris.*] Have you had any trouble with the men at all? No; we have had practically no trouble with the men. Of course, there is a considerable surplus of men at the present time.

140. *Mr. Cann.*] Have you had any coercion on your Department as to taking a certain class of men, whether you want them or not? No.

141. It has been said that you have been forced to take the men who were incompetent? No; I selected the men myself, as a rule. Any man who did not appear to me to be suitable I would not employ him.

142. Even after a man had started work, if he was not competent he was sent about his business? He was given a week or a fortnight to show whether he could do his work or not. If the first day or two he was not working as well as the others he was not immediately sent away, because some of the men were half starved, and we could not expect them to work until they got their muscles into better condition. They were kept going for a week or a fortnight, until they got their real strength. I remember one or two cases where I picked out men whom I had known on contract work, and who were so weak that they could hardly walk, but they were employed because they were known to be good men.

143. Then there was no coercion to induce you to keep these kind of men? No.

144. You had a free hand? Absolutely a free hand. The reason why we have been able to do the work so cheaply is because we have adopted the contractor's method. A contractor when carrying out a work gets as good gangers as he possibly can. We got the very best gangers we could. Then we selected the best men we could. If we found a man shirking we simply told him to go and get his money.

145. *Mr. Bavister.*] Have any of the persons whom you have tried to get as gangers refused to accept your employment? No; I had applications for work from the best gangers in the Colony, and employed only the best men.

146. *Mr. Harris.*] Did you pay the same rate of wages as the contractors? Yes.

147. *Mr. Robert Jones.*] In reference to pile-drivers, if you had to purchase one it would not cost very much? No; but in a big pile-driving job a winding-engine also would be required.

148. Is it not done by horses? It is in some cases, but it is an old-fashioned and rather expensive method. We have winding-engines in our divisions, and we make use of them when required.

149. Have you had anything to do with the alterations made on the Mudgee line about Brogen's Creek? That was before I held my present position.

150. Were you on that work at all? No.

151. *Mr. Bavister.*] Have any of the works done by day-labour cost as much as similar works previously done by contract? Yes.

152. Can you specify any? There is the work between Linden and Woodford. The cost of that exceeded our estimate, and our estimate was based on prices of a similar job carried out by a contract near Linden.

153. *Mr. Robert Jones.*] There is the case of Doyle's Hill and Toowong? We paid a high rate of wages in that case—more than the average rate of wages at the time.

154. *Mr. Bavister.*] You say that the Linden and Woodford deviation was one of the cases in which the cost of the work exceeded the estimate, and for that reason you consider that the cost was as much as it would have been if the work had been done by contract? I believe that we could have got that work done cheaper by contract. That is the only one that I believe we could have got done cheaper by contract.

155. Can you say whether any of those works which were done under contract, and which exceeded the estimate, would have been done equally well, and at as low a cost, if they had been carried out by your own officers? There is only one that could have been done at a much lower cost, and that is a small one between Marulan and Carrick. I think we could have saved a little on that; the others could have been carried out at about the same cost.

156. There is the case of the line from Dubbo to Narromine; the excess there appears to be something like £5,000 in a contract of about £20,000; do you know of any special reason for that? I could not say; I had nothing to do with that contract.

157. The Wellington to Dubbo is another case;—do you know whether there are any special features in that accounting for the large difference? Yes; but the Department was responsible; there were practically no extras.

158. Was the Dargan's Creek work one that could have been carried out by the Department equally well at a less cost, seeing that there is a large increase over the estimate? I do not think we could have carried it out much cheaper. We could have hardly saved anything on that job, the only saving we could have made would have been in time.

159. And that to the Department is really a great consideration? It is a very important point. We could have carried out the Dargan's Creek job in less time, but not for less money.

160. Though the Department would have received no advantage from less cost, the advantage of getting the work completed at an earlier date would have been considerable? It would have effected a considerable saving in working.

161. *Chairman.*] Will you have appended to your evidence a document showing a comparison of the cost of supervision of the Locksley deviation and the Wellington to Dubbo deviation? I will. [*See Appendix* B.]

THURSDAY,

THURSDAY, 29 *JULY*, 1897.

Present:—

MR. HARRIS. | MR. BAVISTER.
MR. CANN. | MR. F. CLARKE.

J. S. T. McGOWEN, ESQ., IN THE CHAIR.

Huch McLachlan, Esq., Secretary to the Railway Commissioners, further examined:—

H. McLachlan. 29 July, 1897.

162. *Chairman.*] You were to furnish the Committee with particulars of the cost of litigation to which the Commissioners had been put? I may say that, so far as actual legal claims are concerned, we have not had a great deal of trouble—for one reason, we have been carrying out many of the works ourselves. We had one great case, that of Proudfoot's. The legal expenses in that case were for a number of services, principally under the re-laying and the re-ballasting contract. We have incurred legal expenses in connection with what would be called construction contracts, but those were comparatively small sums, and would be merged into larger amounts that would be paid by the Construction Branch. The big case that we had to fight was that of Proudfoot's, principally in connection with the re-laying and re-ballasting contracts, and the total law expenses, as far as the Commissioners are concerned, amounted to £11,230. The settlement made in that case was one which we considered favourable to ourselves; so that although those expenses have been incurred, it is not looked upon as altogether lost money. It cost £100 in connection with a contract in reference to which there was a dispute for the construction of station buildings at Eveleigh and Macdonaldtown. There was a smaller sum of £19 in connection with the cancelling of a contract for the erection of driver's quarters. That was an exceptional case. Then we had a dispute with Carson Woods, but that would hardly come within your inquiry.

163. *Mr. F. Clarke.*] How did this case of Proudfoot's, which cost £11,230, come about? I could hardly explain it briefly. It was in connection with the final settlements. Proudfoot claimed a very big sum for all sorts of services—extra ballast supplies which we considered should not have been paid for, measurements, and other claims.

164. And his claim was considerably reduced? Yes; it was compromised afterwards. We paid him £30,000, which included his plant. The plant was valued at about £15,000; so that he really got £15,000. As a matter of fact, we should have been prepared in the first instance to have paid considerably more than that.

165. *Mr. Cann.*] Had he not a permanent contract for that kind of work? Not a permanent contract; it was spread over a certain time.

166. It was in consequence of the Commissioners taking it over before its expiration? No.

167. I thought it was on account of the Commissioner taking over the work that he made a special claim? No; I do not think that that point came up.

168. *Mr. F. Clarke.*] It was simply a matter of measuring up? It was a dispute as to extras and additional claims.*

John Bligh Suttor, A.M.I.C.E., called in, sworn, and examined:—

J. B. Suttor, A.M.I.C.E. 29 July, 1897.

169. *Chairman.*] What position do you occupy? Resident Engineer to the Railway Commissioners in charge of special works.

170. Have you long held that position? Yes; for fifteen years.

171. What are the duties that you perform? I am in charge of special works carried out by the Railway Commissioners, such as deviations. I have been employed recently on the Locksley deviation and deviations on the Southern line.

172. You have personal supervision of those works? Yes.

173. Do you have more than one of those works going on at the same time? Yes; I have at present.

174. You have before you a return handed in by the Secretary to the Railway Commissioners; were any of the works given in that return under your supervision? Yes. The Blue Mountains (Angus & Co.) was carried out under my supervision; Dubbo to Narromine (Proudfoot & Co.); the Mumbil (Proudfoot & Co.); Wellington to Dubbo (J. F. Carson); Maryvale and Gourie (J. F. Carson); and Dargan's Creek (J. F. Carson). All those works were carried out by contract.

175. What works carried out by day-labour have you supervised? The Locksley deviation and the Marulan were the only ones.

176. Have you anything to do with the preparing of the estimates? No; nothing whatever.

177. Do they apply to you, as Resident Engineer, before they carry on these works? No; they have it prepared beforehand—generally by the Construction Branch. The works are approved of by the Commissioners, then handed over to me to carry out.

178. Only two of these cases in which day-labour was employed came under your personal supervision? Only two. Of course, the others I am aware of, but they were not under my immediate charge. Mr. Fraser had to do with those.

179. But under Mr. Fraser there would be a Resident Engineer? Yes; he arranged these himself—they were near Sydney.

180. Did you have anything to do with the engaging of any of the men working at the Locksley deviation? Yes; from start to finish. Some were engaged in Sydney, and were sent up by the Labour Bureau.

181. Do you know that before they were sent up they had to be passed by Mr. Fraser? Yes; he, I believe, had the picking of the men.

182. Do you know anything about any difference in the wages of the men working on the day-labour system as compared with any employed on contract work? I do not know what wages the contractors pay these men, but the men informed me that they were getting higher wages from the Railway Commissioners than they could get from the contractors. Some said they were getting about the same; but we never know what a contractor pays, except what the men tell us.

183. What rule did you carry out in paying wages to those men;—did you pay them the wages prevailing for that kind of work? Yes.

*NOTE (*on revision*):—I find on looking over the papers that the claims included an item for cancellation of contract.

J. B. Suttor, A.M.I.C.E. 29 July, 1897.

184. Did you fix a minimum? We paid the ruling rate—6s. a day for ordinary labourers; 9s. to 10s. a day for gangers, according to their qualifications; bricklayers, 7s. 6d. to 8s. a day; leading bricklayers, 9s. a day; foreman bricklayers, 11s. a day; foreman of works, 12s. to 14s. a day; nippers under 19 years, 3s. 6d. a day; timekeepers, 8s. a day.
185. You always retained the power in your own hands to dismiss the men if they were not suitable? Certainly, or else the Commissioners would dismiss me. We are not harsh in dealing with the men, but we look to every man to do a fair day's work; and they do a fair day's work.
186. In the two cases which you have mentioned in which the work was done by day-labour, was it done as satisfactorily as work done under the contract system? Every bit. It is there for anyone to see now.
187. With any special advantage to the Department? Certainly.
188. In what way? We were allowed eight months to do the work, and I opened it in 114 days.
189. And it did not interfere with the running of trains? It did not interfere with the safety of the road. The men were under our own supervision, and they did what we told them.
190. Therefore you will say that it was as speedy, as cheap, and as efficient as contract work? Certainly.
191. When these works were started and placed under your supervision, were you furnished with any estimate by the Departmental officers? Yes. of the Locksley deviation. They did not furnish it, but it came out in ordinary conversation. I asked what the estimate was for the work and they told me at the time.
192. As the work progressed, did you take any means of checking it to see whether you were under or over the estimate? Every week I know exactly how I stand on the whole work. If I find that one cutting is costing 1d. a yard more than another I want to know the reason why. That is done by a system of work introduced by the Railway Commissioners.
193. Did you in this estimate make a charge against the work for the tools that were used by the men? Yes; everything was charged to the work. The order number for the Locksley deviation was 3,290 C. If I requisitioned for anything I put that number on it, and it was charged to that number. It is a very expeditious system.
194. In the six contract works that were under your personal supervision, did you have the estimate of the work? I had contract prices; they were schedule rates.
195. And it was customary for the contractors to receive so much on account of work done on the contract? They had monthly measurements in this case. In the case from Dubbo to Narromine and Mumbil, they were paid in full. For the Wellington to Dubbo work and others they were paid 90 per cent. on the month's certificate.
196. Therefore, it was your duty to check their statements and charge their work? They were paid on my returns.
197. In any of these cases, did you have any difficulty with the contractors through their disputing your estimate? In the Dubbo to Narromine and Mumbil contracts the contractors always wanted more than I would allow.
198. You see that in the Dubbo to Narromine case the Departmental estimate was £19,822, but the actual cost to the Department was £24,639;—do you know how that difference was made up? Largely through finding softer material than they anticipated at the start. In No. 2 cutting we thought that the walls would stand nearly perpendicularly, but we came across a clay band which increased the quantities considerably; but that was only a small item in connection with it. Proudfoot, the contractor, was rather fond of law, and when the thing was concluded in Equity the amount it came to was £24,639.
199. Some of this £5,000 is made up of extra charges? Yes; the bulk of it.
200. How do you deal with extra charges? They are submitted for the consideration of the Railway Commissioners.
201. In drawing out your schedule, do you try to prevent them—you are not left to the mercies of the contractor, are you? No; not as a rule. It is in the hands of the administration of the Department as to what settlement they arrive at.
202. You frame a schedule for certain work that is to be done; but is there not certain work done that is not covered by the schedule? Such work would be paid for at schedule rates. There would be a provision in the contract that should extra work arise the schedule should apply, or if it is not mentioned in the specifications we should write to the contractor to ask if he would be prepared to do the work at schedule rates.
203. In your experience, have any of these extras arisen that have not been covered by schedule rates? In that case of Proudfoot he claimed over £1,000,000 for extras. How he arrived at the amount I could not fathom.
204. The only remedy the Department has is to go to litigation? Yes.
205. That is another reason why day labour is preferable on deviation work, is it not? The main object of the Commissioners, from what I can see, was to secure the safety of the running-road. We have tried the experiment, and it has proved in every way satisfactory. There is not that anxiety about having strangers on our lines that we have under the contract system. We look after the work ourselves, and when it is done we have no trouble to fight out, as we had in Proudfoot's case. We have done the work more expeditiously and in less time than the contractors.
206. Is there any fear of litigation? No; we have only our own people to deal with. In connection with Proudfoot's work there has always been trouble—trouble in connection with their plant, conveying it over the lines, and their demands for reductions afterwards.
207. The estimate for the Wellington to Dubbo work was over £36,000, but it cost £40,000;—what is the cause of the difference there? That difference arose in connection with a few extra items. The contractor claimed for increased volume of some of the cuttings through the loose nature of the soil.
208. Did the Department pay his charges? I do not know what settlement they arrived at in connection with it. I made out a return, and what differences existed between the contractors and myself would be adjusted by the Railway Commissioners. I returned the details of the work done on the contract, and where there was an extra claim I noted it, and prepared a statement for consideration.
209. In the case of the Dargan's Creek work there is a difference of £4,000 between the estimate and the actual cost of the work;—is that for extras? That is extra work.
210. In your experience, then, have contractors, in submitting claims for extras that were more or less covered by the schedule, overcharged according to the class of work they had done? Yes.

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211. That is your experience? Yes. Proudfoot's case was the biggest case that we had. He claimed £1,250,000, and came down to a settlement for £6,000 less than we offered him.
212. Two cases of day-labour have been under your personal supervision; the estimate in the Locksley case was that the work would cost £47,500, but the work was done for £34,396;—can you explain the reason of that difference? No; that was done by Mr. Deane, of the Construction Branch.
213. *Mr. Cann.*] Were any of the alterations in the plans? The only alteration was an increase of the work. Whatever alterations were made tended to increase the quantity of the work to be done.
214. Therefore, your answer is that there was no alteration to lessen the work, but rather to increase it? Rather to increase it. We provided trucking-yards and platforms.
215. *Mr. F. Clarke.*] Have you formed any opinion at all as to the reduced cost of the Locksley deviation? I have always acted in connection with the work under the instruction of the Railway Commissioners, and every officer seems to throw his whole heart and soul into his work. They personally supervise everything from start to finish; and the men who work for us seem also to throw their heart and soul into it.
216. Which men? The men whom we employ.
217. The men employed on the Locksley deviation were a promiscuous lot? Yes; but if men will not do a fair day's work they must make room for others that will.
218. Had you occasion to dismiss any? I had occasion to dismiss thirty men who were born loafers.
219. Did you find in your experience that there were many examples of that kind? Some half-dozen; but when they found how we dealt with these men we had no more trouble. They worked well, and are working well for us to-day.
220. What class of country had you to deal with in that work? Granite.
221. Had you much blasting? Yes; I used over 40 tons of explosives in connection with it.
222. It is considered pretty hard country? Yes.
223. Did you have any bridges and aqueducts to construct? Yes; a concrete arch and two large iron overbridges.
224. Did you find it necessary to use any machinery in the construction of this work? Yes.
225. What kind of machinery did you use? The ordinary workshop machinery—the same as we have at Eveleigh.
226. But you had no extensive driving-gear to use, I suppose? No, none whatever. That would not come to much.
227. Would it be possible, as far as your experience will enable you to say, that in making an estimate of a work of this character it would probably be misleading, owing to the formation underneath—that you might unexpectedly meet with a class of country that would cause a great deal of extra labour? Yes; but there is provision to meet that by putting trial holes down.
228. Was that done in this case? Yes; there were trial holes on this Locksley work.
229. So that the formation ought to have been pretty well known? It speaks for itself.
230. Referring to the work, Dubbo to Narromine, you will notice that the actual cost was £24,000, but the estimate was a little over £19,000? Yes.
231. That, I presume, was caused, owing to the alterations in the plans? There would be a very small amount of it alterations and increased quantities. The bulk of it would be extra claims made by the contractor, and our own office expenses.
232. Would any of it be law costs? That case would not go to law; Proudfoot went to law.
233. Proudfoot seems to have given the Department a deal of trouble? No end of trouble, from start to finish.
234. *Mr. Bavister.*] You have been in charge of similar works carried out by contract? Yes.
235. Has your experience been that the Department reaped benefit from doing the work by day labour? Yes.
236. Has any such work been done under contract without more or less friction arising between the officers and the contractors? We invariably have had some difficulty to meet at the end of the work—settling claims of one kind or another.
237. I suppose that in connection with such works, there is not often a question arising as to the quality of the material? No; we have a standard quality for everything.
238. Have you any difficulty in getting it recognised and carried out? No; we stipulate for a certain brand of cement—material of a certain standard—and insist upon having it. Contractors are notified that in bringing cement on to the work it must be submitted to a test in Sydney. We do not allow it to be used until it has passed the test.
239. Could you say what proportion of material arriving on the ground for the carrying out of contracts is rejected by the officers? Very little is rejected. We insist upon having it tested before they send it away. If they bring it on to the work, and it has not our brand on it, I do not allow it to be used until it has.
240. I think you have already said that the men on the works carried out by day-labour were as good a class of men and worked as efficiently as if it were carried out by contract? The men give every satisfaction. Men, to my mind, could not work better than the men who are working for the Railway Commissioners.
241. You see no hesitation on the part of the men to accept employment under the Government—they were as willing to work for the Government as they would have been to work under contractors? Yes; I am inundated even to-day with applications from men who have been with me before.
242. They were more satisfied with the conditions of their employment than they have been under contractors? They appeared equally so, if not more so. They say that the contractors pay once a month, but we pay them fortnightly.
243. There has never been any difficulty in the men obtaining the money when it is due? If a man came to me and said I want money, I should say, "Have you any time in?" I ascertain from the timekeeper, and let the man have an advance.
244. You make no deduction? No.
245. You do not compel men receiving their vouchers to deal at a particular store? No; that is more than we dare do.
246. Your advances are made in money? By cheque. We sometimes cash the cheque for them.
247. In your experience of supervising contract work, are there not sometimes delays in men obtaining their money? I have never known a greater delay than a day or two.

248.

248. Has it been the system for any railway contractors to issue tickets or credit notes which were available only at certain stores in the district? They have issued cash orders which were negotiated at certain places. J. B. Suttor, A.M.I.C.E. 29 July, 1897.
249. Only at certain places? That was not stipulated.
250. You have known them to be presented at other places and not accepted? I have known a few cases. Proudfoot gave cash orders, and they could go where they liked, and Mr. Carson did the same on the Dargan Creek work.
251. *Mr. Harris.*] All the material that you use on these jobs, would it be the same as you compel the contractors to use? Certainly, up to the highest standard.
252. You say that all the men that you employed were up to their work? Well, if they are not they go. My instructions from the Railway Commissioners are that if a man is capable of doing a fair day's work we must do all we can to encourage him. Men have come to me who I thought were not strong enough, but I encouraged them for a week or so; but if I found they were loafing on me I made an example of them.
253. *Mr. Cann.*] How do you supervise the work? There is not a particle of work under my supervision that I do not go over either daily or every second day.
254. You could not stand and watch the men working? No; my system of supervision is this: Take the Locksley work. There are something like seventeen cuttings in that deviation; each cutting is in charge of a ganger, and each ganger has so many men, according to the number of drays. Those gangers were under a foreman at the work. By noting each day and each week the depth excavated at each chain, one can ascertain the total quantity excavated. Of course, due allowance has to be made that the same material exists in the two cuttings to make a comparison. If No. 7 contains decomposed granite, and No. 8 the same, the cost of the two works would come out equal; but if No. 8 is costing more than 1s. 2d. a yard, and No. 7 is costing 1s. 6d. a yard, I know there is a screw loose, and I watch that man, and he comes down to the same rate as the other man in a very short space of time. We know exactly how we stand by the system of cross-sections.
255. I suppose that the success of your works depends upon your getting good gangers and good foremen? These we can get anywhere. We find good labourers, and we promote them.
256. Have you any trouble in getting good gangers under the day-labour system? None at all. I get a crowd of men, and speak to them, and find out what they can do. When they find that you put confidence in them they put confidence in you.
257. Do you compel the men to contribute towards the cost of doctors? No; the facts are these: At the start of the work the men voluntarily came to me and asked that some provision should be made for a doctor. I said, "Very well, if you like to subscribe so much a week you can do so." It came to a few pounds a month. Some would give 3d. a week, some 6d.; but there is no compulsion about it.
258. Then, I suppose, you are willing to express a general opinion that the day-labour system for this kind of work is the better system? I should not like to make any comparison. Contract work comes under another branch. I can only say that, as far as the Railway Commissioners are concerned, the day-labour system has given every satisfaction. We have done the work, and done it under the time, and done it for the money.
259. I suppose that the Locksley deviation can be taken as a fair example? Yes; or any other work that we have done. You can go and look at it. There is the Locksley deviation and the Mountain work, and the work that we are doing on the Southern line to-day. I opened the Locksley deviation in 114 days, and the southern work in ninety-three days.
260. *Mr. Bavister.*] Have you ever met with a refusal from a man who was a ganger of known and proved ability to accept employment under you? They have never refused me.

TUESDAY, 3 AUGUST, 1897.

Present:—

Mr. ROBERT JONES.	Mr. BAVISTER.
Mr. CANN.	Mr. HARRIS.

J. S. T. McGOWEN, Esq., IN THE CHAIR.

Henry Deane, Esq., Engineer-in-Chief for Railway Construction, called in, sworn, and examined:—

261. *Chairman.*] What is your position? I am Engineer-in-Chief, Railways, Construction Branch. H. Deane. 3 Aug., 1897.
262. How long have you held that position? The permanent position about six years; for two years before that I was Acting Engineer-in-Chief.
263. Can you give us the cost of litigation to the Government with regard to railway contracts covering the period since the Railway Commissioners took office;—that is to say, for contracts that have been let since then? That would not include the McSharry case.
264. We want the cost to the Government of litigation since the Railway Commissioners took office? I am afraid I am not in a position to say what that would be if it includes the McSharry case. The cost of that could be obtained. It is a very large amount indeed. With the exception of that we have only had two cases in which my award has been disputed. Those were the cases of Proudfoot & Co., in connection with the Marrickville and Burwood-road railway, and McMasters in connection with the Milson's Point railway. The costs at present have been very trifling. The way the matter stands is this: Proudfoot & Co., according to their contract, if they dispute my award, have the right to appeal to the Court to have a statement of the case furnished by me. That is in progress. The costs at present amount to only £7 8s. 6d.
265. *Mr. Jones.*] What is the difference between what they claim and your award? I think it is about £24,600; but the amount has been reduced down to £7,000 recently. They have offered to take £7,000 in full settlement, of course, without prejudice.
266. *Chairman.*] You say there are three cases? Only two cases.
267. And one was for £7,000? No; the claim has been reduced to £7,000, and the amount offered, I think, without prejudice by the Department is about £3,500, so that the difference in dispute is really £3,500.

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268. And in the other case? In the other case the way it stands is this: McMaster claimed about £30,000. There was a proposal for a settlement by which the claims were divided into two portions. Some of the larger claims, which have to do with the supply of ballast, the lengthening of a tunnel, and some labour at Milson's Point end, it was proposed to settle by reference to a single arbitrator. This was what McMaster proposed through his solicitor, and the rest of the claims were to be settled finally by me.
269. Taking that case of Proudfoot, in which the Department are offering £3,500, will that £3,500 cover the whole of the expense the Department has been put to? There may be a few other small costs; practically, it will cover the expenses.
270. In cases of that kind is it the Crown Law Officers who defend the Department? Yes.
271. Would it have to be stated in the arrangement whether counsel for Proudfoot would have to receive their fees in addition to the £3,500? No; it was to cover everything.
272. Have the Department made any proposals with regard to McMaster's claims? I recommended at the time that that proposal should be agreed to. That was before the writ was served. If I remember right, the papers were sent to the Crown Solicitor, and there was some little delay, and a few weeks afterwards a writ was issued for the whole amount.
273. Was that amount £20,000? It was about £24,600.
274. And your recommendation was that it should be paid? No; that it should be dealt with in the way suggested.
275. Practically, by arbitration? That is to say, that there should be arbitration over a few of the claims—the more important claims—and that the bulk of the claims should be settled finally and absolutely by me.
276. This litigation arises out of questions in dispute between the contractors and the Department with regard to the work done? Yes. In the case of McMaster the important items are those abovementioned. The claims arise through a difference of interpretation of the specification, and an alteration of the contract.
277. In your Department you prepare the estimates, do you not, before tenders are called for? Yes.
278. And you try, as far as possible, to cover everything in the contract? Yes. In the estimate that it submitted to Parliament I always allow for contingencies, and I think I have been fairly successful during my term of office.
279. We have here a list of deviation works carried out by the Railway Commissioners since they took office, some of the works being done on the contract system, and some on the day-labour system.
280. Were the estimates for these works prepared by you? I prepared the original estimates for some of them.
281. Did you prepare the Locksley estimate? Yes.
282. Have you noticed that there is a difference between the estimated cost and the actual cost of the work? Yes.
283. Was that allowing for contingencies? An estimate allows for contingencies, and I took a high rate for the excavation, because no trial-holes had been made at the time to test the material. I think I took 2s. 3d. per cubic yard, assuming that the material would be somewhat similar to that on the original line, which has pretty hard rock at the bottom, but for some time past the contract rates have been falling. I myself have had excavation works carried out for about 1s. 6d. a cubic yard. I have no doubt that if the information obtained since then had been available on the making of that estimate I should not have put 2s. 3d. down, because I am quite sure that any contractor who took the line would not have asked 2s. 3d. I should think the rate would be about 1s. 6d. I have brought particulars of some recent contracts. On the line from Narrabri to Moree, and also from Parkes to Condobolin, the price of the earth-works was 1s. 6d. per cubic yard.
284. *Mr. Jones.*] There is no rock on that work at Locksley? No.
285. *Chairman.*] Is it not your invariable custom before submitting estimates for the cost of construction to make trial-holes? Yes.
286. In the Locksley case you did not do it? No. The matter had not proceeded so far. The trial-holes had not been sunk.
287. The lines Narrabri to Moree and Parkes to Condobolin are not mentioned in this return? No; the Railway Commissioners did not carry them out. I carried them out myself. The contracts mentioned in the return are those connected with existing lines; they are deviations. I prepared the surveys and plans for the Lapstone deviation; for three deviations near Mittagong, between Hilltop and Mittagong, at Dargan's Creek, Locksley, and Mudgee line deviation. The first ones in the Blue Mountains I got set out for the Commissioners, but I am not quite certain whether Angus's contract covers the exact ground or not.
288. *Mr. Bavister.*] Do you know when the Locksley work was completed? No; I think about six months ago.
289. Have you any idea how long it was in progress? No.
290. I ask this because you see there is a great difference in the prices for excavation;—you mentioned 2s. 3d. per cubic yard as a sufficient estimate; then in some later work—for instance, the one at Condobolin—the rate was as low as 1s. 6d.? Yes.
291. Were these prices so low as 1s. 6d. for such excavation work being tendered during the period that the Locksley work was in progress? I think that tenders for the Dargan's Creek deviation have been pretty low. I can only speak from what I have been told, because I do not come into immediate contact with the work after I have got the plans completed. I think Mr. Carson's price was 1s. 7d.
292. Did he do that work? Yes; he did it: and at Dargan's Creek there was much hard rock-cutting.
293. Have you any idea as to the amount excavated by you in connection with the Locksley work? The estimated quantity was 250,000 cubic yards, at 2s. 3d. That was the bulk of it, except side-ditches, and so on.
294. Can you say now, with your present knowledge, what you would have priced that at in your estimate? Well, knowing that it would all be soft, I should probably have put it at about 1s. 6d. or 1s. 8d. That would have taken off about £9,000. In the estimate completed in October, 1896, for Hilltop to Colo Vale, where there is a good deal of rock, I put down 1s. 7d.; Colo Vale to Braemar, 1s. 7d., as a through price for those three deviations between Hilltop and Mittagong.
295. Have you had any knowledge of the day-labour work that has been going on in connection with deviations? Not any intimate knowledge.

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296. Your duties do not bring you into close contact with any work whilst it is being completed? Not on existing lines.

297. *Mr. Harris.*] You say that there have been disputes with Proudfoot and McMaster;—I suppose it is for alterations and measurements that they claim for? It is partly due to difference in the interpretation of specification, and partly due to extra work ordered. It sometimes happens that additional works are called for under particular conditions that give rise to a claim for more, we think, than is the value of the extra work.

298. What did McMaster charge for ballast? There was a dispute about ballast. The way that arose is this: McMaster wanted to put down ordinary sandstone for ballast, and I would not have that. I allowed him to put sandstone for bottom ballast, but would not have it for top ballast. When the different contractors came to me before tendering for the contract, some of them asked me what kind of ballast would be required, and I told them the same class as was on the line from Hornsby to St. Leonards. That contract was carried out by Pritchard, and he got his ballast from Thornleigh. It is what they call white metal. It is indurated vitrified sandstone, very good stuff. McMaster did not come to me, but thought he understood that sandstone would be allowed; but I insisted upon the white metal being used for the top if he could get it; but as he showed clearly that he could not get it, an arrangement was made to pay him extra for supplying blue metal, and he got his blue metal by water from Kiama. Previously I had made an arrangement for him with the Railway Commissioners to get blue metal from Bombo quarries by rail, but he was so long in coming to a decision about the matter, that no sooner had it been agreed upon between the Department and McMaster than the Railway Commissioners, who are doing very little work at Bombo, notified us that they could not supply the ballast; so that arrangement fell through, and McMaster had to get his ballast down the coast. I think he got it from Kiama. Part of his claim is in consequence of difference of price; but he always maintained that the price he was being allowed in any case was not sufficient.

299. If you had got leave to put down trial-holes it would have saved £9,000 in connection with the Locksley deviation? I should not like to put it in that way. I do not say that there has been a large saving. If I had let that contract we should not have had to pay £47,500.

300. *Mr. Bavister.*] If trial-holes had been put down before your estimate was made, that estimate would have been much lower? Yes. I also should have put it lower had I known what the contractors at that time had in their minds as to the value of work, because it so happened that at that time no contract of the kind had been recently let. There had been contracts with heavy earth-works up the coast; the last contract of the sort being on the Richmond and the Tweed. At any rate, we had no contracts let under similar circumstances at the time in question.

301. *Mr. Jones.*] In Proudfoot & Co.'s contract, where was the principal difference? A good deal of it was as to ballast.

302. Had those slips on the Mudgee line anything to do with it? No. This was Proudfoot's contract for the Marrickville and Burwood-road railway; but in this case there cannot be, under any circumstances, any great expense on account of the contract conditions being such as to preclude them.

303. Your award is £7 8s. 6d.? No; the costs are only £7 8s. 6d.

304. What is the difference in the claim? The claim for extras was about £24,600. I awarded something over £2,000.

305. Have you any recollection as to how the Railway Commissioners and Proudfoot settled up that matter on the Mudgee line between Capertee and Ilford? You mean the deviation. I do not know how it was settled. I did the surveys for that deviation, but I had nothing to do with the carrying out of the work.

306. You do not know under what system it was carried out? No.

307. *Chairman.*] You say that whenever there is a dispute between a contractor and the Government it is referred to you, and you make your award or recommendation? Yes; it is my duty to make an award. In the first instance the contractors' engineer and the Government engineer measure up together. Then the Government engineer makes up his return, and the contractor makes up his claim, and they are both submitted to me for decision. If there is any difference I see the contractor and the engineer together, and we go through each item.

308. In your experience on that point is it the custom or rule for the contractors to overcharge for the extras? Oh; some of them very much.

309. I want to know whether it is a rule for them to overcharge? A good many of them do. I should not like to say that it is a rule. I do not know a single case in the large contracts where the Government has given the contractor the whole amount claimed; but there have been many cases in which comparatively small reductions have been made, and the contractors have accepted settlement. There are also many cases in which contractors put in most exorbitant claims.

310. I will put the question this way—in every case that is settled do the Government give the contractors more than your estimate for the work? You mean more than the supervising engineer's return.

311. You were just saying that when there is a dispute you estimate the cost of the work, and state to the Department what you think the contractor ought to receive; in some cases you say their charges are exorbitant;—do you know of any cases in which the contractor has accepted the estimate submitted by the Departmental officers for work not covered by schedule? No; I do not think that has ever been so excepting in small contracts, and for this reason—that in nearly every case there arise circumstances which the supervising engineer cannot deal with finally, and matters have to be settled by the Engineer-in-Chief, especially as regards the price. The supervising engineer, in his return, can include only schedule rates; but if there are circumstances which render the schedule rates inapplicable, he cannot deal with these finally, but he can make a recommendation to the Engineer-in-Chief. It is only the Engineer-in-Chief who can settle the amount, so that as in nearly all contracts such circumstances do arise it also nearly always happens that there is an increase over the supervising engineer's returns. Sometimes it is a very small, sometimes a considerable amount. The supervising engineer makes his recommendation; but the contractor must necessarily depend upon the justice of the Engineer-in-Chief in recognising certain special conditions under which portions of the work have been done.

312. From your knowledge of human nature, it affords an opportunity for the contractor to make a little more out of his work? Yes.

313. But when the work is done by day-labour that danger does not exist; the Department would pay exactly

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exactly what it would cost them to do the work? Yes; I do not think that you save so much by day-labour in that class of claim, a claim which is for definite rates for work done which can always, I think, be satisfactorily assessed—not so much in that case as in cases where they want extra prices or extra amounts on account of damage done, loss caused, and delays. If you carry out work by day-labour, of course you will suffer the loss yourselves if there is any, and you will have to pay for it. Whatever it costs is not a matter of imagination.

314. Have you ever had any contract to your knowledge in which the contractor has given up the work before it has been fully completed, ostensibly because he was losing money? I do not remember any case since I took office.

315. In a case of that kind, what would be the custom of the Department;—supposing a man only went half through his contract, and then gave it up? They would seize the retention-money, the deposit, and the plant; perhaps measure up the work, and let the contractor have what is fairly due to him, then call for fresh tenders. It would be a very vexatious thing to have to do, because it is so difficult to measure up exactly a partly-finished work.

316. I only ask that question because you said the Government might lose money by it;—of course, it is not in your knowledge where a contractor has lost money by these contracts? No.

317. *Mr. Bavister.*] You have referred to the question of damages being claimed, or compensation where work has been delayed;—have you ever known in any of these cases that it was provided to compensate the workmen wherever they were laid idle through such delays? No.

318. What is the damage in these cases supposed to consist of? Loss of time by the contractor, plant lying idle, and having to pay a portion of his staff and to feed his horses.

319. Such claims sometimes amount to a considerable sum? They have amounted to large sums in some cases.

320. And a large number of men have been employed on such works? Possibly.

321. Whether the number was large or small, you have never known a case in which it entered into the consideration of either party that the workman should receive something for his delay? I do not think so.

322. In a previous portion of your evidence I was questioning you as to the reductions you would have made in your estimate for the Locksley work if you had known absolutely the class of excavation to be made, when you said that you would have reduced it probably to 1s. 6d. or 1s. 8d. per cubic yard, and you went on to say that that would have resulted in a saving of about £9,000? Not a saving so much as a reduction in the estimate.

323. You said there would be that reduction on 250,000 yards;—that was at 1s. 6d. per yard, was it not? One shilling and sixpence, as compared with 2s. 3d.

324. That was putting it at the extreme; you priced it at 2s. 3d.;—the lowest price you had known excavation to be done at at that date was 1s. 6d.? Yes; I suppose that is about the lowest.

325. If a reduction had only been made to the extent of 1s. 8d., that would have resulted in a saving of £7,290? Yes, about that.

326. The excavation work does not account for the total saving in the Locksley deviation;—the list shows that the work was carried out at a cost of £13,100 less than the estimate? Yes.

327. So that, making allowance for the lower estimate submitted for the earth-work, would still leave a difference of some £6,000? Yes; if the estimate had been reduced to £40,000 it does not follow that the lowest tender would have been £40,000. On the contrary, I generally find that there are three or four contractors who put in their prices below my estimate. I do not know of a single case in general railway contracts where the contractor who was the lowest tenderer, or even the next to him, has put in prices above mine. There was one case, I think—that of the Nyngan to Cobar line.

328. *Chairman.*] The estimate for the Dubbo to Narramine work was £19,800? I do not know anything about that.

329. Take the Lapstone deviation—Proudfoot's contract;—the actual cost was £52,925? That seems to have been an increase.

330. *Mr. Bavister.*] That might include a number of extras that were not included in the original estimate? That is very likely; I could not say exactly. The same with Dargan's Creek—the quantities may have been increased, or there may have been additional work.

331. In dealing with extras have you ever known a case in which a contractor, claiming for extras, has put in the same price for extra work as you find in his tender for similar work, but still not included in the schedule under contract prices? Unless it is a mere increase in a cutting, or in the quantity of timber-work in a bridge, or items of that kind, contractors invariably charge higher prices. They generally try to make out that the work is of a different character.

332. In cases when extras are claimed for, what has been your experience as to the quantities they claimed for;—have they generally been well under the quantity of the work done, or on your measuring up have you found that their estimates exceeded the actual work? As a rule, the quantities have exactly agreed. It very rarely happens that a contractor and a supervising engineer are not able to agree as to quantities. Quantities are a matter that it is very easy, as a rule, to settle. Sometimes there have been differences as to the principle of measurements, as in large cuttings, cuttings on curves, and so on. Differences of method of measurement may mean a difference in quantities in those cases.

333. In dealing with costs incurred in litigation I was not quite clear as to whether the Crown Law Officers acted for the Commissioners in cases of dispute? I think eventually they do in cases such as McSharry's, where the Commissioners are only nominal defendants. The Railway Commissioners have their own solicitor to advise them.

334. He is only their consulting officer? Yes.

335. So that the actual cost of litigation would be very difficult to arrive at, seeing that the greater portion of the service is rendered by those already in the pay of the Government, and for which no separate or specific charge is made to your Department? A portion of the cost would be reckoned in that way.

336. *Chairman.*] In such cases is there any charge allowed for the salaries of law officers? Most of the salaries in the Crown Law Offices are paid, I think, out of the Estimates-in-Chief, and are not charged to any particular work; but there are some officers whose salaries are charged to particular works, but I think your question is answered when I say that some of the salaries are down on the Estimates-in-Chief and are paid directly out of the Consolidated Revenue.

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337. If the Government supply any material it is charged to the work, and why should not the salaries of Government officers? In the case of a deviation carried out by the Railway Commissioners a good deal is done by the staff which, if done by a contractor or by another Department, would appear as a cost. That is not a question of legal costs, but other costs, which bear on the matter.
338. Your answer to that question is that in submitting the cost of litigation you have not made any allowance for the Crown Law Officers' salaries? I have not. In the two cases mentioned the costs are so low that I could not say exactly what they consist of. It does not look as if any Crown Law Officers' salaries had been included.
339. *Mr. Bavister.*] You have been referring to cases in dispute that have arisen since the Railway Commissioners took office, does that include cases which have been settled by arbitration instead of going to law? I remember one case in which there was arbitration after the Railway Commissioners took office. That was the case of Walker and Swan, who had the contract for the railway from Michelago to Cooma. Mr. Pilcher was appointed arbitrator. There was also arbitration to settle disputes between the contractor and the Government on the Molong-Forbes line.
340. Do you think that the Government, or any other person employing contractors, get advantages or conveniences from the contractors which they do not have to pay for? They have to pay, of course, for everything they get.
341. Would you contend that the Government pay at a lower rate than they could purchase it themselves? In some cases I think so.
342. Could you give an illustration? I think in cases of a large contract embracing a great number of different works, in erecting large bridges, for instance, it would be better to let the work by contract. Contractors have plenty of men at their disposal, and men who have been used to special work, so that they are in the best position to carry out the work well and economically. The system of carrying out work by contract is so widely extended throughout the world, and is acknowledged by everyone to be of such convenience, that it scarcely requires any advocacy. In the case of some work the system of day-labour can be very well adopted with advantage; but where there are works of a special character, requiring special plant and experience, I think it is much more convenient to let it by contract.
343. Do you not think the Government, or any person in their position desiring to do so, could as readily obtain the services of those persons specially experienced as any of the existing firms of contractors; and do you not think they would as willingly be in the employ of the Government, or of the Railway Commissioners, as in the employment of private firms of contractors? Yes; I should think so.
344. Where works of magnitude and speciality is done by contractors, do they not allow not only interest on the outlay for their plant, but also upon a very large percentage as a sinking fund for its absolute destruction? Yes; they ought to.
345. You have reason to believe that the contractors who make special work their special consideration charge a much higher rate for special appliances than would cover the ordinary life service of such appliances? They are bound to do that; they are bound to get the value out of them or the bulk of it, because if they were to sell at the end of the contract they would not get much for their appliances.
346. According to custom, are not all such appliances open for hire? Yes; they would be obtainable.
347. *Mr. Jones.*] Are you clearly of opinion that the Railway Commissioners get their cases defended by the Crown Law Officers, considering what occurred in reference to Mr. Barton and Mr. O'Connor? I do not think that that would affect the question, because, suppose that the Attorney-General by any chance had a brief on the opposite side, the Crown Solicitor and his staff would not be working for the opposite side, they would be working for the Government.

DAY-LABOUR—RAILWAY DEVIATIONS.

APPENDIX.

[*To Evidence of Hugh McLachlan, Esq., Secretary to the Railway Commissioners.*]

A.

CURVE AND GRADE IMPROVEMENTS CARRIED OUT.

Deviation.	Estimated Cost.	Actual Cost.	Remarks—Contract or Day-labour.	Deviation.	Estimated Cost.	Actual Cost.	Remarks—Contract or Day-labour.
	£	£			£	£	
Blue Mountains	33,250	32,469	Angus & Co.	Doyle's Hill and Toowong..	10,400	11,708	Day-labour.
Wentworth Falls	11,874	11,235	Logan & Love.	Locksley	47,500	34,396	,,
Lapstone	50,840	52,925	D. Proudfoot.	62½ miles South	1,130	733	,,
Dubbo to Narromine	19,832	24,639	Proudfoot&Co.	Springwood and Numantia	3,750	3,811	,,
Mumbil	3,531	2,783	,,	Linden and Woodford	11,250	12,918	,,
Near Singleton	35,608	37,166	,,	Valley and Springwood	3,060	2,038	,,
Blaxland to Karabar	4,913	4,394	J. McSweeney.	Hazelbrook and Lawson	3,500	2,497	,,
Wingello	10,000	11,234	J. Ahearn.	Lawson & Wentworth Falls	1,350	943	,,
Moss Vale	10,100	11,938	,,	58m. 72c. to 59m. 72½c. West	4,360	3,709	,,
Karabar	5,000	4,614	McLeod Bros.	Katoomba (exclusive of alterations to Katoomba Station yard).	14,800	15,960	,,
Goulburn to Cullerin	8,305	6,603	W. Spouncer.				
Marulan and Carrick	899	1,132	J. Ahearn.	Blaxland	300	341	,,
Wellington to Dubbo	36,335	40,195	J. F. Carson.	Camden Line	300	176	,,
Linden	6,800	6,190	Shand & Co.	168m. 77c. West	322	253	,,
Maryvale and Geurie	18,170	20,141	J. F. Carson.	335½ S.-West Line	2,200	2,247	,,
Dargan's Creek	19,260	23,149	,,	Moss Vale	2,500	3,100	,,
73m. 20c. to 73m. 66c. South	1,500	1,602	Day-labour.	Blackheath	2,900	1,900	,,
Quirindi	7,500	7,900	,,	Marulan	2,850	2,511	,,
24m. 30c. to 24m. 55c. South	236	236	,,				
West of Faulconbridge	1,400	1,348	,,				

THOMAS R. FIRTH.

[*To Evidence of James Fraser, Esq., Chief Assistant Engineer for Existing Lines.*]

B.

NEW SOUTH WALES GOVERNMENT RAILWAYS, PERMANENT-WAY DEPARTMENT, 22 JULY, 1897

DEVIATIONS, WELLINGTON TO DUBBO AND LOCKSLEY—COST OF SUPERVISION.

	£ s. d.	£ s. d.
Wellington to Dubbo.		
Salaries and Expenses of Officers	810 2 9	
Wages of Inspectors	388 5 6	
		£1,198 8 3
Locksley.		
Salaries and Expenses of Officers	425 17 6	
Wages of Foremen, Timekeepers, &c.	653 8 7	
Materials, Horse-feed, &c.	61 15 7	
Hire of Vehicles, Paying Men, &c.	18 0 0	
Purchase of Horses—Proportion of Cost	4 14 10	
Telephone to Office	4 8 2	
		£1,168 4 8

JAMES FRASER,
24 July, 1897.

J. E. BOURKE,
Permanent-way Accountant,
24 July, 1897.

C.

[*Appended by the Committee.*]

VICTORIAN RAILWAYS.

ANALYSIS OF COST per Mile of Lines constructed under the "Butty-gang" System to 31st August, 1896.

	Names of Lines	Warrack-nabeal to Beulah.	Donald to Birchip.	Beulah to Hopetoun.	Dimboola to Jeparit.	Natimuk to Goroke.	Boort to Quambatook.	Wycheproof to Sea Lake.	Totals and Averages.	Korumburra to Jumbunna.	Korumburra to Silkstone and Strezlecki.	Totals and Averages.	Jumbunna to Outrim.	Totals for all Lines.
		Easy and moderate country—Mallee lines.								Difficult country.			Very difficult country.	
2	Lengths of Lines	22 miles	32½ miles	16 miles	23 miles	28¼ miles	22 miles	48 miles	191¾ miles	3¾ miles	2¾ miles	6½ miles	2·4 miles	200·65 miles
		£	£	£	£	£	£	£	£	£	£	£	£	£
3	Engineer's estimate	82,500	120,937	41,175	61,950	94,446	60,500	86,400	547,908	18,750	13,750	32,500	20,000 + 5,000	605,408*
	Engineer's estimate per mile	3,750	3,750	2,574	2,694	3,343	2,750	1,800	2,857	5,000	5,000	5,000	8,571 / 2,143 } 10,714	3,017*
	Actual cost of line to 31st August, 1896	51,510	69,818	30,841	35,889	57,721	38,863	66,469	351,111	15,488	10,610	26,098	24,427	401,636*
	Actual cost of line per mile	2,341	2,148	1,928	1,560	2,043	1,766	1,385	1,831	4,130	3,858	4,001	10,178	2,001*

Sydney: William Applegate Gullick, Government Printer.—1897.

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